

# inCider

# A+ Apple II / Macintosh

# ALL IN ONE

## Integrated-Software Showdown

- ClarisWorks
- BeagleWorks
- Microsoft Works
- GreatWorks
- DESK
- HandiWorks

## Do-It-Yourself HARD DRIVES

## TAX PLANNING WITH APPLEWORKS p. 46

AN IDG  
COMMUNICATIONS  
PUBLICATION  
February 1992

FIRST LOOK

System 6.0  
For Your GS

USA \$3.95  
Canada \$4.95

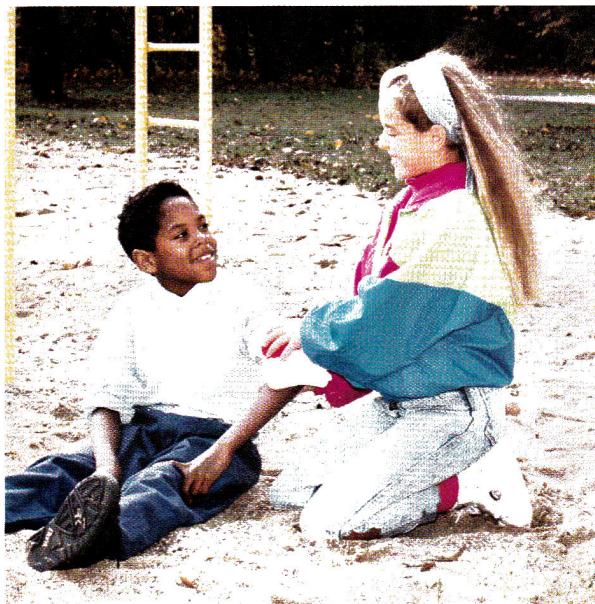
NEW

P. 14

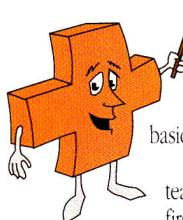
WHAT'S NEW



# New for the Apple II from QUALITY COMPUTERS



## Does your child know how to react in an emergency?

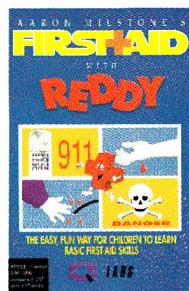


As a parent or teacher you try to equip your child to handle whatever life throws at them. There's so much out there that can hurt them. That's why children, even young children, should know basic first-aid.

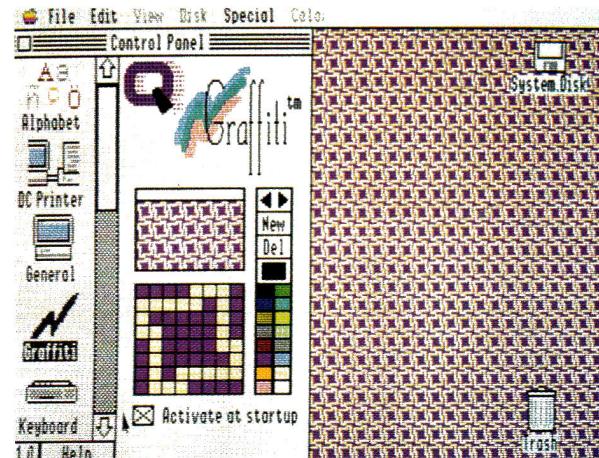
*First-Aid with Reddy* is the only computer program that teaches basic first-aid techniques to children as young as first grade. Your child will be captivated by the colorful animation and cheery sound as Reddy demonstrates proper techniques of treating burns, poison, shock, broken bones, bites, bleeding, and more.

The lessons are simple, and easy enough for a child to practice and use with confidence. Your child will learn how to determine treatment, how to keep a victim calm, how and where to get help, how to dial 9-1-1, as well as treatments for specific injuries.

Give your children the tools to act in an emergency — with confidence. Get *First-Aid with Reddy*.



**First-Aid with Reddy .....** \$29.95



## Make your IIgs anything you want it to be

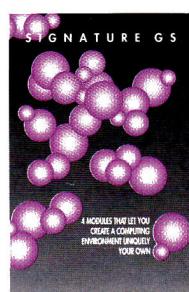
Is your IIgs just plain vanilla? Now you can make it a custom ride — with *Signature GS*, Q Lab's set of C-Devs that will soup up your Apple IIgs. *Signature GS* lets you create a computing environment that is uniquely your own. With *Signature GS* you get:

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**SONICS** — The "S" in IIgs stands for sound. Sonics lets you customize your IIgs sounds, and assign special sounds for specific functions. And these aren't just beeps — they're fun and entertaining. Add sounds to Insert/Eject Disk, Dialog Boxes, etc.

**BOOTMASTER** — Changing the configuration of all your IIgs's drivers, and system elements can be a pain. But BOOTMASTER makes it easy by putting the controls for all your IIgs's drivers, CDAs and NDAs on one master control panel. You turn them on and off at will — and change your selections easily.



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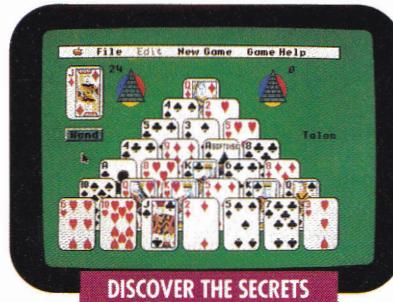
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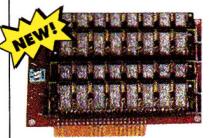


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**40 w/o SCSI card .. \$389.95**

See page 4



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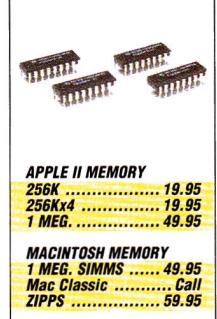
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SuperWriter 924 64.95

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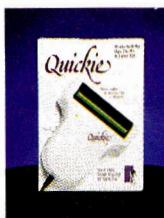
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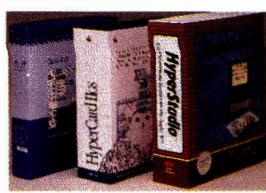
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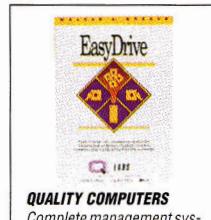
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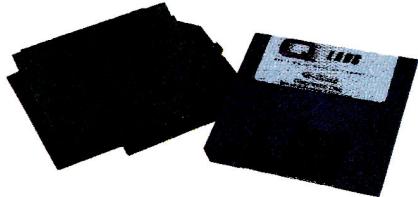
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When we could no longer find reliable, affordable hard drives, we made our own—the Q Drive. The Q Drive made Apples faster and easier to use. In fact, it was such a success that we had to wonder why we'd waited so long. Now we've done it again.

Introducing the Q-RAM GS memory card.

The Q-RAM GS is an economical way to add up to 4 MEG of memory to your Apple IIgs. It's fully compatible with all Apple IIgs hardware and software—including the IIgs RAM Disk and DMA peripherals like the Apple II High Speed SCSI Card. And it's so small that it fits in your shirt pocket.

When you install the Q-RAM GS life becomes just a little easier. Programs load completely into memory at startup, eliminating disk swapping. Out-of-memory error messages disappear. You'll have memory to spare—memory to load desk accessories, or to set up a convenient RAM disk.

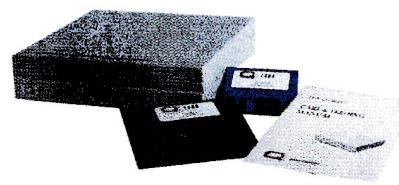
Installation is simple. You can expand a Q-RAM GS by snapping in standard SIMMs—we even include the necessary diagnostic software for your peace of mind. And since the Q-RAM GS uses SIMMs, your memory investment won't go to waste.

Of course, since you're dealing with Quality Computers, you get an unconditional 30-day money-back guarantee and a five-year warranty. And the price is the best news of all—a 2 MEG Q-RAM GS costs about the same or even less than other IIgs memory cards in a 1 MEG configuration!

CAPACITY	PRICE
1 MEG	99.95
2 MEG	149.95
4 MEG	249.95

30-day money-back guarantee • 5-year warranty

## The Q DRIVE



Thousands of drives later, experts still are praising the Q Drive for its performance and value. *inCider/A+* gave it a four-and-a-half-star rating. Our customers are using words like "amazing" and "fantastic" to describe the way the Q Drive has changed their computing.

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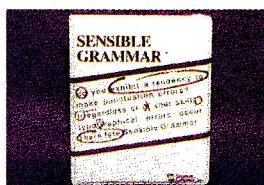
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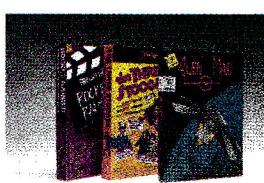


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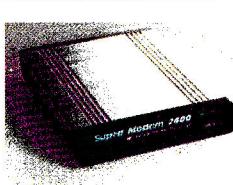
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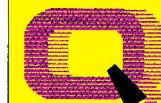
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In the realm of computer software, good integrated programs are the renaissance packages — the jacks of all trades. Six Mac titles providing word processing, spreadsheet calculation, database management, and more in one box are currently available or about to be released. While each offers a different set of compromises, this suddenly crowded market goes further toward meeting the demands of more people than ever before, promising a new level of versatility and convenience.

### 38 **Roll Your Own Hard Drive** by Garry Howard

Your data files are overflowing, your application disks are getting buried — the old shoebox method just doesn't work anymore. What's a storage-hungry computer user to do? Build your own hard-disk drive — for a fraction of the cost of a commercial model. Don't panic — it's not as complicated as you think. Assembling the parts requires some confidence and a little knowledge, but it's not quantum physics, either. *inCider/A+* shows you how, step by step.

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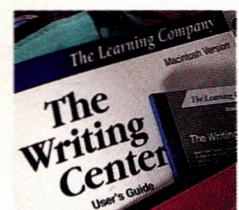
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## APPLEWORKS DYNASTY

**Can one program capture the Mac integrated-software market the way AppleWorks did? Probably not.**

**Y**ears ago, *inCider* used to conduct annual reader polls in which we asked you to list your favorite product. Eventually we stopped asking, because your answer was just too predictable: AppleWorks, AppleWorks, AppleWorks. Since its release in 1984, AppleWorks has simply dominated the Apple II community. It has built an industry for companies that produce add-on products and has helped sell countless RAM-expansion boards, hard drives, accelerators, and other products that let AppleWorks users



By DAN MUSE \* EDITOR IN CHIEF

push this workhorse to its fullest. And it isn't finished by any stretch. The Software Publishers Association stopped tracking Apple II sales a couple years ago, and now monitors only MS-DOS and Mac software figures; still, there's this curious lump of money (we're talking millions) under "Other" in the integrated-software category. You can be sure it's not the Amiga generating those unspecified sales. It's AppleWorks chugging along.

Now suddenly several software companies want to produce the AppleWorks of the Mac world. While Microsoft Works stumbled into the role of standard integrated package for the Mac, it came at a time when Mac users didn't really want integrated software. If Microsoft Works was number one, the \$64,000 question was "what's number two?"

Now as the Mac finally finds its way into schools and homes, Works' weaknesses and Microsoft's years of neglect have surfaced. Mac users — especially teachers and parents who scoff at the idea of paying \$700 or \$800 for one application — are clamoring for an all-in-one solution. Beagle Bros, Claris, Symantec, Microsoft (to some extent), and others want to be there with the next AppleWorks. Is it possible? Can one program

capture a market the way AppleWorks did? Probably not.

First, AppleWorks is more than a productivity package. In many ways, it actually defined a standard user interface for the Apple IIe and IIc. Even if you weren't using AppleWorks, you could still expect to see that familiar index-card interface whether you were using a telecommunications program such as Gary Little's classic Point-to-Point or a full-fledged accounting system such as Manzanita's BusinessWorks. AppleWorks helped give the Apple II a consistent personality.

Obviously, the Mac already boasts a well-established user interface, so there's no need for one integrated program to implement a uniform look for Mac software.

Second, the void these integrated packages seek to fill is much less clear. The concept of frame-based software is difficult to explain, let alone sell. Beagle Bros and Claris have the two products that stand the best chance of wowing users. In short, they're integrated in a truer sense of the word. Your document can be part word processor, part spreadsheet, part graphics program. When you select a graphics element in your document, menu items change to reflect that application; move the cursor to the spreadsheet tool, and the menus offer spreadsheet-related options.

It's interesting that companies that have shown the most innovation in this area have strong AppleWorks ties. Beagle Bros knows AppleWorks better than anyone, and wrote version 3.0 for Claris. Claris has done a solid job of supporting and promoting AppleWorks. It would have made more sense for Beagle Bros and Claris to stick together and do a joint integrated product, but that's not what America is all about. And the competition will in the end benefit the user. Just about every company that's offering a Mac integrated product is also offering an upgrade from a competitor's product for just \$99.

We expect the integrated-software wars to rage on in the Mac industry. The competition is just too strong for one product to dominate. As for AppleWorks, it'll join the Boston Celtics and the Montréal Canadiens as a dynasty that won't be matched. □

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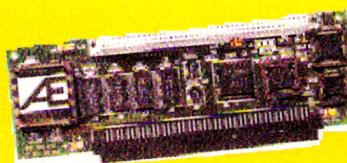
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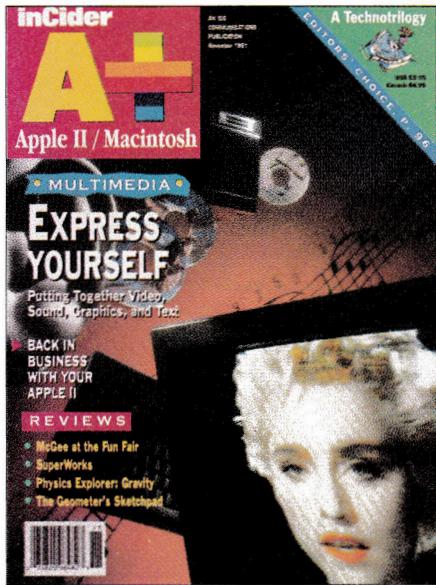
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# LETTERS



## COVER GIRL

HAVING SOMEONE IN THE entertainment industry who is blatantly immoral and a bad role model for kids is bad enough, but having to see Madonna's face on the cover of what is supposed to be a professional magazine [November 1991] is an insult! If your purpose was to attract attention, you succeeded — but what kind of attention do you want?

**Annette Arnold**  
**P.O. Box 158**  
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— eds

## HYPER-VAPOR-MOVER?

IN YOUR SEPTEMBER 1991 ISSUE you mentioned a utility called Hyper-Mover, which converts Mac HyperCard stacks to Apple IIgs stacks and is supposedly available to user groups. (See "Shareware Solutions: HyperCard IIgs," p. 18.)

As a loyal Apple user group (the largest in our area), we wrote to Apple Computer for information on obtaining this utility. As yet, we haven't heard a peep from the company. Can you direct us to a more reliable or appropriate source, so that we can share more stacks with our Apple II members?

**Joan Z. Hoffman, Secretary**  
**AppleShare User Group**  
**P.O. Box 200**  
**Greens Farms, CT 06436**

*Try registering with the Apple Programmers and Developers Association (APDA), 20525 Mariani Avenue, MS-33G, Cupertino, CA 95014-6299, (800) 282-2732. This group sells tons of software-development tools, including HyperMover.*

— eds.

## MISSING ORACLE

IN YOUR NOVEMBER 1991 LETTERS column, you responded to Preston Boomer on the subject of shareware sources ("Can't Find It," p. 10). I'd like to point out one you missed: Delphi (located at 1030 Massachusetts Avenue, 4th Floor, Cambridge, MA 02138, 617-491-3393).

Not only is Apple II shareware available on line, with more and more titles added to the library each day, but Delphi is also now a recognized Apple user group, so we may legally offer Apple-copyrighted software, such as MIDI Synth, Find File, and GSOS 5.0.4.

On top of that, Delphi offers the best on-line deal I've seen: \$1 an hour if you join the 20/20 Advantage plan.

And new users can sign up free on line: Set your communications software to 8 bits, no parity, 1 stop bit, and call 1-800-695-4002. When the other modem answers, hit Return three times. At the *Username* prompt, type JOINDELPHI. At the *Password* prompt, type DELPHIFREE.

**Erik Kloeppel**  
**Assistant Sysop, Apple II SIG, Delphi**  
**Box 6451**  
**Key West, FL 33041**

## QUESTIONS, QUESTIONS

YOU'VE SHRUNK! WHAT'S THE deal? Why has *inCider/A+* decreased in size? And why do you talk constantly about the Mac LC? Why not the IIxi? It's a faster, more efficient computer and has the same capabilities as the LC. I've also noticed a change in your Reviews section — specifically, you removed Game Room. Why? The Mac is a great play toy as well as a super work machine!

**Michael Mucciarone**  
**P.O. Box 837**  
**Trenton, FL 32693**

*Most of the information we present is equally applicable to all Macs, from the Plus to the IIfx. We highlight the Mac LC instead of the IIxi, however, because we feel that although the LC is slower, it's far more affordable for our audience, and our surveys tell us that most of our readers either already have an LC or are likely to buy one.*

*Also, a Mac LC equipped with a IIe emulation card is more in keeping with our emphasis on how the two computer lines can work together. As for games, we'll continue to cover entertainment software, but we've incorporated those evaluations into our Reviews section.*

— eds.

*inCIDER/A+ WELCOMES READERS' COMMENTS. WE RESERVE THE RIGHT TO EDIT FOR CLARITY, STYLE, AND LENGTH. ADDRESS YOUR CORRESPONDENCE TO LETTERS, *inCIDER/A+*, 80 ELM STREET, PETERBOROUGH, NH 03458.*

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**CORRECTIONS**

Our listing of **Alliance for Technology Access** centers is incomplete as it appears in our October 1991 issue ("Breaking Down Barriers," p. 40). To the **California** listing, add the **Special Technology Center**, 590 Castro Street, Mountain View, CA 94041, (415) 961-6789; the **Computer Access Center**, 2425 16th Street, Room 23, Santa Monica, CA 90405, (213) 450-8827; and the **Special Awareness Computer Center**, Rehabilitation Center, 2975 North Sycamore Drive, Simi Valley, CA 93065, (805) 582-1881. In **Colorado**, you may contact the **Access-Ability Resource Center**, 1056 East 19th Avenue, B-410, Denver, CO 80218-1088, (303) 861-6250; in **Florida**, **Computer CITE**, 215 East New Hampshire Street, Orlando, FL 32804, (407) 898-2483; in **Georgia**, **Tech-Able**, 1040 Irwin Bridge Road, Conyers, GA 30207, (404) 922-6768; in **Hawaii**, the **Aloha Special Technology Access Center**, 1750 Kalakaua Avenue #1008, P.O. Box 27741, Honolulu, HI 96827-0741, (808) 955-4464. In **Maine**, contact the **Maine Parent Federation**, P.O. Box 2067, Augusta, ME 04338-2067, (207) 582-2504; in **Maryland**, **Learning Independence Through Computers**, 28 East Ostend Street, Suite 140, Baltimore, MD 21230, (301) 659-5462. In **New Jersey**, add the **Center for Enabling Technology**, 9 Whippny Road, P.O. Box 272, Whippny, NJ 07981, (201) 428-1455. In **Ohio**, the Dayton facility listed is now called the **Technology Resource Center: Enabling People with Disabilities**.

In addition, a spokesperson for the **Information Technology Resource Center** of Chicago, Illinois, offers this clarification regarding the role of the **Technology Resource Consortium**: The TRC is a nonprofit organization that seeks to advise other nonprofit groups (not individuals) in the areas of purchasing, training, and computer literacy (not in the area of assistive devices).

In our recent "Year in Review" feature (December 1991, p. 42), we inadvertently omitted **Wings for Learning's** address; the company is located at 1600 Green Hills Road, P.O. Box 66002, Scotts Valley, CA 95067-0002, (408) 438-5502. Also, **Fantasy-Works Software's** address is inaccurate as it appears; the correct address is P.O. Box 57, Bedford, TX 76095-0057, (817) 685-8003, (800) 727-4103. The program **Flicks 'n' Chips**, from Robert A. Brent, is priced at \$48 plus \$3.50 shipping; a free preview copy is available for \$3.50 shipping only. The company's address is 33 Midway #204, San Francisco, CA 94133, (415) 397-5759.

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Expands ROM 01 & ROM 3 Iigs ...w/2 MEG	\$149
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256K RAM SET (8pc) Lifetime Wty .....	\$18
256K RAM 3 Set Special (24pc) .....	\$49
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Above w/512K .....	\$119
w/1 Meg	\$159

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A.W. 1.0-2.1 req. 64K, 80 columns, shift key mod.	
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<b>Plusworks III</b> w/complete docs .....	\$39
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128K RAM BD. Legend/Titan Compatible...	\$64
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SSB to Imagewriter I cable 10'.....	\$11
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<b>AE Transwarp</b> 3.6MHz accelerator. II+/e ...	\$99
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<b>Disk Drive H/H DSY Chainable IIc+/IIGs .....</b>	\$139
<b>Disk Controller BD 5.25"</b> II+/IIe/IIGs .....	\$34
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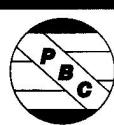
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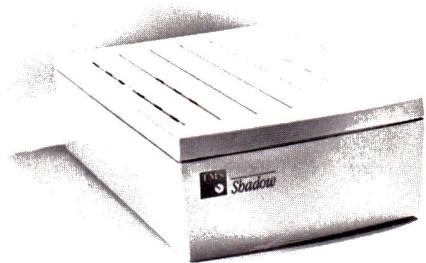
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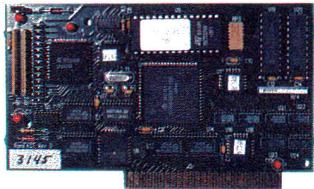
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The memory board that is upgradable to 4 Mbs and fully DMA compatible up to 8 Mbs utilizing its piggyback connector is now *the most affordable IIGS memory board available today!* It's made by a company known for its support of the Apple II market. It's made by C.V. Technologies.

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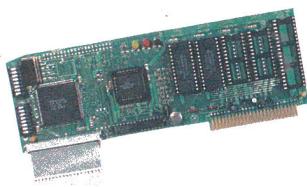
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Printer driver software for excellent GS/OS text & graphics.

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Macintosh Version **\$26.95**  
Katie's Farm or McGee, IIGS **\$23.95**  
Macintosh Version **\$26.95**  
Where in (the) World, USA, Europe or Time is Carmen Sandiego? **\$28.95**  
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256K chips (set of 8) **\$18**  
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# WHAT'S NEW

## LOST IN CYBERSPACE

**C**yberspace is no place to be: It's simulated reality. It's the setting for cyberpunk novels, the dangerous electronic space inhabited by cyberjocks — computer cowboys who ride the digital networks. Cyberjocks flex their joystick muscles in mammoth games so realistic that you start asking questions: "What is real, anyway? Am I? Is my girlfriend?"

**Spectre** (\$44.95), from Velocity Development and Peninsula

Gameworks, is one of those cyberpunk games. It's fun to play alone, on a Mac, driving a Spectre — which looks a lot like a tank — around the playing field, shooting at bad guys and collecting flags and points.

Spectre looks sharp. By keeping the shapes and motions of the vehicles simple, the programmers have conjured up a complex illusion: reality.

We played Spectre alone, getting that important arcade-game "feel": when to fire guns or grenades, whom to destroy first, how to attack while backing into a corner, and when to bail out into "hyperspace."

We experimented with the design of Spectres: how many shields, how much ammo, and so on. We discovered the pros and cons of the overhead view, the driver's-seat view, and the axiometric view. Spectre is great fun, but it's not unfair or unkind to describe it as "Arkanoid in 3D."

The computer is an easy opponent. The real fun begins when you challenge another cyberjock. Spectre is a network game. If you've got two or three Macs on an AppleTalk or EtherTalk network, the Spectre mission suddenly becomes difficult. When a human gets behind the wheel of the other Spectre, you don't know what to expect next. When three or more of you gather in cyberspace, the potential alliances become baffling.

Contact Velocity Development at P.O. Box 875, Palatine, IL 60078-0875, (708) 991-0594, or Peninsula Gameworks at (415) 848-9168.

## BEEFING UP YOUR II GS

**S**ystem Software 6.0 for the Apple IIgs should be shipping by the time you read this. Was it worth the wait? Is it good because it's the last system-software update for the GS, or is it going to be the last because it's so good? Here are some highlights of the long-awaited upgrade:

- System 6.0 brings the IIgs and the Mac even closer together: You can now simply insert a Mac disk with its hierarchical file system into a GS drive. You can't run the same programs, but it's easier to share data.
- A tiny word processor called **Teach** is included with the prerelease version of System 6.0; it's a text-file reader that also imports MacWrite files from HFS disks, in addition to AppleWorks and AppleWorks GS word-processing files. This simple program proves that it's possible for a GS to understand and create Mac data files. Apple could write Apple File Exchange for the GS.
- Dan Hitchens' **Media Controller** desk accessory looks like a complex remote control. It promises to replace Apple's CD Remote desk accessory as well as a number of third-party controllers for devices such as videodisc players, VCRs, and compact-disc players with a single standard interface. Apple includes drivers for the Apple CD SC CD-ROM drive and the Pioneer 2000 and 2400 videodisc players; third parties may write more. We hope this standard is accepted — writing a similar media controller for the Mac would be a big first step.
- The Finder can now find files on large storage devices. **FindFile** will locate a file on your hard disk or CD-ROM if you have some idea of its name.

- The Control Panel is replaced by a group of **control panels**. (But the classic control-open-apple-escape Control Panel works as before.) You can have more than one control panel open at a time. You can handle a number of new and old network jobs

from control panels: The *Namer* is now a control panel; *NetPrinter* has replaced the names of individual printers; and *FolderPriv* lets you set AppleShare folder privileges from a IIgs.

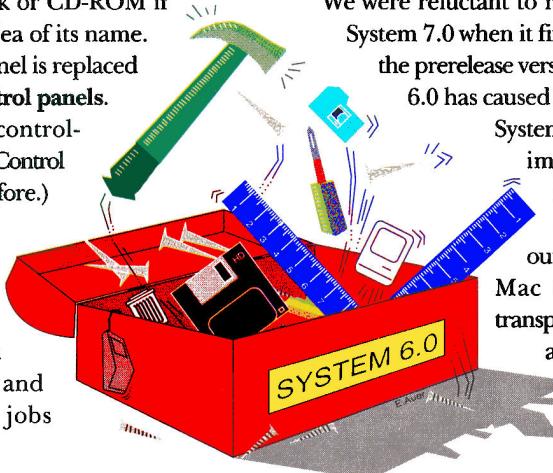
• **CloseView**, utilities to improve computer use for people with disabilities — first demonstrated in 1988 — lets you use arrow keys to move the cursor, and "sticky" keys let you press key combinations, such as Open apple-S, in sequence instead of simultaneously. **Video Keyboard** lets you use the mouse, or any other ADB pointing device, instead of the keyboard.

• The **Finder**, by Andy Nicholas, is a gem. The key difference, aside from accelerated window scrolling, file opening, and maintenance, is improved navigation. It's easier to move around the GS desktop. You can "tunnel" into nested folders; holding down the option key while you double-click on a folder opens it and also closes the original folder, to keep the desktop uncluttered.

Apple added a lot to the Finder, and to all of System 6.0, for software developers: new kinds of menus, more system sounds, improved QuickDraw graphics routines, and icon and cursor resources.

It wouldn't be fair to compare the speed of a prerelease version of System 6.0 to System 5.0.4, but it did load noticeably faster. System 6.0 also works seamlessly with accelerator boards. We connected a GS to an AppleTalk network without slowing down its Zip GSX, a feat that was impossible with earlier system software.

We were reluctant to recommend Mac System 7.0 when it first came out, but the prerelease version of GS System 6.0 has caused less trouble than System 7.0. System 6.0 improves GS performance immediately; it made our mixed GS-and-Mac network more transparent. If you own a GS, get System 6.0 as soon as possible.



*"Apple II"* indicates an 8-bit product compatible with IIes, IIcs, IIc Pluses, and IIcses unless noted otherwise.

## NEW SOFTWARE

### MAKING HISTORY

**C**omputer Vistas Unlimited has introduced a new multimedia extravaganza for the Macintosh — photographs, high-resolution graphics, sound, and text on compact disc or floppy disk.

**Multi-Educator American History** contains more than 400 photographs, 150 computer graphics, 100 maps, 50 historic documents, original sound recordings, and the text of a number of presidential addresses.

Students can look at any aspect of history they choose — economy, foreign policy, immigration, even standard chronology. Multi-Educator American History is written to be understood by middle-school students, but it also includes a deeper level of information that's designed to appeal more to high-school students.

An important feature often overlooked in multimedia presentations is a bibliography, but Multi-Educator American History includes an extensive survey of books and articles to which students can turn for more information about American history.

Multi-Educator American History sells for \$49.95, with no sound, and requires at least 5 megabytes on a hard-disk drive. Multi-Educator Sound, which sells for \$89.95, requires 40 megabytes. For grey-scale monitors, 70 megabytes is required, and the software costs \$129.95. The CD-ROM product, which contains standard and grey-scale versions, is priced at

\$79.95. An MS-DOS Windows version is \$89.95.

For more information, contact Computer Vistas Unlimited, 13 South Division Street, New Rochelle, NY 10805, (914) 654-9717, or circle number 355 on the Reader Service card.

### POWER PRINTING

**S**uperPrint has long been a popular printing program for the Apple II; now Scholastic Software has released SuperPrint for the Macintosh, a natural match between the Mac's graphics power and Scholastic's educational know-how.

SuperPrint lets you create posters, banners, calendars, and cards. Whatever you choose to print, you'll enjoy the program's built-in comprehensive painting tools, including the Fun tool, which stamps a number of entertaining shapes anywhere on your document. SuperPrint's word-processing abilities also let you edit text wherever you choose. SuperPrint includes a large gallery of clip art, and also lets you save any graphics image or a portion of one as clip art, to expand your collection.

The quality of your printed newsletters, bulletin boards, books, banners, and greeting cards will be as good as it comes. SuperPrint uses Macintosh TrueType technology to generate great-looking fonts on screen and on paper. SuperPrint works with all popular classroom printers, and even prints in color.

SuperPrint for the Macintosh is available in a teacher's edition with four disks, a user's manual, a reference guide, and a teach-

ing guide for \$129.95. The network version is \$649.75. Site licenses are also available.

For more information on SuperPrint, contact Scholastic Software's Inquiry Department, P.O. Box 7502, 2931 East McCarty Street, Jefferson City, MO 65102, (800) 541-5513, or circle number 350 on the Reader Service card.

### FAIR EXCHANGE

**I**f you relied on the **Teachers' Idea and Information Exchange** for timely Apple-Works tips and templates when the only computer you had was an Apple II, you'll be glad to learn that the same resources are now available to users of the Macintosh integrated package Microsoft Works.

TI&IE is offering Works users a quarterly subscription — disks in September, November, February, and April — for \$34.95. A sample disk costs only \$4.95. Teachers are encouraged to submit files and templates; if your work is published, you'll receive free products.

TI&IE also sells a number of resources for Works. Among the disks available are a database of notable women in science, the arts, and history, as well as spreadsheet and database files for weather forecasting, census taking, and environmental studies, among others.

Each set costs \$24.95, but subscribers receive a discount.

For more information, contact the Teachers' Idea and Information Exchange, P.O. Box 6229, Lincoln, NE 68506, (402) 483-6987, or circle number 351 on the Reader Service card.

### THAT'S LIFE

**F**ields of Learning: Life Science integrates your Macintosh with videodiscs, recorded sound and music, animation, still photographs, graphics, and text. It links all that information into a non-linear, interactive lesson that's bound to appeal to today's visual learners.

You can use Fields of Learning in a class that has only a single computer or 20 — it's designed to be as effective for a classroom presentation as it is for individual instruction. Both computer-based and text-based instruction encourage students to apply what they've learned outside the classroom.

Not only does the program teach students about specific content, it also helps them to learn to use HyperCard, database managers, word processors, and spreadsheets. A comprehensive guide for teachers smooths the integration of Fields of Learning into your classroom, with complete lesson plans keyed to the most popular life-science textbooks.

Fields of Learning requires a Macintosh with 2 megabytes of random-access memory and a hard-disk drive. You don't need a videodisc player.

The introductory price is \$695 for an unlimited site license for a single school. You may also purchase it already installed on a 40-megabyte hard-disk drive for \$1145.

Other Fields of Learning modules scheduled for this school year include **Earth Science, Physical Science, U.S. History, World History**, and **African-American History**.

For prices and additional information, contact K-12

## NEW-PRODUCT FOCUS

MicroMedia, 6 Arrow Road, Ramsey, NJ 07446, (201) 825-8888, or circle number 352 on the Reader Service card.

## ◆ LOGO TOOLBOX

**U**sers of LogoWriter — an Apple II word processor that incorporates a programming language, graphics, and just a bit of database management — already know they can do a lot with one program. But with the addition of **Hypermedia Tools**, they can now link LogoWriter pages to create documents that can include text, graphics, animation, and music.

Using the new tools, you can jump from page to page by pointing at a word with the cursor. You can import graphics from other programs or from scanners and video-capture boards; you can also import text from most word processors. You can even create your own multimedia presentations by using Hypermedia Tools to control a videodisc player.

You can use Hypermedia Tools only with LogoWriter. The package includes two sample documents: Turtles, which requires a videodisc player, and Stars and Planets, which doesn't.

Hypermedia Tools costs \$39.95 (\$47.50 Canadian), and is available from Logo Computer Systems, 3300 Côte Vertu Road, Suite 201, Montréal, Québec, Canada H4R 2B7, (514) 331-7090.

For more information, circle number 353 on the Reader Service card.

## ■ SIGN HERE

If you own an Apple IIgs, but envy some of the toys your Macintosh-owning friends have — such as screen savers, hand-drawn desktops, personalized error beeps, and custom control panels — you can put your mind at ease: Quality Computers' **Signature GS** promises to make your computer smile again.

Signature GS includes four special Control Panel devices — all you have to do is simply add them to your GS' System folder and off you go. Here's a rundown:

- Phantasm prevents your Apple IIgs from suffering the heartbreak of screen burn-in by displaying a colorful graphics image of your choice whenever your GS has been idle too long.
- Graffiti lets you draw or copy any GS graphic right on your desktop — letting you add a little color and spice to your system.
- The S in GS stands for sound, they say, and Sonic proves it by letting you add entertaining — or embarrassing — sounds to your computer's repertoire. Why listen to the same boring "beep" again and again?
- Bootmaster lets you configure your GS' Control Panel just the way you like it: Put all your drivers and desk accessories into one easy-to-use menu.

The price for Signature GS is an affordable \$29.95, from Quality Computers, 20200 East Nine Mile Road, St. Clair Shores, MI 48080, (800) 443-6997.

For more information, circle number 354 on the Reader Service card.

## AROUND THE WORLD

our first thought is: Every school with a Mac should have **MacGlobe**, from PC Globe and Broderbund.

That's the first impression this atlas-on-a-disk gives you. The maps, flags, and charts are beautifully drawn and colored and look bright and clear on the Mac display. The program even knows the German national anthem — and plays it.

MacGlobe contains data on everything "from life expectancy to beer production," according to the package. It knows the average rainfall in Perth in August and the long-distance telephone codes for Beijing. Then, of course, the second thoughts begin: Every school with a color Mac should have it. Make that every school with a Mac II: MacGlobe is pokey on the LC.

MacGlobe's speed is more a problem for reviewers — browsing through the world looking for something to complain about — than for a student writing a report on the relationship between the number of physicians and the literacy rate in the Third World. If you know what you're looking for, it won't take long, even on an LC, to find it. If you're used to looking up data in reference books, MacGlobe's "hypertext" information-retrieval plan will take some getting used to.

Another second thought: If the graphics images look great on screen, how good are they anywhere else? Can you print the map of Botswana or save it to disk? You can save, print, and copy MacGlobe data, maps, charts, and flags — just make sure you leave the copyright notice that's generated. That's generous; most other publishers emphatically say no to your pasting their maps into your social-studies term papers.

The raw data, you might imagine, is locked into a chart so that you can't use it in your own spreadsheet or database: a second thought and a half. But not so: You can copy the statistics as tab-delimited text and paste them into most other programs.

Contemplating copyright, you may wonder where MacGlobe gets its information. Are these figures for the consumption of coal in Newcastle accurate? Are they "legal"? MacGlobe's data was collected by PC Globe, a company that's been creating products like it since 1985. They know what they're doing.

Okay, no more second thoughts. But it must cost a fortune, right? No, just \$59.95. It belongs in your school. MacGlobe is distributed by Broderbund Software, P.O. Box 6121, Novato, CA 94748, (415) 382-4400.

FIRST • LOOK

Year	Population	Debtors Given in Current Dollars		
		National Debt	Per Capita Debt	
1985	230,813,000	\$1,352,860,000,000	\$5,844	
1986	231,000,000	1,372,860,000,000	5,871	
1987	234,539,000	1,375,860,000,000	5,857	
1988	236,000,000	1,378,860,000,000	5,852	
1989	237,720,000	1,387,860,000,000	5,868	
1990	239,650,000	1,395,860,000,000	5,872	
1991	241,680,000	1,403,860,000,000	5,879	
1992	243,810,000	1,411,860,000,000	5,882	
1993	246,030,000	1,419,860,000,000	5,885	
1994	248,340,000	1,427,860,000,000	5,887	
1995	250,640,000	1,435,860,000,000	5,889	
1996	253,030,000	1,443,860,000,000	5,891	
1997	255,510,000	1,451,860,000,000	5,893	
1998	258,080,000	1,459,860,000,000	5,895	
1999	260,640,000	1,467,860,000,000	5,897	
2000	263,280,000	1,475,860,000,000	5,899	
2001	265,900,000	1,483,860,000,000	5,901	
2002	268,590,000	1,491,860,000,000	5,903	
2003	271,350,000	1,499,860,000,000	5,905	
2004	274,180,000	1,507,860,000,000	5,907	
2005	277,080,000	1,515,860,000,000	5,909	
2006	280,050,000	1,523,860,000,000	5,911	
2007	283,090,000	1,531,860,000,000	5,913	
2008	286,190,000	1,539,860,000,000	5,915	
2009	289,340,000	1,547,860,000,000	5,917	
2010	292,540,000	1,555,860,000,000	5,919	
2011	295,780,000	1,563,860,000,000	5,921	
2012	299,050,000	1,571,860,000,000	5,923	
2013	302,340,000	1,579,860,000,000	5,925	
2014	305,650,000	1,587,860,000,000	5,927	
2015	309,000,000	1,595,860,000,000	5,929	
2016	312,370,000	1,603,860,000,000	5,931	
2017	315,750,000	1,611,860,000,000	5,933	
2018	319,140,000	1,619,860,000,000	5,935	
2019	322,540,000	1,627,860,000,000	5,937	
2020	325,950,000	1,635,860,000,000	5,939	
2021	329,370,000	1,643,860,000,000	5,941	
2022	332,800,000	1,651,860,000,000	5,943	
2023	336,240,000	1,659,860,000,000	5,945	
2024	340,700,000	1,667,860,000,000	5,947	
2025	345,170,000	1,675,860,000,000	5,949	
2026	349,650,000	1,683,860,000,000	5,951	
2027	354,130,000	1,691,860,000,000	5,953	
2028	358,620,000	1,699,860,000,000	5,955	
2029	363,110,000	1,707,860,000,000	5,957	
2030	367,600,000	1,715,860,000,000	5,959	
2031	372,100,000	1,723,860,000,000	5,961	
2032	376,600,000	1,731,860,000,000	5,963	
2033	381,110,000	1,739,860,000,000	5,965	
2034	385,620,000	1,747,860,000,000	5,967	
2035	390,130,000	1,755,860,000,000	5,969	
2036	394,640,000	1,763,860,000,000	5,971	
2037	399,150,000	1,771,860,000,000	5,973	
2038	403,660,000	1,779,860,000,000	5,975	
2039	408,170,000	1,787,860,000,000	5,977	
2040	412,680,000	1,795,860,000,000	5,979	
2041	417,190,000	1,803,860,000,000	5,981	
2042	421,700,000	1,811,860,000,000	5,983	
2043	426,210,000	1,819,860,000,000	5,985	
2044	430,720,000	1,827,860,000,000	5,987	
2045	435,230,000	1,835,860,000,000	5,989	
2046	439,740,000	1,843,860,000,000	5,991	
2047	444,250,000	1,851,860,000,000	5,993	
2048	448,760,000	1,859,860,000,000	5,995	
2049	453,270,000	1,867,860,000,000	5,997	
2050	457,780,000	1,875,860,000,000	5,999	
2051	462,290,000	1,883,860,000,000	6,001	
2052	466,800,000	1,891,860,000,000	6,003	
2053	471,310,000	1,899,860,000,000	6,005	
2054	475,820,000	1,907,860,000,000	6,007	
2055	480,330,000	1,915,860,000,000	6,009	
2056	484,840,000	1,923,860,000,000	6,011	
2057	489,350,000	1,931,860,000,000	6,013	
2058	493,860,000	1,939,860,000,000	6,015	
2059	498,370,000	1,947,860,000,000	6,017	
2060	502,880,000	1,955,860,000,000	6,019	
2061	507,390,000	1,963,860,000,000	6,021	
2062	511,900,000	1,971,860,000,000	6,023	
2063	516,410,000	1,979,860,000,000	6,025	
2064	520,920,000	1,987,860,000,000	6,027	
2065	525,430,000	1,995,860,000,000	6,029	
2066	529,940,000	2,003,860,000,000	6,031	
2067	534,450,000	2,011,860,000,000	6,033	
2068	538,960,000	2,019,860,000,000	6,035	
2069	543,470,000	2,027,860,000,000	6,037	
2070	547,980,000	2,035,860,000,000	6,039	
2071	552,490,000	2,043,860,000,000	6,041	
2072	556,990,000	2,051,860,000,000	6,043	
2073	561,500,000	2,059,860,000,000	6,045	
2074	566,010,000	2,067,860,000,000	6,047	
2075	570,520,000	2,075,860,000,000	6,049	
2076	575,030,000	2,083,860,000,000	6,051	
2077	579,540,000	2,091,860,000,000	6,053	
2078	584,050,000	2,099,860,000,000	6,055	
2079	588,560,000	2,107,860,000,000	6,057	
2080	593,070,000	2,115,860,000,000	6,059	
2081	597,580,000	2,123,860,000,000	6,061	
2082	602,090,000	2,131,860,000,000	6,063	
2083	606,600,000	2,139,860,000,000	6,065	
2084	611,110,000	2,147,860,000,000	6,067	
2085	615,620,000	2,155,860,000,000	6,069	
2086	620,130,000	2,163,860,000,000	6,071	
2087	624,640,000	2,171,860,000,000	6,073	
2088	629,150,000	2,179,860,000,000	6,075	
2089	633,660,000	2,187,860,000,000	6,077	
2090	638,170,000	2,195,860,000,000	6,079	
2091	642,680,000	2,203,860,000,000	6,081	
2092	647,190,000	2,211,860,000,000	6,083	
2093	651,700,000	2,219,860,000,000	6,085	
2094	656,210,000	2,227,860,000,000	6,087	
2095	660,720,000	2,235,860,000,000	6,089	
2096	665,230,000	2,243,860,000,000	6,091	
2097	669,740,000	2,251,860,000,000	6,093	
2098	674,250,000	2,259,860,000,000	6,095	
2099	678,760,000	2,267,860,000,000	6,097	
2000	683,270,000	2,275,860,000,000	6,099	
2001	687,780,000	2,283,860,000,000	6,101	
2002	692,290,000	2,291,860,000,000	6,103	
2003	696,800,000	2,299,860,000,000	6,105	
2004	701,310,000	2,307,860,000,000	6,107	
2005	705,820,000	2,315,860,000,000	6,109	
2006	710,330,000	2,323,860,000,000	6,111	
2007	714,840,000	2,331,860,000,000	6,113	
2008	719,350,000	2,339,860,000,000	6,115	
2009	723,860,000	2,347,860,000,000	6,117	
2010	728,370,000	2,355,860,000,000	6,119	
2011	732,880,000	2,363,860,000,000	6,121	
2012	737,390,000	2,371,860,000,000	6,123	
2013	741,900,000	2,379,860,000,000	6,125	
2014	746,410,000	2,387,860,000,000	6,127	
2015	750,920,000	2,395,860,000,000	6,129	
2016	755,430,000	2,403,860,000,000	6,131	
2017	759,940,000	2,411,860,000,000	6,133	
2018	764,450,000	2,419,860,000,000	6,135	
2019	768,960,000	2,427,860,000,000	6,137	
2020	773,470,000	2,435,860,000,000	6,139	
2021	777,980,000	2,443,860,000,000	6,141	
2022	782,490,000	2,451,860,000,000	6,143	
2023	786,990,000	2,459,860,000,000	6,145	
2024	791,500,000	2,467,860,000,000	6,147	
2025	796,010,000	2,475,860,000,000	6,149	
2026	800,520,000	2,483,860,000,000	6,151	
2027	805,030,000	2,491,860,000,000	6,153	
2028	809,540,000	2,499,860,000,000	6,155	
2029	814,050,000	2,507,860,000,000	6,157	
2030	818,560,000	2,515,860,000,000	6,159	
2031	823,070,000	2,523,860,000,000	6,161	
2032	827,580,000	2,531,860,000,000	6,163	
2033	832,090,000	2,539,860,000,000	6,165	
2034	836,600,000	2,547,860,000,000	6,167	
2035	841,110,000	2,555,860,000,000	6,169	
2036	845,620,000	2,563,860,000,000	6,171	
2037	849,130,000	2,571,860,000,000	6,173	
2038	853,640,000	2,579,860,000,000	6,175	
2039	858,150,000	2,587,860,000,000	6,177	
2040	862,660,000	2,595,860,000,000	6,179	
2041	867,170,000	2,603,860,000,000	6,181	
2042	871,680,000	2,611,860,000,000	6,183	
2043	876,190,000	2,619,860,000,000	6,185	
2044	880,700,000	2,627,860,000,000	6,187	
2045	885,210,000	2,635,860,000,000	6,189	
2046	889,720,000	2,643,860,000,000	6,191	
2047	894,230,000	2,651,860,000,000	6,193	
2048	898,740,000	2,659,860,000,000	6,195	
2049	903,250,000	2,667,860,000,000	6,197	
2050	907,760,000	2,675,860,000,000	6,199	
2051	912,270,000	2,683,860,000,000	6,201	
2052	916,780,000	2,691,860,000,000	6,203	
2053	921,290,000	2,699,860,000,000	6,205	
2054	925,800,000	2,707,860,000,000	6,207	
2055	930,310,000	2,715,860,000,000	6,209	
2056	934,820,000	2,723,860,000,000	6,211	
2057	939,330,000	2,731,860,000,000	6,213	
2058	943,840,000	2,739,860,000,000	6,215	
2059	948,350,000	2,747,860,000,000	6,217	
2060	952,860,000	2,755,860,000,000	6,219	
2061	957,370,000	2,763,860,000,000	6,221	
2062	961,880,000	2,771,860,000,000	6,223	
2063	966,390,000	2,779,860,000,000	6,225	
2064	970,900,000	2,787,860,000,000	6,227	
2065	975,410,000	2,795,860,000,000	6,229	
2066	979,920,000	2,803,860,000,000	6,231	
2067	984,430,000	2,811,860,000,000	6,233	
2068	988,940,000	2,819,860,000,000	6,235	
2069	993,450,000	2,827,860,000,000	6,237	
2070	997,960,000	2,835,860,000,000	6,239	

# Parallel Pro™

The Most Powerful Apple Printer Interface You Can Buy

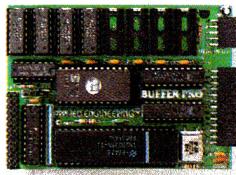
When you're trying to find the right parallel interface for your printer, look to Applied Engineering to bring you the best in quality and features.



- Compatible with Apple IIe, IIgs, and II+ (works in any slot except 3). • Fully compatible with ProDOS, Dos 3.3, Pascal, and CP/M. • Works automatically with virtually all software.
- Supports almost all parallel printers including: Epson, IBM, Okidata, C. Itoh, NEC, Star Micronics, Toshiba, and more.
- Conforms fully to the Centronic Standard • Built-in control panel allows easy access to set-up information • Automatic formatting of basic listings.
- Built-in self test and Buffer Pro™ support • Extensive graphics print capability for the hi-res, double hi-res, and the IIgs super hi-res screens. • Buffer option available (see below).
- Includes 6-ft. cable for connecting to your printer.

## Buffer Pro™

Buffer Pro adds memory to Parallel Pro, freeing your Apple from running the printer. With Buffer Pro, you can continue to use your Apple while the printer is printing. To add Buffer Pro to Parallel Pro, simply unplug the cable on Parallel Pro and plug Buffer Pro where the cable was, then plug the cable onto Buffer Pro. That's it!



- Compatible with IIe, IIgs, and II+. • Fits in a IIgs with or without fan. • Adds 32 to 256 pages of printer buffering.
- User expandable using 64K or 256K RAM chips one chip at a time and in any combination. Each 256K chip adds 32 pages (maximum of 8 chips). • Connects directly to Parallel Pro. • Works automatically with virtually all software • May be paused or cleared with simple commands (unlike other buffers, you don't have to "shoot the computer" if you want to stop the print-out before it's done).

Both Parallel Pro and Buffer Pro come with a comprehensive manual, a 1 year warranty—parts & labor, and outstanding technical support if needed.

Parallel Pro.....	\$99.00
Buffer Pro Option: with 32-page buffer .....	\$115.00
with 128-page buffer .....	\$129.00
with 256-page buffer .....	\$149.00

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## WHAT'S NEW

SHAREWARE SOLUTIONS \* BY JOE KOHN



# A FORCE OF NATURE

What does a beautiful Apple II graphic have in common with a false-color image of a distant galaxy, an electron-microscope image of a human cell, the ice craters found by the Voyager spacecraft on Triton, a leaf, a coastline, or a mountain range?

If you've read James Gleick's book *Chaos: The Making of a New Science*, the Computer Recreations column in *Scientific American*, or David Thornburg's Learning Curve column here in *inCider/A+*, you may have wondered about the similarities among these different phenomena, and dreamed of uncovering the complex and intriguing relationships among all things in nature.

Welcome to the science of chaos, a new way of looking at the universe and the seemingly random processes of nature. Born, in part, out of the frustration of trying to use the traditional shapes of Euclidian geometry to describe natural phenomena, chaos theory is an attempt to explain the mysteries of the unexplainable. Chaos theory tries to show that there is indeed a complex relationship among all things in our universe.

Computers have played a large role in this new science. Fractal geometry, for example, originated by theoretical mathematician Benoit Mandelbrot, is a branch of chaos that attempts to reproduce physical and natural phenomena by using simple mathematical models and computer algorithms.

Several Apple II programmers have created freeware and shareware that provide an introduction to chaos theory and fractal geometry. Even if you're not fascinated by the science of chaos, you're sure to be spellbound by the beauty of fractal images unfolding before your eyes. You don't have to understand the math to appreciate these computer-generated images; suffice it to say that fractals are generated by repeating a simple mathematical calculation on a field of real and imaginary numbers, and representing it visually through the computer. A fractal is an infinitely repeating fraction of itself, duplicating the same irregular structures on every scale.

If you own a IIe or IIc, you're bound to be intrigued by a pair of \$5 shareware programs that produce hi-res fractal images. **Fractal Generator**, by a programmer known only as Crazy Diamond, and **Manset**, by Jim Scarborough, both re-create fractal images that most people agree are works of abstract art. One fascinating aspect of fractals is that they're infinitely repeatable, and these fractal programs let you generate new, complex fractals from each previous generation. You can magnify any particular portion of a fractal and repeat the procedure. The more generations developed through magnification, the more complex the images become.

If you own a GS, you'll probably want to start your investigation into chaos and fractals with a pair of freeware HyperStudio stacks by Doug Beeferman. His **Mandelbrot Mini-Stack** presents a good plain-language overview of fractal geometry and shows a

series of succeeding generations of fractal images. If you're into the mathematics of it, there's a special section just for you. Beeferman's **Siepinsiki Gasket** stack is based on the November 1990 Learning Curve column, "The Beauty of Chaos" (p. 86); it employs an inventive combination of text, graphics, and animation as it offers an in-depth explanation of the math behind the fractal image. To use these stacks, you need HyperStudio or the HyperStudio run-time module (available from your local user-group library or favorite on-line network).

As chaos theorists are quick to point out, nature works in strange and wonderful ways to produce highly irregular shapes on a regular-yet-random basis. Although fractals seem quite esoteric to many, chaos theorists believe there's a direct relationship between how a computer generates a fractal and how nature generates a mountaintop. The computer is the ideal instrument to simulate that randomness of nature. Several fractal-generation programs produce natural-looking images. For example, **Mountain Maker**, a \$5 shareware gem from Ryan Olson, creates stunning 2D or 3D fractals resembling mountains and lakes. It can generate an image in minutes, so you can watch a natural landscape form before your eyes.

**Fractal Mountain Generator** is a freeware program written by Ron Lewin, developer of Micol BASIC. Lewin has added ray tracing, which lets the program create an imaginary sun and realistic shadow effects. As Lewin points out, a typical fractal is created by as many as a million mathematical calculations, so the detail of these images is astonishing.

Three freeware programs produce more-abstract fractals: **Fractal-GS**, by Steve Disbrow, **Yet Another Fractal Program** (YAPF) by Thomas Farrell, and **Set View**, by Jeff G. Erickson. These programs simulate natural processes as they create colorful images. Like the fractals they generate, the programs share many similarities, yet they generate images in different ways.

**Set View** creates fractals quickly, but it uses a nonstandard interface and doesn't let you save images to disk. It does allow for color-palette cycling during the creation process, and that can lead to some stunning special effects. **Fractal-GS** uses the standard GS interface, has pull-down menus, provides color cycling, and can save to disk a completed graphic or an image in progress. The fractals are intricate and can take up to 12 hours to complete. **YAPF**, using the standard GS interface, provides a way to create many more types of fractal images, in smaller sizes, than the other programs. It lets you print your fractals and can even display multiple fractals in resizable windows; you can also overlay one fractal on another for some unpredictable special effects. All three programs let you create new images by zooming in on a portion of a fractal and magnifying it.

Fractal geometry appeals to people for a variety of reasons. They provide a way to generate beautiful abstract computerized images; they also attract people who love math. After creating, viewing, studying, pondering, and manipulating fractal images, you may just see the world from a different perspective. □

IF YOU'D LIKE TO SUBMIT YOUR PUBLIC-DOMAIN OR SHAREWARE PROGRAMS FOR REVIEW, SEND DISKS TO CONTRIBUTING EDITOR JOE KOHN, 166 ALPINE STREET, SAN RAFAEL, CA 94901.



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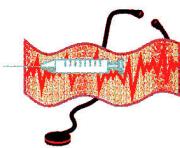
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## APPLE CLINIC

# EXTRA, EXTRA

**Copying extra System folders to your hard disk can eat up space — so get rid of those freeloaders.**

BY CECIL FRETWELL

### DUMP THE SYSTEM

MY HARD DISK IS SLOWLY FILLING up, so I'm looking for items I can delete safely to gain some room. I'm using GS System Disk 5.0.2. Like many computer users, I copy software packages I purchase to my hard drive. Most of them are bootable, so I end up copying an extra *System* folder into the folder I already have on my hard drive. As long as I boot from my hard drive, can I delete these extra *System* folders?

**Jack E. Tilley  
Lancaster, OH**

*In general, yes, you can delete the System folder that comes from a disk intended for booting. You can also get rid of other folders, such as Icons and so on. For a list of the minimum files and folders you need for a bootable disk, see "Boot It Up" in the September 1991 Apple Clinic, p. 22. Compare it to your System folder to find out what you can delete.*

*There are exceptions, however. For instance, ByteWorks' ORCA/C compiler requires its own System folder because it contains vital files such as SYCMD (a table of legal commands for the ORCA shell), LOGIN (a prestart routine for the shell), and so on. Your best bet is try to find a local expert to help you out. Or call the technical-support people at each of the companies that produced your packages.*

*One last comment: Update your GS to the latest System Disk — currently 5.0.4, soon to be 6.0. (See "Beefing Up Your IIgs," What's New, p. 14 in this issue.) Every new release not only adds enhancements, but also contains bug fixes.*

### TWO FOR ONE

I OFTEN USE APPLEWORKS AND MY GS to print multiple forms on an ImageWriter II; I mail-merge database items into the word processor. In most cases, the document is no longer than half a page. Can I set the paper length to 5.5 inches so that I can print two forms on one page and save paper?

**Don Bertucci  
Upland, CA**

*The solution to your problem is simple once you learn the trick. From AppleWorks' main menu, select Other Activities. From that menu, for AppleWorks 3.0, choose Select Standard Settings for AppleWorks. The AppleWorks 2.x series doesn't include this menu; it proceeds to the next menu.*

*Choose Specify Information About Your Printer(s) to bring up the Printer Information folder. There, select the printer you want from the Change Printer Specifications section of the menu. This brings up the Change a Printer folder. I'll wager your Accepts Top-of-Page command option is set at Yes. Select it and change it to No. After you finish printing your multiple forms, you can change it back to Yes, but you don't have to. Another alternative is to create an "extra" printer identical to your regular printer, except for the top-of-page command.*

*Let's see what's happening from a technical point of view. With the option set to Yes, AppleWorks assumes the indicated printer electronics will accept what's called a form-feed character. At all times, the printer keeps track of where its printhead is with respect to the paper. When it "sees" the form-feed character, it indexes the paper forward (or backward if you're*

*playing some exotic tricks with your printer) to produce a full page, whatever that might be.*

*With the option set to No, you're telling AppleWorks your printer doesn't support the form-feed character or that you want it to ignore this capability. AppleWorks then takes responsibility for keeping track of the printhead position; when you tell it to go to a new page, the software indexes up (or down) the proper number of lines to reach the top of the next page, instead of just sending a form-feed character to your printer.*

*Now just go back into Printer Options (Open apple-O) for your document, set the Paper Length to 5.5 inches, and you're ready to roll.*

### RESOLUTION CONFUSION

I'M CONFUSED BY THE PHRASES *low resolution, high resolution, super high resolution*, and so on. What do these Apple II graphics terms mean?

**Charles Sarchet  
United States Navy**

*The original Apple IIs and II Pluses came with two graphics modes, both of which have remained in all later incarnations of the II.*

*Low resolution provides a graphics screen 40 pixels wide by 48 pixels high, or a mixed mode of 40 blocks wide by 40 blocks high with the bottom containing straight text accessible via a simple PRINT statement.*

*High-resolution graphics screens are 280 pixels wide by 192 pixels high. You can define a mixed mode here also, wherein the bottom 32 lines of pixels are replaced by four lines of text, so that the dimensions of the graphics screen becomes 280 by 160.*

*When the Apple IIe came along, double-high-resolution graphics screens were introduced: 560 pixels wide by 192 high, sporting 16 colors. Unfortunately, Applesoft BASIC programmers are unable to access this mode without resorting to machine-language routines.*

*The Apple IIgs offers two super-hi-res graphics modes. Both offer 200 scan lines, but they differ in horizontal resolution; one mode has 320 pixels (the color of each specified by four bits), while the*

other has 640. In changing from 320 mode to 640 mode, the horizontal resolution is doubled at the expense of dividing the color resolution by four.

## SPEED DEMON

**W**ITH ALL DUE RESPECT, THE TWO programs presented in the October 1991 Apple Clinic ("Changing Speed," p. 20) represent a rather severe case of overkill for the stated purpose. If you need to alter your GS' speed to run a particular program, it should be a temporary change. BUILD.SPEED and CHANGE.SPEED result in a permanent change in the Control Panel setting —

```

100 GOSUB 190
110 PRINT "Enter desired speed"
120 INPUT "SLOW = 0
    FAST = 1 [0/1]: ":"$%
130 PRINT
140 IF $% < 0 OR $% > 1 THEN 110
150 IF $% = 0 AND X% > 127
    THEN POKE 49206,X% - 128
160 IF $% = 1 AND X% < 128
    THEN POKE 49206,X% + 128
170 GOSUB 190
180 END
190 X% = PEEK (49206)
200 IF X% > 127
    THEN PRINT "FAST SPEED"
210 IF X% < 128
    THEN PRINT "SLOW SPEED"
220 PRINT

```

**Program listing.** Changing GS system speed temporarily in BASIC.

that is, one that will still be in effect after the next boot.

If you're running Applesoft BASIC as stated, there's a much better scheme that doesn't alter the speed permanently. It involves hardware register \$C036 (a.k.a. 49206 or -16330). See the accompanying **Program listing** for a demonstration.

Set, bit 7 of \$C036 indicates high speed; cleared, it indicates slow speed. Note carefully how lines 150 and 160 alter the system speed. The hardware register contains other critical bits you must not change; if you do, you can expect weird things to happen.

Again, remember that the changes are in

effect only during the life of the program. You must read the current contents of \$C036, modify only bit 7, then store the result back into the register. When the program ends, system speed returns to its original state.

**J. Morris Prosser**  
Pebble Beach, CA

*Spending too much time in college sometimes alters one's state of mind. It's the old "can't see the*

*forest for the trees" syndrome. I stand corrected. Thanks also to James X. Paterno of Belle Mead, New Jersey, for the same observation.*

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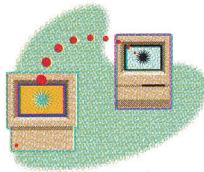
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## BRIDGING THE GAP

# PORTABLE CLASSROOM

A new notebook machine, remote access, and an updated Classic put more Mac power into teachers' hands.

By GREGG KEIZER

YOU CAN BUILD BRIDGES. YOU'VE proved it by integrating older Apple IIs with newer Macs. In school, at home, and in the office, you've successfully meshed three operating systems, three distinct lines of personal computers, and three different printer technologies, and still kept things working. It hasn't always been easy, but you've done it.

Bridging the Gap débuted a year ago, and in that time it's covered everything from sharing hard-disk drives to wiring up your home office. But 12 columns ago, it talked about how educators in particular planned to bridge the gap between what they had and what they wanted to have — Apple IIs on one side and Macs on the other.

So how far have we come, and what more is in store? In one development, Apple recently rolled out a slew of new computers. Sorry, folks — no new Apple IIgs, but a

bunch of Macs instead. Still, three of these introductions — two computers and one software package — can build new bridges and extend the old ones in schools. Each has its place in the educational-technology scheme; each can contribute to the classroom.

But even here and now, schools are using today's hardware and software to solve their problems and help teach their students: schools like Arapahoe, a K-8 school in the wilds of Wyoming that spent the last year (and more than \$100,000) bridging the gap. You may be surprised at the results, and at what the future holds.

### APPLE DOES PORTABLES

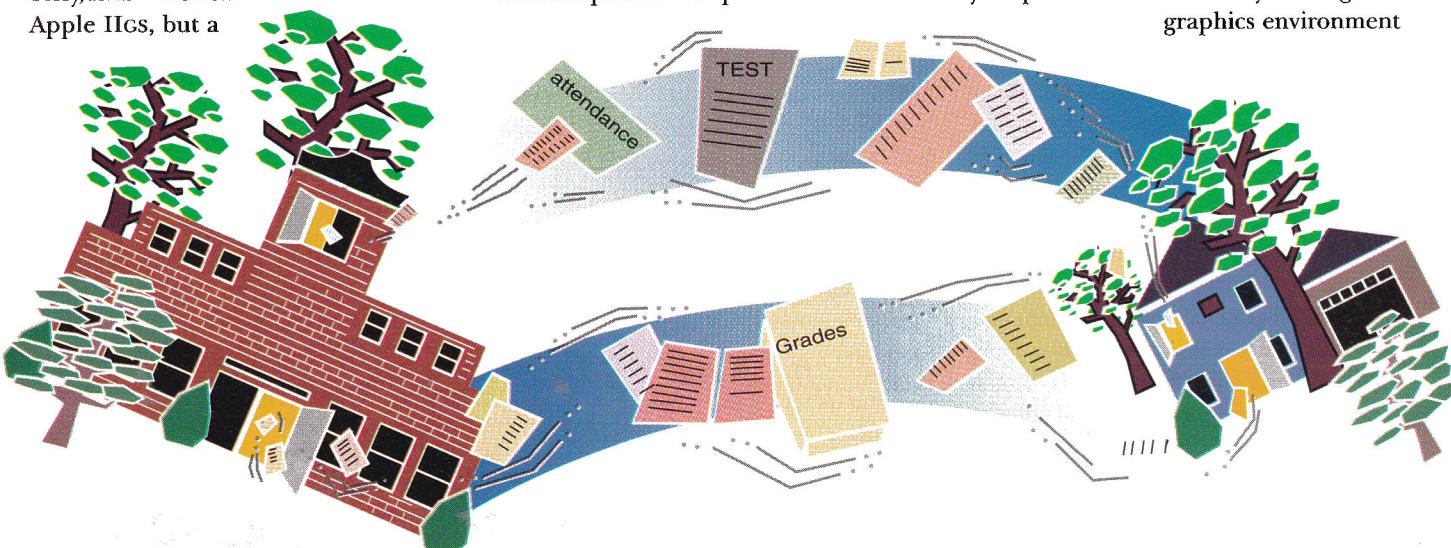
First, though, let's get one thing straight. I was wrong — sort of. Last month, I spoke a bit too soon, dismissing Apple's notebook line and recommending less expensive DOS machines for those who need portability. I stand by my words. You can't beat the price of compact PC machines if

you want to take your work with you. And moving files from PC to Macintosh, or even PC to Apple II, isn't an obstacle.

But Apple's new **PowerBook 100**, the bottom-line notebook computer made by Sony, is worth a look-see by teachers. That's because many educators will be able to buy the PowerBook 100 for less than three-fourths of its list price of \$2299. Apple has arrangements with many district and state educational offices, and offers computers at a discount to both schools and the teachers who staff them. (The rest of us have to hustle for a bargain ourselves.)

The PowerBook 100 is a compact 5-pound portable that's small enough to carry in a briefcase, unlike Apple's Mac Portable. It comes standard with 2 megabytes of RAM, a 20-megabyte hard-disk drive, a built-in track-ball-style mouse controller, and the ports you'll need to connect it to an AppleTalk network. What it doesn't have is a floppy-disk drive and a top-of-the-line display.

Though the PowerBook 100 uses the venerable 68000 microprocessor, the same chip as the Mac Classic, this portable completes most tasks as quickly as the LC. Its unique keyboard layout — in which keys occupy the top half, while the bottom half contains the trackball and a place to rest your palms — works well as you navigate a graphics environment



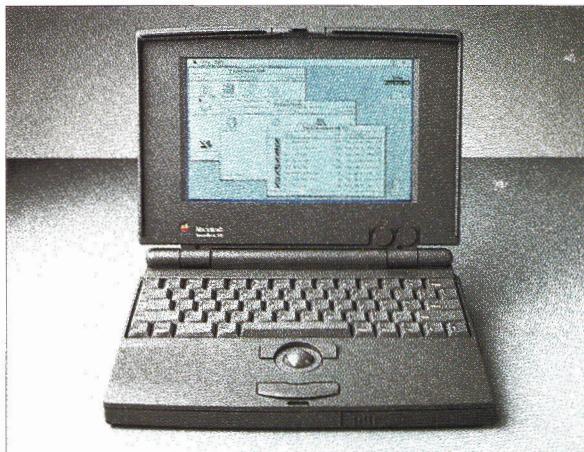
and handles all but the longest typing jobs.

I see the PowerBook 100 as the perfect computer for teachers. Its portability means that you can tote it easily between home and school. That alone makes it attractive to educators, who often do much of their paperwork and grading off hours. But the PowerBook 100 is more than just an easy-to-move Macintosh. Here's how Sara, a hypothetical high-school English teacher, might use it to improve her work flow and that of her students.

Once at school, Sara plops the PowerBook 100 on her desk, plugs it into the outlet, reaches for the **LocalTalk** cable, and jacks the cable into the port at the back of the computer. Since she added another 2 megabytes of RAM to the PowerBook, she can run System 7.0; she's set up several shared folders as locations for Apple IIgs applications and her students' work. She prints assignments and the lecture notes she wrote the night before to the classroom's AppleTalk ImageWriter II (already shared by a pair of GSes), then makes copies on the school's Xerox machine before classes begin.

Sara's PowerBook 100 is the only Mac in the classroom's miniature network. The other two machines, both GSes, use her notebook as a hard-disk depository for files and select applications. In one shared folder on her PowerBook 100, for instance, Sara has a copy of AppleWorks GS, which her students launch from a GS over AppleTalk. It's a bit slow, but it simplifies classroom computing.

More importantly, students can drop their work into another shared folder, titled *In*, on Sara's PowerBook 100. At the end of the day, she disconnects the notebook from the network, drops the computer into her briefcase, and heads home. There she runs ClarisWorks or MacWrite II (she has both on her crowded hard-disk drive), opens her students' AppleWorks GS word-processing files directly, makes her changes and appends comments, then saves the files in AppleWorks format to the third shared folder, marked *Out*. Next morning, when she again links the PowerBook to



**PowerBook 100: the ideal traveling companion.**  
**Photo by Will Mosgrove, courtesy of Apple Computer.**

the GSes, her students can quickly retrieve their work over the network.

Because she uses the same computer at home and in the classroom, Sara doesn't have to worry about where she keeps her lesson plans, attendance and grading spreadsheets, and student database — they're all in the PowerBook. For less than \$1700, a school puts a computer on a teacher's desk and in her home; at the same time, it bridges the Apple II-to-Mac gap in a classroom, introduces System 7.0's folder and file sharing, and, to some extent, adds a hard-disk drive to that classroom's Apple IIgs computers.

Smart school districts, those that are truly committed to technology, know that teachers are the first in the computer "food chain": if teachers aren't comfortable with computers, it's unlikely that they'll push their students to use the machines in the classroom. One of the best things that a school or district can do to foster technology in the classroom is to split the cost of a PowerBook 100 with any teacher who wants one. The school gets another Mac during school hours; the teacher gets a capable computer at home during evenings, weekends, and holidays; the students get a more productive, responsive instructor. Everybody wins.

#### SON OF CLASSIC

The second new Mac educators should pay attention to is the **Classic II**. It may look just like a Classic, but it's nearly twice as fast, thanks to the 16-megahertz 68030 brain inside the box. Other improvements crop up inside and outside the Classic II's case, the same plastic shell that houses its slower sibling, but they're almost incidental: an audio-in port and included microphone for sound input à la the LC, and memory

expandability up to 10 megabytes rather than the Classic's measly 4 megabytes.

It's the Classic II's speed that makes it attractive at school. No, not to equip kids' (or even teachers') desks. The less expensive two-floppy Classic is the best black-and-white buy; if you need color and want Apple II compatibility, you need the LC. (The Classic II does include 32-bit Color QuickDraw in ROM, but you can't connect it to an external monitor without a pricey third-party add-on; nor can the Classic II run Apple II software.)

Think AppleShare instead. The Classic II makes an affordable — and powerful — AppleShare file server, especially configured with an 80-megabyte hard disk and 4 megabytes of RAM (\$2399 list). Install the AppleShare file-server software on a Classic II, connect it to an AppleTalk network, and you have a central depository

#### UPDATE ON AFE

*In "You Asked For It" (Bridging the Gap, November 1991, p. 68), I said that "moving text from the Mac to the GS isn't easy." Astute readers commenting in inCider/A+'s America Online area took exception.*

*One reader chastised me for omitting a discussion of using Apple File Exchange to transform Mac files into ProDOS.*

*Point well taken. AFE can take a Macintosh format file, put it on a ProDOS disk, and turn it into something an Apple II can recognize; I do it all the time. My point, however, was that it's not as easy moving data from the Mac to the Apple II as it is from the Apple II to the Mac. As long as the crucial operations of disk reading and invisible file translation reside on the Macintosh, that will be true.*

*Another reader told me about A2FX, a shareware program that does let you stick a Macintosh disk into an Apple II's 3.5-inch drive and transfer files to a ProDOS volume. Bridging the Gap will take a look at A2FX in the near future.*

*Something like A2FX may be moot for some GS owners, though, assuming that Apple releases System 6.0 and that the new operating system reads Mac disks directly from a connected SuperDrive.*

— G.K.

# BRIDGING THE GAP

for Mac and Apple II software, anything from MacWrite to AppleWorks Network. Apple IIe and IIGS computers can connect to the Classic, draw on its hard-disk drive for program and file storage, and even launch directly from the server, saving money that otherwise would have been spent on floppy-disk drives.

Because it's twice as fast as the Classic, a Classic II can handle a larger network load without bogging down. Although it's only several hundred dollars more, it's a much better choice as a server than the Classic, and nearly as good as the more expensive Macintosh LC. Small- to medium-sized AppleShare networks — up to a dozen machines or so — will be well served with the Classic II as their server.

## ON REMOTE

If you've ever tried to work from home, but discovered that the work was tucked away on the computer in your classroom, you'll relish this third bridge — **AppleTalk Remote Access**. Simply put, AppleTalk Remote Access lets you work from any modem-equipped Mac as if it were connected to an AppleTalk network. Instead of LocalTalk cabling stretching between hearth and home room, phone lines carry the data.

AppleTalk Remote Access may seem more like a business tool — something that PowerBook owners would use to connect with the office network from a hotel room (every PowerBook, incidentally, does come with a copy of AppleTalk Remote Access) — but this \$199 package has some practical schoolhouse applications.

Imagine working at home, catching up on worksheets, handouts, notes, or other classroom material. Your school has a laser printer connected to the office AppleTalk network, but teachers are usually three deep around the machine first thing in the morning. Why not print from home the night before?

Using AppleTalk Remote Access, all you do is dial up the office Macintosh (it has to have a modem, too) from home. Within moments, your Mac's desktop looks just as if your computer were physically connected to the network. Pull down the Chooser, select the laser printer, and print from home. Amazing.

Several levels of security are built into AppleTalk Remote Access so that the network remains out of bounds to the uninvited. You can even set up AppleTalk Remote Access so that once the remote computer takes a call, it hangs up the phone, then automatically calls your Macintosh back.

AppleTalk Remote Access has some amazing applications for educators, and even for students. Look for an in-depth and idea-packed evaluation of it in an upcoming Bridging the Gap.

## WESTWARD HO!

In the center of Wyoming, near picturesque Wind River Canyon, Arapahoe School has recently added dozens of new computers that help it bridge the gap between old and new. Alleta Baltes, a teacher and computer coordinator at the 350-student Arapahoe School, oversaw the purchase and installation of more than 50 new computers during 1991. Most were Mac LCs, though there were a smattering of powerful Mac IIs, a few Classics, half a dozen Apple IIGSes, and ten IBM PCs.

"We looked at both [Mac and IBM]," says Baltes, "and we seriously considered both. But the LC came with everything — a network card [built-in AppleTalk], sound input, a microphone. We didn't have to buy another piece of equipment. And the LC also has Apple IIe support."

In fact, Arapahoe installed an **Apple IIe Card** in each LC it purchased, "even those used by the administration. We did it for consistency's sake," notes Baltes.

Though Arapahoe already had more than 20 Apple IIs in its K-8 classes, it didn't have much Apple II software. But once the LCs were added, it made sense to up the Apple II ante. Arapahoe turned to **MECC** for a school-wide site license. "It gives us a tremendous amount of Apple II software," Baltes reports.

Contrary to the practice in many other schools — which are breaking up computer collections and parceling them out to individual classrooms — Baltes assembled a mega computer lab with the bulk of the LCs. Linked via an AppleTalk network (using Farallon's **PhoneNet** connectors), the lab's machines are used for multimedia, writing, computer-aided instruction, and more. "Eventually we'll put them [the LCs] in the classroom," predicts Baltes. "But for now, the lab is the only way to go. Without a lab, the software simply disappears."

The Apple IIs in the building aren't connected to this network, though — a failing that Baltes isn't sure will ever be corrected. U.S. West Communications studied Arapahoe's technology needs and recommended a school-wide network, but that's difficult when "it's two hours to the nearest Apple dealer." Instead, teachers and students use "sneakernet": They walk disks from Apple IIs to Macs. AppleWorks files, for instance, make the transition to the Mac via **Apple File Exchange (AFE)** and **Works-to-Works Transporter**, an AFE file that transforms AppleWorks documents into Microsoft Works-format files.

When asked to talk about the future of technology at her school, Baltes mentions Mac and IBM PC, but doesn't breathe a word about Apple IIs. That's not as strange as it seems. Arapahoe may bridge the gap between Apple II and Mac today — thanks to the LC's IIe Card, AFE, and sneakernet — but that bridge may not be up for long. Not when the Mac has swept aside new Apple II purchases. If there are any new bridges to be built at Arapahoe, they're certain to be between Mac and PC, not Mac and Apple II. "I think we're going to have both Mac and IBM," she says, then adds, half apologetically, "I'd love to get a Tandy grant for some more PCs." □

## PRODUCT INFORMATION

**AppleTalk Remote Access.** \$199  
**Apple IIe Card.** \$199  
**LocalTalk Connector Kit.** \$75  
**Mac Classic II.** \$2399  
**PowerBook 100.** \$2299  
Apple Computer Inc.  
20525 Mariani Ave.  
Cupertino, CA 95014  
(408) 996-1010

### MECC

6160 Summit Drive North  
Minneapolis, MN 55430  
(800) 685-6322

### PhoneNet

Farallon Computing  
2000 Powell St.  
Emeryville, CA 94608

(510) 596-9100  
\$59.95/connector box

### Works-to-Works Transporter

Microsoft Corp.  
1 Microsoft Way  
Redmond, WA 98052-6399  
(503) 245-0905  
freeware  
available on line

WRITE TO CONTRIBUTING EDITOR GREGG KEIZER  
AT 4420 HILYARD STREET, EUGENE, OR 97405.  
ENCLOSE AN SASE IF YOU'D LIKE A PERSONAL REPLY.

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# REVIEWS



## THE WRITING CENTER

To the smart software shopper, reading that a package is designed specifically for "students, families, and social groups" can serve either to raise hopes or to arouse suspicion. Such descriptions usually imply that a program merits attention because it's easy to use. If you own an MS-DOS machine, your interest might be piqued at the thought of a manual that's shorter than the last book you read or installation that doesn't require a shopful of tools and a degree in advanced molecular field theory.

But if you have an Apple, particularly a Macintosh, you might arch your eyebrows in suspicion at a box that trumpets "easy to use." The Macintosh was built

on the concept of "ease of use." Many students, including very young ones, have mastered "regular" Mac word processors without even working up a sweat. So what



**The Learning Company**  
**6493 Kaiser Drive**  
**Fremont, CA 94555**  
**(800) 852-2255**

- word processor with desktop-publishing features
- 1-megabyte Mac Plus or higher
- System 6.0 or later
- supports color
- \$89.95 consumer; \$129.95 school

could an "easy to use" word processor hope to offer except fewer features? Jump back, Jack, and take another look at The Writing Center.

### EASY TO SEE

Ironically, The Writing Center's star attraction isn't its text processing, but its handling of graphics. Its method of importing pictures is the most convenient of any word processor available: You simply select images from a *Choose a Picture* dialog box. This has two advantages over the more typical method of importing graphics via the clipboard.

- First, you don't have to return to a graphics application to copy each new picture to the clipboard.
- Second, you can use the dialog box's preview screen to browse quickly through all available pictures. When you find what you want, simply select *Place in Document* and the picture appears at the location of the cursor.

But The Writing Center doesn't stop there. Any existing text wraps automatically around the picture. You can resize, crop, flip, or rotate the images or drag them to a new location (although you still need a separate

graphics program to create or edit pictures). This attention to graphics makes eminent sense in a "student" word processor. Students are more likely to have an interest in including pictures in their work than a typical adult business user. Indeed, during informal testing with a group of 10-year-olds, The Writing Center's graphics features invariably received the most favorable comments.

To help you get started, The Writing Center includes a selection of more than 200 clip-art images. Each was created with no more than 16 colors, so that they look great even when printed with the limited color capability of the ImageWriter II. To maximize output quality, The Writing Center provides separate optimized settings for color printing on an

ImageWriter II and for printing in shades of gray on a laser printer.

## **EASY TO READ**

Despite its focus on student users (its targeted age range begins at 7 years old), The Writing Center isn't a word-processing lightweight. It contains all the expected features of a traditional Macintosh word processor (font styles and sizes, tabs, paragraph alignments, spelling checker, and so on). To this collection of options, the program adds a small but useful selection of desktop-publishing features, such as column layout and border placement around any paragraph or picture. They're just the ticket for creating simple but professional-looking newsletters quickly and easily, as well as more unusual output, such as monthly calendars.

The Writing Center's header and footer functions are something of a mixed bag. On the positive side, images you place in the header will overlay text, rather than wrap around it, permitting special graphics-and-text combinations appropriate for newsletter titles or letterheads. For this reason, the header appears only on the first page and always spans the width of the document. There's a separate option to place a number at the bottom of each page, but it's always in 12-point Geneva and can't be modified in any way.

## **NOT SO EASY TO SEE**

The Writing Center often employs a hide-and-seek approach to its command layout that complicates access. For example, there's no *Font* menu to change typefaces—you must bring up a dialog box instead. This slows you down considerably if you switch fonts frequently or want to experiment with a variety of typefaces. Similarly, there's no menu command to turn the ruler on or off. Instead you have to search out the *Preferences* dialog box and check the appropriate option. There may be some value to keeping these features tucked away where younger users aren't as likely to select them inadvertently. But more often, it causes more problems than it solves.

For those times when you need on-line assistance, help is readily available. There's a detailed *Help* menu, and context-sensitive help buttons are accessible from most dialog boxes. The manual is clearly written and cleanly designed. The last section

discusses the sample templates (award certificates and so on) and makes suggestions for other creative uses. The package also includes a separate guide covering report-writing skills. Still, we'd like to see one more manual: a brief one written specifically for elementary-school students.

Other features notably absent include a column-break command, a page-count command, and an interactive spell-checking capability. Also, you can import only PICT graphics and ASCII text files. A thesaurus is available, but as an extra-cost option in the consumer edition.

FINAL EDIT

Clearly, The Writing Center is more than just a basic, easy-to-use word processor. Its additional desktop-publishing features, especially its use of graphics, provide the tools you need to produce a variety of different documents, from reports to newsletters to greeting cards. It has a few rough spots, but none is so serious it can't be addressed easily in future upgrades. While the program is designed with a student's interests and capabilities in mind, don't be misled into assuming it's too limited to meet the demands of adult users. Many parents as well as their children will find that The Writing Center is all the word processor they need.

**Ted Landau, Ph.D.**

**Bochester, MI**

Mischief on the High Seas." "Galloping Down the Wind." "Angry Flight from the Hill." "The Great Blizzard of '92." If ever you wanted children to write the Great American Short Story, MECC's Storybook Weaver: World of Adventure may be just the writing tool to get them started.

## THE BASICS

Sequel to MECC's original Storybook Weaver, released in 1990, the latest incarnation targets slightly older children: kindergarten through grade 6 instead of kindergarten through grade 3. It provides a feast of composition ingredients to help kids write and publish illustrated stories.

Storybook's familiar GS (Mac-style) graphics interface with pull-down menus, point-and-shoot cursor control, icons, scroll bars, and dialog boxes greets computer users like an old friend. The program features on-line assistance (available by accessing *Help* from the *Apple* menu), but for those already acquainted with the GS desktop, the application offers no major surprises.

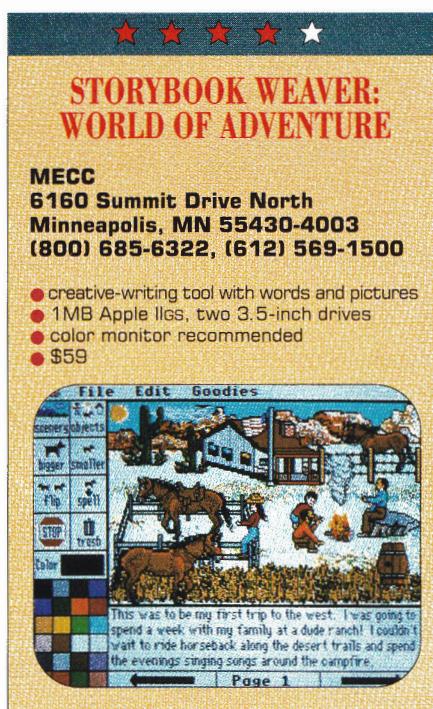
A well-written manual provides step-by-step instructions for all program options, as well as suggestions for using the program in an instructional setting. The manual would benefit from an index for quick information retrieval.

## THE WRITE APPROACH

Kids begin a storybook project by creating the title page. The program simplifies the design process by providing a template with appropriate "fill in the blank" boxes. Buttons such as *Title*, *Author*, and *Info* down the left side of the screen provide design options.

Once the title page is complete, it's time to begin writing. Storybook pages are of two types: text and mixed-mode (text plus graphics). An all-text page holds either nine or 17 lines of text, depending on the selected font size (small or large). A mixed-mode page positions the graphic at the top of the screen, in the picture window, leaving room for either two or four lines of text at the bottom, in the story window.

Young children or students just learning to write will appreciate mixed-mode pages with big print, because this option minimizes the number of words they must type.



# INTEGRATED SOFTWARE

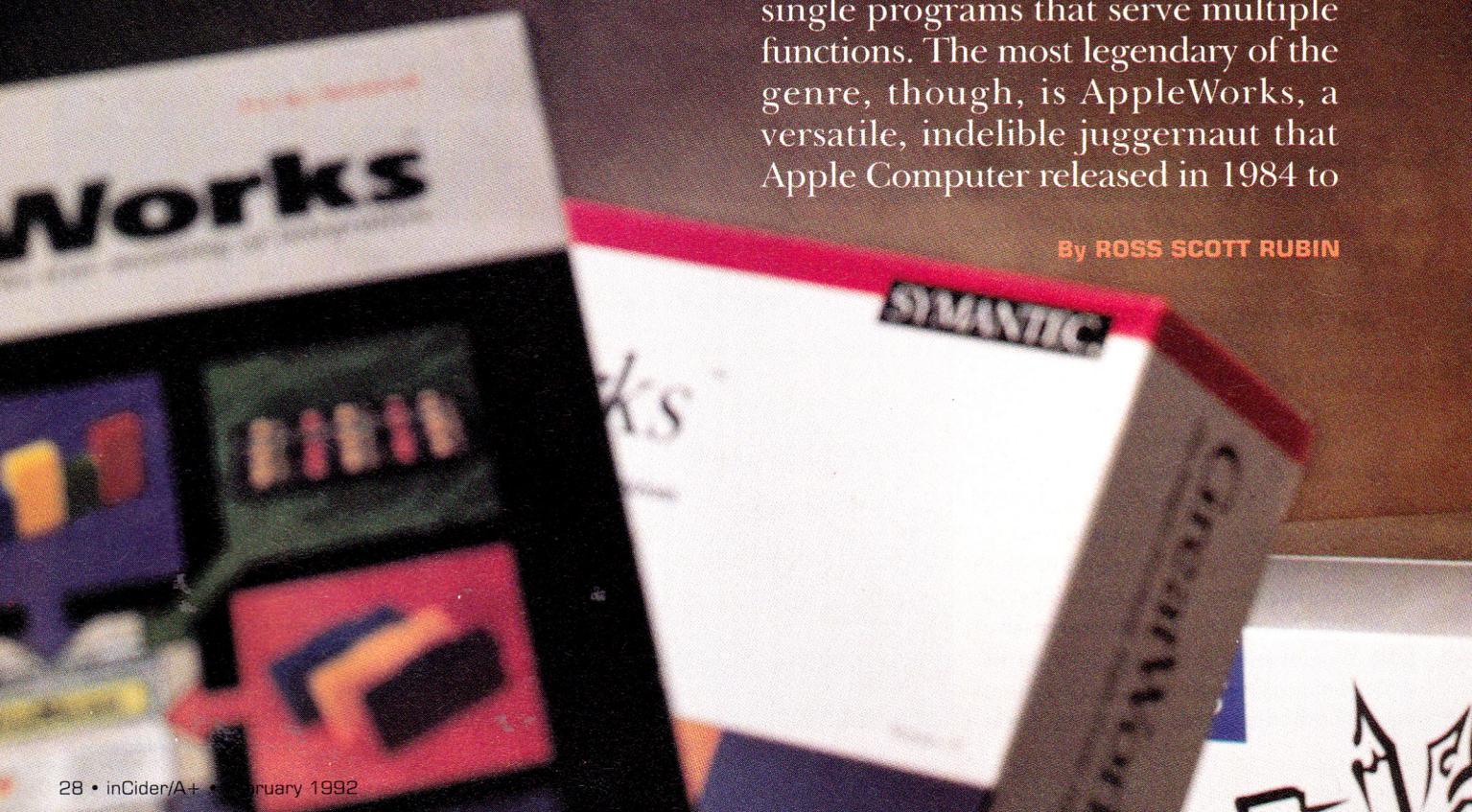
## WEIGHING YOUR OPTIONS

In the realm of computer software, good integrated programs are the renaissance packages — the jacks of all trades. Poor integrated programs, on the other hand, are masters of none. Select your software wisely and you get a program that handles diverse tasks such as word processing, spreadsheet calculation, database management,

and so on. Choose a product in haste and you'll find software that instead of filling all your needs, fills none of them.

Integrated software isn't unique to the Apple II or the Macintosh. In fact, whether you're talking about a modest system such as the Commodore 64 or a powerful mini-computer such as Digital Equipment Corporation's VAX, you'll find single programs that serve multiple functions. The most legendary of the genre, though, is AppleWorks, a versatile, indelible juggernaut that Apple Computer released in 1984 to

By ROSS SCOTT RUBIN



Promising Mac  
users a new level  
of versatility  
and convenience,  
five hot-shot  
contenders challenge  
Microsoft Works for  
its longstanding title.



showcase the versatility of its popular home machine, the Apple II.

To some extent, the Macintosh's clipboard and standard user interface have diluted the need to offer diverse functions in one program. Macintosh software by definition is consistent from application to application. Then, too, the introduction of System 7 promises to redefine what integration on the Mac is all about. Not only will you be able to share information among programs from different companies, you'll be able to share and update data automatically among different types of programs. For example, a computer artist's painting can be — in System 7 lingo — "published" to a designer using a desktop-publishing program. Or an architect using a computer-aided design (CAD) package can publish changes to his drawing automatically in a database manager.

The plodding pace, however, at which developers are adopting AppleEvents — the System 7 technology required for this type of interapplication communication — ensures that the advantages of integrated software won't fade away anytime soon. And, despite progress in multitasking as evidenced by the Switcher, MultiFinder, and System 7, the Mac's system software can't replicate the convenience and cost effectiveness of a true integrated package such as Microsoft Works. Even today, as Apple touts small, specialized applications that share data dynamically, Works continues to hold its place among Mac software best-sellers.

In addition, developers focusing on System 7-savvy applications (those that

## THE CONTENDERS WEIGH IN

1-5, 5 highest

	Ease of Learning/Use	Consistency	Features	Efficiency	Overall
BeagleWorks	5	5	5	4	4.5
ClarisWorks	4.5	4	3.5	5	4
DESK	4	3	3	2	3
GreatWorks	5	4	3	4	3.5
MS Works	3.5	2	2	2	2.5
SmartBundle*	2.5	1	4	2	3

\* programs priced together as package; software not integrated

exploit 7.0's capabilities fully) are producing high-end programs, not software geared toward home, school, and small-business needs. Other manufacturers are rushing to bridge the resulting gap. Indeed, the popularity and limited practical expandability of the Macintosh Classic, the LC, and the new PowerBook notebook computers have provided a fertile field for contenders to Works' title — and today's crop go well beyond common command sets and user interfaces in their concept of integration. Integrated software for the Macintosh is a hot and competitive area. And when the competition heats up, you, the user, reap the benefits.

Six packages providing word processing, spreadsheet calculation, database management, and more together in one box are currently on the home/school/small-business market or about to be released. (For one additional package that offers a convenient selection of modules without integration, see the accompanying sidebar, "All-in-One Grab Bag.") While each package offers a different set of

compromises, this suddenly crowded arena goes further toward meeting the demands of more users than ever before.



### SOLID PERFORMANCE

Marketed originally by the Leonard Development Group as SmartWorks, the package now called GreatWorks was hailed as a Microsoft Works killer — but the bugs in the initial version destroyed only the work you did with it. Now that Symantec has fixed the bugs with version 1.01, GreatWorks wins the features war with Works.

If having the most were all there was to it, GreatWorks would be the best in eight different applications. While no other company considers spreadsheet and charting to be different applications, Symantec's package alone boasts an outstanding outlining module, a natural

GreatWorks' "mini-MultiFinder." Note outliner window at left.

ClarisWorks' frame-based "seamless integration." Note tool palette.

boon benefitting both educational and business Macintosh users.

Philosophically, GreatWorks evolves from and adheres to the Microsoft model, but provides a better interface, consistent among modules. Menus are brief and straightforward. GreatWorks includes balloon help, a feature of System 7.0 applications. While "frame-based" packages such as ClarisWorks facilitate page layout, GreatWorks resembles a self-contained "mini-MultiFinder," which new users might find easier to digest. It's a more traditional interface, with separate modules in which you create your data, using the clipboard to cut-and-paste material among them.

Interestingly, with its hypertext help system, consistent interface, and XTND filters (Claris' specialized code and development tools that allow easy importing and exporting of diverse file formats), GreatWorks feels very much like a Claris product. Its diminutive palettes pack a lot of functionality while conserving screen space, an important consideration for Mac Classic owners. While GreatWorks differs significantly from ClarisWorks, users could migrate to Claris applications such as MacWrite II, Resolve, or FileMaker Pro pretty easily.

GreatWorks' communications module (like ClarisWorks' and BeagleWorks') is little more than a few menus built around Apple's Communications Toolbox. When it comes to communications, however, many users believe less is better, and the Toolbox provides a consistent way to specify settings such as baud rate and parity. The Toolbox is extensible, so GreatWorks and

its two chief competitors will be able to take advantage of advanced protocols such as Zmodem once they're released as communications tools.

Minor annoyances blemish GreatWorks' otherwise smooth operation. For instance, the slickly designed *Open* box fails to dim the *New* button if no document type is selected. The database palette could be more interactive; color palettes should tear off. There's no *Preferences* command.

Caught between chaotic Microsoft Works and ambitious ClarisWorks and BeagleWorks, GreatWorks can claim some real-world exposure, unlike products that were still in beta testing at press time. GreatWorks' workaday modules betray its moniker somewhat, but, although it offers little to excite, GreatWorks is a solid performer.



#### A TASTE OF CLARIS

The publisher of AppleWorks and AppleWorks GS for the II line, Apple's software subsidiary consistently produces well-designed and easy-to-use software. Foremost, **ClarisWorks** serves as a teaser for the company's line of mainstream products. The word processor, spreadsheet, database manager, and drawing module have generic names, but they could have been called MacWrite Jr., Son of Resolve, FileMaker Lite, and MacDraw Classic.

ClarisWorks glides more easily between modules than any of its competitors. In the Claris tradition, a palette glued to the left side of the window houses tear-off line, fill, and color selections, as well as all the tools for the word processor, spreadsheet, and drawing module. (Including ClarisWorks' reduced complement of database tools might have alienated users familiar with FileMaker Pro's robust interface.)

As in BeagleWorks, different types of documents (data) can coexist in frames on the same page, but Claris' method of choosing the frame type before drawing it is more intuitive. Word-processing and spreadsheet tools are available at all times from the same palette, as noted above; menus change depending on the type of frame you select. Claris calls it "seamless integration" in "interactive environments"; it does away with most cut-and-paste via the clipboard in that you can work with text, drawings, or spreadsheet data in the same module.)

In addition, ClarisWorks' drawing module dissolves into the others as ever-present tools, whereas you must make a new frame for any drawing in BeagleWorks. Like Microsoft Works, ClarisWorks incorporates macros that let you streamline repetitive tasks.

Claris has finally cashed in the long-dormant spreadsheet technology it licensed from Informix. The speed and scripting ability of Informix's Wingz appears in Resolve, from which ClarisWorks in turn borrows a powerful, versatile spreadsheet and charting environment.

The word processor follows MacWrite

File Edit Window Type View Format Effects  
3:58:53  
Eco Newsletter (WPS)  
Newsletter Headline (PT)  
Xanadu 1991  
Great Lakes Region Implements Clean Air Act  
Environmental, labor, tribal, government and community groups from the Great Lakes region gathered in Chicago recently to participate in the Air Toxics Conference. Participants outlined a strategy for strong implementation of the  
Other states that have implemented strong air pollution measures include California. Los Angeles in particular has drafted an "LA Proposal" that calls for elimination of 70 percent of smog-producing emissions in the Los Angeles area by the year 2000. Environmental, labor, tribal, government and community groups from the Great Lakes region gathered in Chicago.  
Agency and state pollution prevention programs.  
The Hilltop Climber has arrived at the toughest terrain!"

BeagleWorks lets you work with all types of data in a single document.

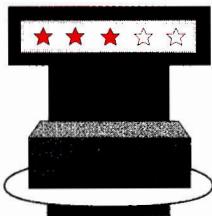
Team	Peops	Requested Fd	Cost per Person	Local	Available	Comment
USA	10	Hamburgers	\$5.10	Yes	May, June	High-protein
France	7	Bouillabaisse	\$1.50	Yes	May, June	Based Duck
England	6	Fish and Chips	\$5.40	No	May, June	English favor
Germany	8	Brezen	\$1.10	Yes	May, June	High-carbo
Austria	5	Wiener Schnitzel	\$4.25	Yes	May, June	High-protein

St. Etienne May 1 5 Lodging \$60000 \$20000  
Geneve May 1 6 Bicycles \$20000 \$5000  
Chamonix May 1 7 Promotions \$12000 \$12000  
Bern May 2 8 Total Expenses \$122000 \$58000  
Interlaken May 2 9  
10 Total Budget Avarie \$125000 \$67500  
11  
12 Under (Over) Budget \$13000 \$14500  
13  
14

Microsoft Works' database suffers by comparison with newer products.

## ALL-IN-ONE GRAB BAG

It's true that T/Maker's **SmartBundle** provides many of the capabilities found in integrated software. Forsaking any claim of integration, though, Smart-Bundle packages four applications from four different vendors: T/Maker's own WriteNow 2.2, Ashton-Tate's Full Impact 2.0s spreadsheet, Silicon Beach/Aldus' SuperPaint 2.0, and Software Discoveries' Record-HolderPlus database. They share little more than the box. T/Maker also includes a launching menu that functions like any number of other widely available application launchers on the Macintosh market. There's no communications module in this one.



**WriteNow 2.2** is the jewel of the package. This perennial favorite of critics and educators combines speed and a well-chosen feature set; its advanced capabilities embarrass competing word-processing modules. Unfortunately, it lacks the convenient table-making functions ClarisWorks and BeagleWorks borrow from their spreadsheet modules.

While WriteNow has two ways of assigning paragraph styles, it would benefit from conventional style sheets. A better-integrated thesaurus, better column handling, and color support would also be welcome. A substantial upgrade, due to ship in early 1992, should address some of these shortcomings and provide full System 7 support.

Sporting 3D charts and a full macro language, Ashton-Tate's **Full Impact 2.0s** is a high-end spreadsheet that holds its own against Microsoft Excel, Claris Resolve, and Lotus 1-2-3 for the Macintosh. Its manual alone is thicker than those of several integrated packages. Like WriteNow, Full Impact trounces its counterparts among the integrated set. It's known as an innovative package, as well, employing an icon bar before Excel came along and incorporating sound input before its rivals did. Full Impact's Achilles' heel lies not in its features, but in its future. Borland International, which abandoned the Macintosh long ago, recently devoured Ashton-Tate in a merger, and has not yet stated what will become of the spreadsheet.

**SuperPaint 2.0**, too, was once an innovator — the first Mac application to incorporate drawing and painting in one package. Its workhorse interface has staved off a slew of competitors, many of which dwarf its feature set. In August, Aldus rewarded this loyalty with full-color SuperPaint 3.0, a vast improvement over the eight-color limit of the SmartBundle version.

**RecordHolderPlus** is an obscure, although fast and capable, flat-file database with noteworthy data-validation features and limited color support. It's an ideal entry-level product that departs from the FileMaker model you'll find in Claris-Works, BeagleWorks, and GreatWorks. A concise manual describes its straightforward feature set well, although its software interface is cluttered and rather unattractive.

With an introductory booklet that lists five different numbers for technical support, SmartBundle isn't ideal for new Macintosh users, and at a \$349 suggested list price, it isn't cheap, either. Collectively, the applications don't exploit the Macintosh interface well. SmartBundle is better suited to knowledgeable Macintosh users who don't mind risking some low-end also-rans in hopes of getting overdue major upgrades. If Full Impact could find a new home and T/Maker were to include WriteNow 3.0 and SuperPaint 3.0, however, SmartBundle would be an unassailable value.

— R.S.R.

II interface and keyboard conventions, adding split bars and custom magnification levels. ClarisWorks is the only package of those reviewed to include footnoting. Mail merges, well implemented in MacWrite II, are a lark here. And you can link text boxes, making ClarisWorks something of a desktop-publishing program of last resort.

Despite demonstrating interapplication communication long before System 7 appeared, Claris has been slow to make its main applications System 7 savvy. While it supports balloon help, ClarisWorks joins MacDraw Pro and FileMaker Pro in a quiet archipelago of isolated applications. Like Microsoft Works, ClarisWorks

forsakes even a monochrome painting module, but it can import bit-mapped graphics using XTND technology. An efficient application, it weighs in at under 600K of disk space, so you can use it even on LCs with two floppy-disk drives. Most users won't soon outgrow it, but those who do will find a comfortable home in Claris' family of applications.



## BEST IN SHOW?

Beagle Bros worked closely with Claris on AppleWorks add-ins and, in fact, was contracted by Claris to develop the most recent version of AppleWorks, 3.0. Beagle decided to compete against Claris, however, in the Macintosh market. BeagleWorks' slogan, "The True Meaning of Integration," is no marketing hype. It's the best-integrated integrated software for the Macintosh.

Like ClarisWorks, BeagleWorks is frame based, but extends the concept further than its capable competitor. In BeagleWorks, you can create virtually any type of frame within any document. This liberating design facilitates creation of complex documents incorporating words, pictures, and numbers.

Without any models to follow in stand-alone products, Beagle Bros wisely explored interfaces used in other Macintosh programs. Its most extraordinary borrowed interface asset is a Quark XPress-like interactive toolbar — a palette, more accurately, since it's a floating window, the controls of which vary, depending on which module is active. You format text with a few button clicks; color lies but a tear-off menu away.

Beagle Bros went the extra mile in most of this package's modules. The word processor, for instance, features paragraph styles, word count, and text wrap around irregular graphics. The spreadsheet features in-cell editing like Lotus 1-2-3 for the Macintosh, and an automatic summation button like Microsoft Excel. Its painting module takes advantage of color, and its database allows compound searches.

Its communications module includes a phone book. Attention to detail shows in a hierarchical *File* menu that lets you specify types of new documents without a dialog box.

BeagleWorks fully exploits System 7. It can publish and subscribe to data, and communicate with other applications under System 7. It can even generate dynamic links among its internal modules under System 6. And even with its debugging code, included in the pre-release version tested for this article, BeagleWorks fits on a high-density floppy disk and can operate in less than 1 megabyte of RAM.

In the prerelease version, the placement of certain menu commands was less than intuitive, but it's hard to find fault with BeagleWorks. Although a built-in outliner module would be useful, BeagleWorks can share data with the popular System 7-savvy **Acta 7** from Symmetry Software. Although BeagleWorks lacks a macro facility, it will be able to trade AppleEvents with advanced system scripting in UserLand's **Frontier** and future versions of System 7.



#### A TIRED CLASSIC

The "mother of all Mac integrated software," **Microsoft Works** defined the stan-

dard for its category: compact, easy to use (the box even says "no experience necessary"), and interactive. Unfortunately, it has failed to uphold that standard. For too long, it was the best choice for new users because — after blasting Lotus Development's Jazz out of the marketplace — it was the only choice.

Compared with today's alternatives, Works' modules are mixed bags. The sluggish word processor can't save custom character styles, for example. The spreadsheet features split windows and annotated cells, but its charting functions are weak. Despite its golden touch, Microsoft has yet to produce a capable database, and Works' offering isn't even a good try. Inadequate menu titles such as *TotalsPage* and cryptic commands such as *Take a Subtotal on 1st Char* abound; part of this idiocy stems from Microsoft's inexplicable disdain for hierarchical menus.

And, unlike its recent competition, Works can't bring pictures into a field. Even its drawing tools are unavailable in database mode.

Despite its position as sales leader in both the Macintosh word-processing and spreadsheet markets, Microsoft has implemented in Works neither the modern features you might expect nor its Word- and Excel-style interfaces (although it did clean up the interface for its recently released Windows version of Works for IBM PCs and compatibles).

Compared with competitors such as ClarisWorks and BeagleWorks, Works'

	Year 1	Year 2	Year 3
Cash	\$0	\$0	
Investments	\$0	\$0	
Accounts Receivable	\$0	\$0	
Notes Receivable	\$0	\$0	
Inventory	\$0	\$0	
Total Current Assets	\$0	\$0	

**Sophisticated graphics features, including a 32-bit color paint module, distinguish DESK.**

#### FURTHER READING

"**Sneak Preview: SmartWorks**"

January 1991, p. 66

"**Apple II to Mac and Back**"

March 1991, p. 77

"**Swap 'til You Drop**"

Bridging the Gap, March 1991, p. 100

"**Your First Mac Package: What's the Best Deal?**"

April 1991, p. 46

"**System 7.0: Is It for You?**"

What's New, July 1991, p. 14

"**Systematic Gamble: Apple Rolls a 7.0**"

inCider's View, August 1991, p. 8

"**Long Live 7.0**"

Bridging the Gap, August 1991, p. 24

"**Jacks of All Trades**"

What's New, November 1991, p. 14

"**GreatWorks**"

Reviews, December 1991, p. 38

modules have about as much in common with their stand-alone counterparts as they do with each other, which is precious little. For example, Command-R in the word processor means *replace*, while in the spreadsheet it indicates *fill right*.

While Works operates fine under System 7, it contains no 7.0-specific features, not even color icons. Its no-frills approach to integration might be justified if the application ran in a minimal RAM (random-access memory) partition, but, although Works is no memory hog, other packages give you more per megabyte. The package retains a vintage 1986 flavor; this is one classic in dire need of an overhaul.



#### DESK SET

As Zedcor's integrated collection made its débüt, its name was changed from DeskWorks to **DESK**, hinting at oversized packaging and foreshadowing an identity crisis. Zedcor released this first competitor to Microsoft Works (after Jazz's demise) as a collection of desk accessories (DAs) after Apple cast doubt on the future of these little utilities. As it happens, System 7 has retained some DAs, although their

diminished role has detracted from DESK's design.

Under System 7, DESK operates as a set of five applications and two desk accessories. Its self-defeating installer fails to place certain files in their proper places. This package's modular design proves to be a great asset, however; you don't need to waste RAM on capabilities you don't need.

Zedcor broke new ground in desk accessories with its *DeskPaint*, a 32-bit color painting program with special effects found in applications costing hundreds more. *DeskDraw* is a lean object-oriented application that perfectly complements word processors that don't offer graphics capabilities; their inclusion in DESK makes the package the strongest graphically of those reviewed here. DeskWrite's unique features include "siders" (graphics that sit in the left or right margin and repeat on every page) and the type of background graphics offered in expensive page-layout programs, as well as envelope templates for popular printers.

*DeskSecretary*, an easy-to-use but unremarkable reminder system, adds some value to the package. With slicker programs routinely selling for less than \$65, though, you might as well get the one you want. The *Communications* DA is simple enough to call gratuitous, but it operates in only 20K of RAM.

In its current form, DESK still seems like a set of System 6 DAs on steroids. Its applications share certain interface amenities, but its main components — none of which

share data dynamically under System 7 — are linked only with primitive and incomplete menu commands that launch other DESK applications. To have all the capabilities of its competitors available at once, DESK unacceptably requires several megabytes of RAM under System 7 or MultiFinder. Nevertheless, adding some AppleEvents and beefing up DESK's spreadsheet and database components could yield a powerful set of applications embodying Apple's vision of future Macintosh software.

### BARGAIN PRICING

While Claris and Beagle Bros love to show spreadsheets embedded in their word processors, that trick is old hat to *Ragtime*, MacVonk's high-end, PostScript-optimized desktop publishing/spreadsheet *tour de force*. A scaled-down version of that program — *Ragtime Classic* — was marketed originally to cater to Apple's low-cost Macs. At press time, MacVonk USA had just announced **HandiWorks**, which we couldn't examine in time for the story. Geared toward PowerBook owners, HandiWorks earnestly addresses complaints about Ragtime Classic's lack of XTND-based file-import capability. To quell the critics completely, MacVonk bundles DataViz's **MacLinkPlus/PC** file-translation utility, which works with XTND to import many MS-DOS formats seamlessly.

HandiWorks is a frame-based package that includes word-processing and spreadsheet capabilities, as well as an address-

and-phone-book DA, surprisingly well integrated with the rest of the package while accessible from within any other software. While MacVonk claims HandiWorks can perform some neat tricks in terms of automatic addressing of faxes and other documents, the company's marketing folks may have outshone its programmers in pricing the package below the list cost of its competitors.

### PRO AND CON

**GreatWorks**, **ClarisWorks**, and **BeagleWorks** stand out as modern products for today's new Macintosh user. Each features a consistent user interface among modules, plus spelling-checker and thesaurus extras. They also use Apple's communications toolbox and XTND technology, which make them easily adaptable to new communications and file-translation tools. That flexibility will prove especially important for PowerBook users.

While ClarisWorks and BeagleWorks facilitate mixing different document types on the same page, those more comfortable with Microsoft's "mini-application" model will find a worthy alternative in GreatWorks, which doesn't distract you with tools you don't need. While BeagleWorks outshines its competitors in many respects, ClarisWorks is a compact, capable program with an obvious growth path into a family of strong applications.

At present, DESK would ideally be a great supplement to a mainstream program, filling in with some capabilities lacking in stand-alone applications, but its price and RAM requirements exclude it from that role. Until its applications start talking to each other, most users will be more satisfied elsewhere.

Regardless, Microsoft will have to do something more drastic than its rumored bundling of Intuit's *Quicken* with Works if it hopes to fend off this ambush of capable and accessible competitors. GreatWorks, ClarisWorks, and BeagleWorks are all polished products that should find very little resistance as they attempt to carve a niche in Works' market. □

ROSS SCOTT RUBIN IS WORKING ON A BOOK ABOUT THE NEW MACINTOSH POWERBOOKS. WRITE TO HIM AT 339 WEST 85TH STREET, NEW YORK, NY 10024. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

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Claris Corp.  
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Palo Alto, CA 94306  
(415) 325-5700  
price not available  
at press time

**GreatWorks**  
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10201 Torre Ave.  
Cupertino, CA 95014-2132  
(408) 253-9600  
(800) 441-7234  
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**HandiWorks**, \$175  
**Ragtime 3**, \$599  
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Narberth, PA 19072  
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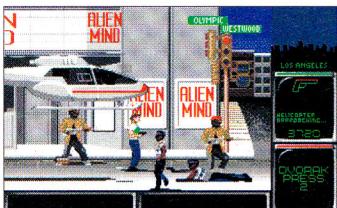
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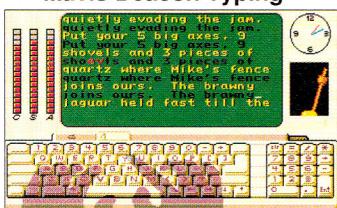
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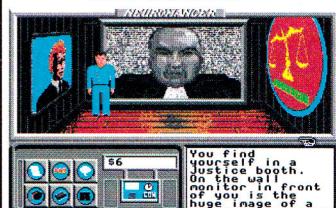
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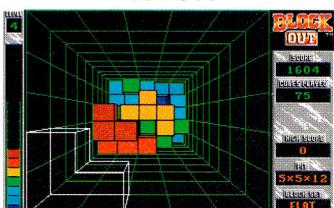
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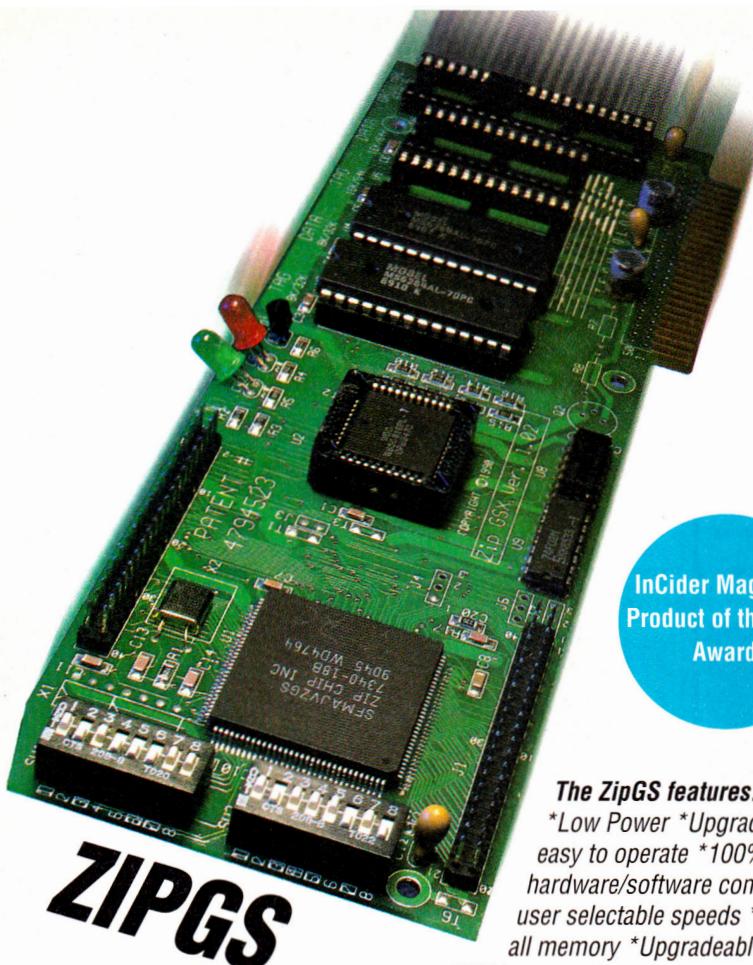
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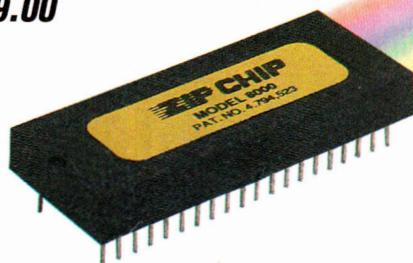
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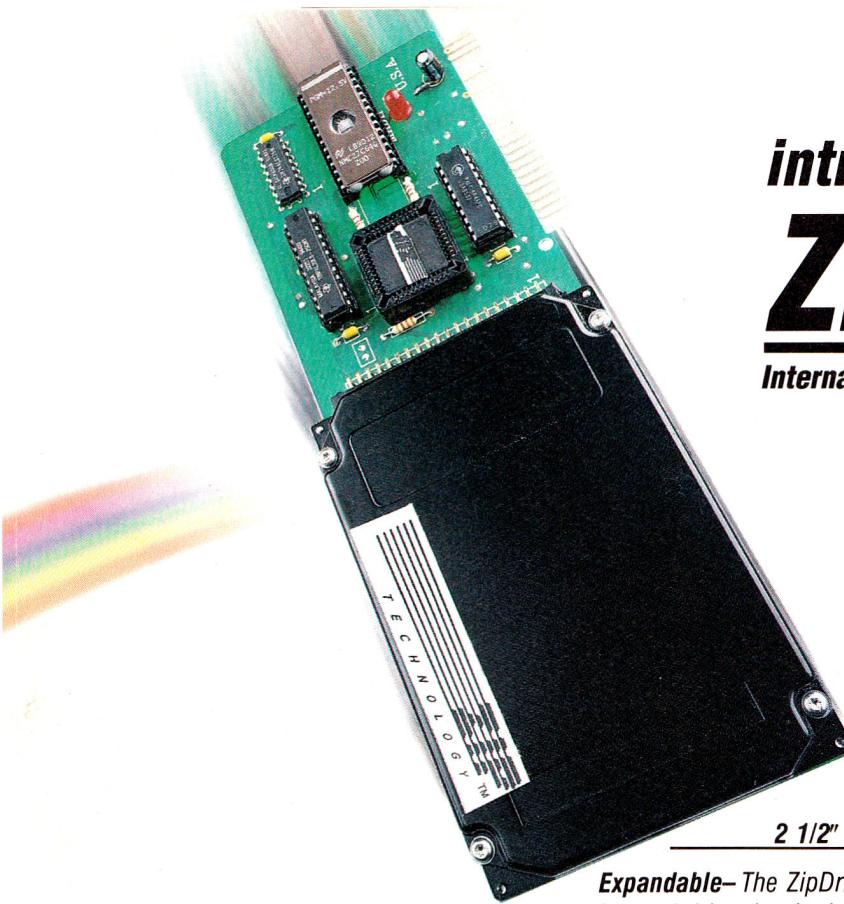
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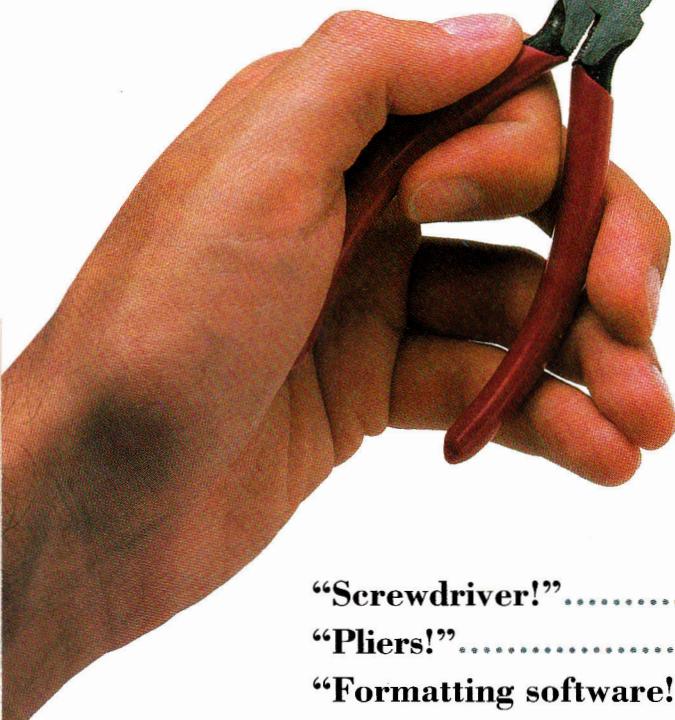
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# ROLL Hard Drive!



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YOUR DATA FILES ARE OVERFLOWING, YOUR APPLICATION disks are getting buried — the old shoebox method just doesn't work anymore. Time to look at hard drives, maybe?

Hard drives: Your friends have them, your favorite magazines review them, you wish you had one. But there you are, still doing the "floppy-disk shuffle." While it's true that hard-drive prices are dropping almost daily, you still have to take out a short-term bank loan to buy a commercial model with enough room to last you more than a couple of years. What's a storage-hungry computer user to do?

Build your own for a fraction of the cost. Don't panic — it's not as complicated as you think. SCSI (small-computer-systems interface) hard-drive components are highly standardized and readily available if you know where to look. Assembling the parts requires some

confidence and a little knowledge, but it's not quantum physics, either. Stay tuned — *inCider/A+* is going to show you how, step by step.

Just to whet your appetite, let's compare prices for a "home-grown" hard drive and a commercial model. Your basic third-party, store-bought, 80-mega-byte unit will run you about \$500 on the average; when you build your own, you'll pay about \$59 for the case, \$20 for an external cable, and maybe \$300 discount

for a unit housing the platters (the storage media themselves) and mechanism (including read/write heads), for a total of \$379. That's quite a savings. Here's another point to keep in mind: Getting quality assurances from cut-rate drive retailers can be an exercise in futility. With a home-grown model, though, you'll know you've got a top-quality drive mechanism and case, with low-cost expansion potential — plus the satisfaction of having built it yourself.

- "Screwdriver!".....(slap!)**
- "Pliers!".....(slap!)**
- "Formatting software!".....(slap!)**
- "Dammit, Jim, I'm a surgeon,  
not an electrician!"**
- "It doesn't matter, Bones.  
Anyone can build a hard-disk drive."**

By GARRY HOWARD

## ALL THE KING'S HORSES

To get going with your hard-drive project, you'll need the following basic components:

- hard-drive mechanism (platters, heads)
- case, fan, and power supply
- internal and external cables
- for Apple IIs, a SCSI controller card

Let's look at each requirement in more detail.

We'll start with the main item: the hard drive itself. This is where you'll be spending most of your cash, so take a couple of minutes to think about what you want and then shop around. What features do you need?

A 5.25-inch platter size might be cheaper or more spacious than a 3.5-inch, for instance, but it will require more power and a larger case. Fast access times and autopark are expensive, but well worth the money. ("Autopark" hard drives set read/write heads down in a "safe" area of the disk when you turn off the drive.) Want a more reliable drive? Life span is expressed as *mean time between failures*, or *MTBF*. (**Table 1** lists some typical statistics, including MTBF, for a number of **Seagate** SCSI drives.)

Mail-order and local suppliers offer a wide selection of drives from a number of manufacturers. Take a look at the hardware listings in the publication **Computer Shopper** as you get started — it's a good source for most of the components you'll need for this project. (See **Table 2** for a sampling of typical SCSI hard drives and prices.)

A variety of hard-drive cases are available, from three-sided models in which the drive mounts with an exposed *faceplate* (the front panel, with a light-emitting diode, or LED, that flickers to show disk access), to closed boxes that can contain a drive that doesn't come with its own faceplate. (If you've got a closed case, you'll have to run a wire from your drive to the case's LED if you want to see that comforting disk-access flicker). You can also buy a hard-drive case constructed of old parts, or build one yourself with the case from a "dead" hard drive or an old Apple II or PC.

Select your power supply carefully, too — its job is to step your 110-volt household current down to the trickle most hard drives run on. The average hard-disk drive requires about 15 watts from its power supply; to be safe, a one-drive system should have at least a 30-watt power supply. (Some drives require more power than others; doubling your wattage ensures that you won't end up with an underpowered drive, which could damage your data.) If you're planning to buy a high-capacity drive or stuff several drives into one case, you'll need 60 watts or better.



Avoid cheap cases that don't include a fan; the resulting heat buildup will reduce the life of your drive. Some good hard-drive cases available to do-it-yourselfers are the **Wetex 2866**, the **Tulin A-Hive**, and Sun Remarketing's **BYOD SCSI Kit**. Again, *Computer Shopper* is a good source.

You'll need an internal and an external cable, as well.

Internally, that's a 50-pin conductor ribbon to plug into the drive mechanism's 50-pin connector; the other end of the cable should have a 50-pin SCSI connector you'll mount on the back of the case. The external cable should be a standard 50-pin SCSI-to-DB25 to connect the hard drive to your Apple II's SCSI card or your Mac's SCSI port. Internal cables are available from Tulin or Wetex. External cables are available from many sources, including **Redmond Cable** and most computer mail-order houses.

As noted above, Apple II home-grown projects require a SCSI card for the computer. You can use Apple's original SCSI card; its more recent **Apple II High-Speed SCSI Card**, faster because it transfers data directly to and from RAM via *direct memory access* (DMA), bypassing your computer's central processing unit; or CV Technologies' **RamFast** card, which not only takes advantage of direct memory access, but also houses 256K of fast cache memory, where it stashes the data you use most often (your operating system, say, or the three AppleWorks modules), bypassing the slower hard disk for frequent reads.

## ASSEMBLY REQUIRED

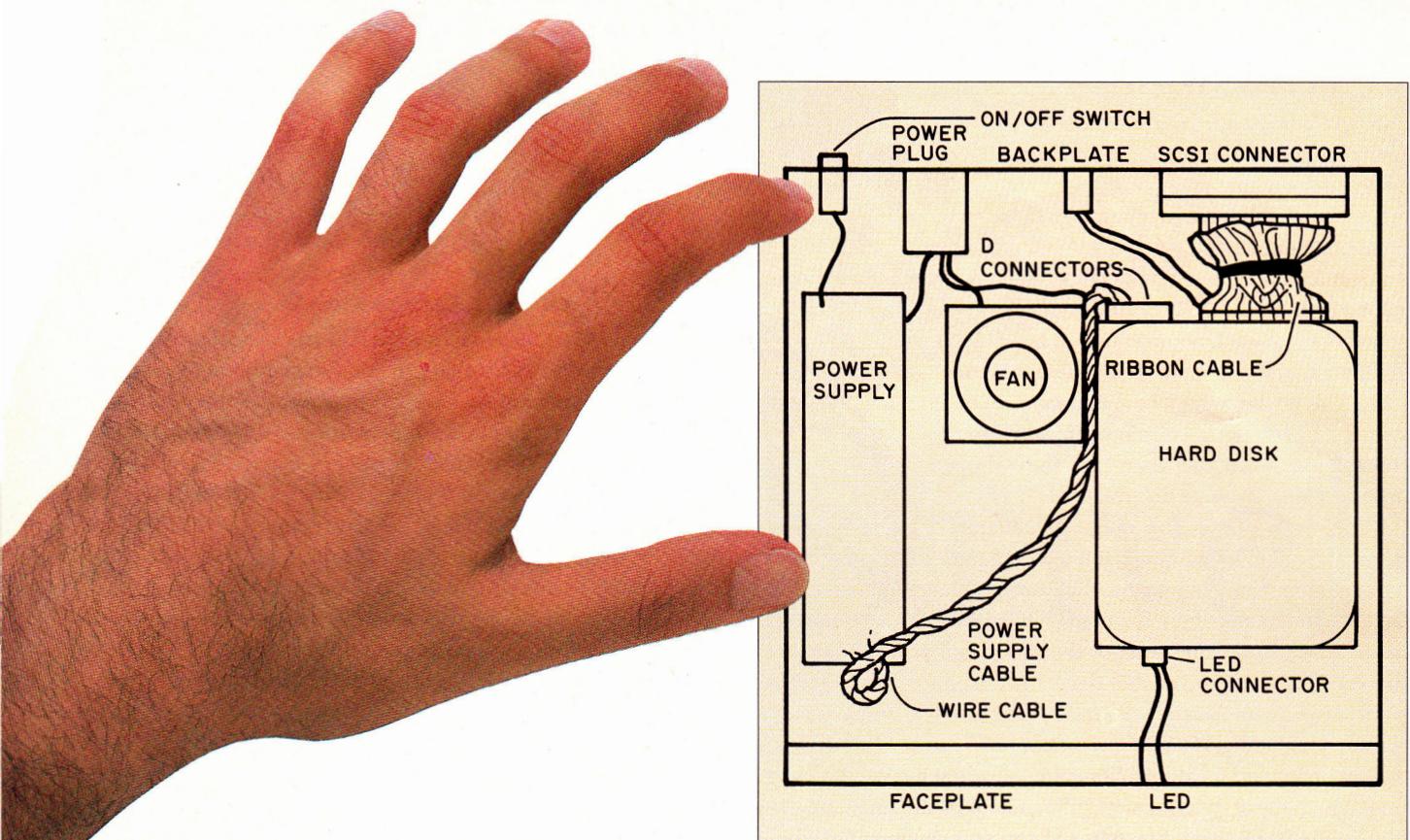
Now for the nitty-gritty: We're aiming for something that looks like the drive depicted in the schematic in **Figure 1**. Let's take it step by step:

Model	Capacity	Platter Size	#Platters	#R/W	Seek Time	MTBF	Power
ST277N	64.9MB	5.25"	3	6	28ms	70,000hr	13W
ST296N	84.9MB	5.25"	3	6	28ms	70,000hr	13W
ST125N	21.5MB	3.5"	2	4	40ms	70,000hr	9W
ST138N	32.2MB	3.5"	2	4	28ms	70,000hr	9W
ST157N	48.6MB	3.5"	3	6	28ms	70,000hr	9W
ST1201N	171.9MB	3.5"	5	9	15ms	70,000hr	11W
ST1239N	204.2MB	3.5"	5	9	15ms	70,000hr	11W
ST2502N	435MB	5.25"	4	7	16ms	100,000hr	16W

**Table 1.** Seagate drive models. MB = megabytes; R/W = read/write heads; ms = milliseconds; MTBF = mean time between failures; hr = hours; W = watts.

Drive Model	Manufacturer	Capacity	Platter Size	Price
Removable	Syquest	44MB	5.25"	\$399
ST296N	Seagate	80MB	5.25"	\$329
MC1674	Micropolis	160MB	5.25"	\$995

**Table 2.** Typical hard-drive mechanisms. MB = megabytes. Prices are suggested retail.



**1** First, get all your hardware components together. Clear a good-sized work area with lots of light and get out your hard-drive case. Plug the case into a wall outlet and turn on the fan to make sure the power supply works.

**2** Now "pop the hood." Remove the screws from the hard-drive case cover and slide or lift it off. A word of caution: Power supplies can contain considerable residual charge after being used. Let it dissipate before going to work on assembling this project: Unplug the power supply and turn the switch on and off three times.

If your power supply and fan didn't operate correctly, keep the unit turned off and check for shaky connections — loose wires or obvious solder breaks. If the equipment still doesn't work, contact the manufacturer.

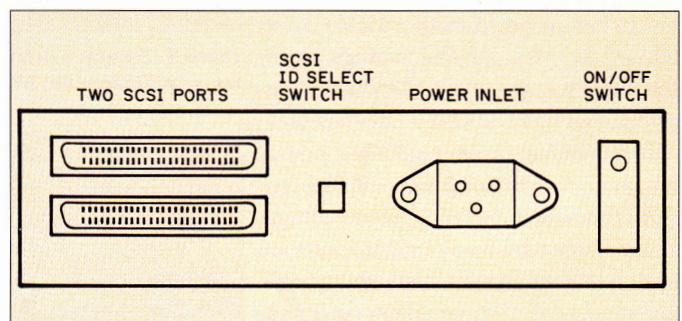
**Figure 1** shows an assembled hard drive with the case lid removed to show the interior. The power supply is the circuit board at the left in this schematic. The fan is mounted toward the back of the case. Ignore the installed hard-drive mechanism for the moment; we'll be getting to that shortly. Right now, let's just get oriented inside this bare-bones case.

**3** If your fan and power supply are working correctly, it's time to install your internal SCSI cable. Fasten the external SCSI connector to the backplate of your hard-drive case; it just screws in. (Don't connect it to the mechanism yet.) **Figure 2** shows the backplate, with two SCSI ports ("in" and "out"), the SCSI ID-select switch (more on that below), the plug that connects your internal power supply with the cord from your wall outlet, and the drive's on/off switch.

**Figure 1.** Assembled hard drive with case lid removed. Note power-supply circuit board at left, fan toward back, D connector at rear of mechanism, power-supply cable, and 50-pin internal ribbon cable running to SCSI connector at rear of case.

**4** Before you pick up your hard drive to begin installing it, ground yourself. Make sure the power supply is turned off, plug the drive case into a wall socket and touch the bare metal of the case. Don't stick your fingers into the power supply — the case will do fine.

**5** Now unpack your hard drive carefully. It'll probably come in a special translucent antistatic bag. Make sure you've already grounded yourself as described in step 4 before opening it. Don't drop the drive or bump it. Watch the controller board mounted beneath the drive, as well — it's sensitive to mechanical damage and static electricity.



**Figure 2.** Backplate of hard-drive case. Note SCSI in and out ports, SCSI ID-select switch, plug for cord from wall outlet, and main unit on/off switch.

**6**

Now check to see whether the controller board beneath the drive has any terminator resistors installed.

They look like small plastic cylinders or hourglass-shaped pieces. Most drives don't come with terminator resistors installed; if you're not sure, ask when you buy the mechanism or call the manufacturer. In order to be able to chain SCSI devices (up to eight, including the computer), each one has to have an "in" and an "out" port, and the last device must be *terminated* — that is, it must have a resistor pack installed in its "out" port. If you'll be daisy chaining other SCSI devices to your drive, you may have to remove the controller board's terminator resistors.

On the other hand, if you're working with Apple's older revision C non-DMA SCSI controller card for the II, or the Mac's SCSI port, the first and last devices in the SCSI chain must be terminated, so leave your hard drive's terminator resistors installed. The Apple II High-Speed DMA SCSI card and CV's RamFast SCSI card require only that the last device on a SCSI chain be terminated.

If your setup requires that your hard drive be terminated and you find that the resistors aren't installed, don't worry. Ask for an external SCSI terminator, available at the same place where you bought your cables, and plug it into your SCSI "out" port.

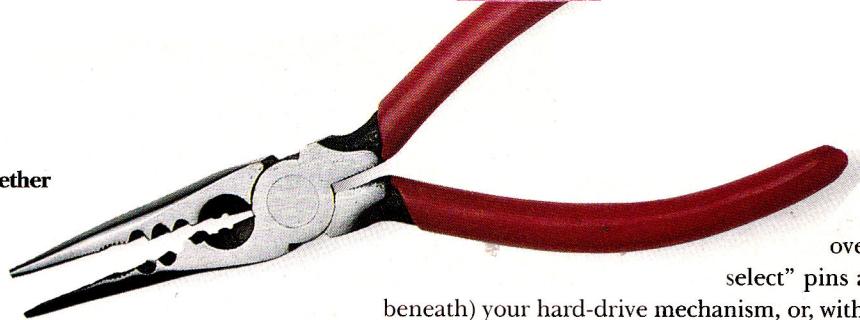
**7**

**Each SCSI device in a chain has to have a unique ID number.**

You probably shouldn't use 0 or 7 for your drive's SCSI ID, though. Zero is usually reserved for the computer's internal hard disk; 7 is normally assigned to the CPU (the computer's central processing unit).

If you want your home-grown drive to be the boot device in a SCSI chain, choose a high number such as 5 or 6; SCSI boot protocol goes in numerical order from highest to lowest. That is, the computer's CPU polls your storage devices when you turn it on; if some other storage device contains valid system files and carries a higher SCSI ID number, it'll boot that device instead of your home-grown drive.

You can set the ID for your hard drive by placing "jumpers"



(small plastic blocks with holes)

over a set of "drive-

"select" pins at the back of (or beneath) your hard-drive mechanism, or, with some drive cases (such as the Tulin A-Hive), by plugging an *ID-select cable* into these pins. An ID-select cable slips over the pins and connects to a click switch with numeric readout on the outside of the case to let you set the drive's ID number. (Note **Figure 2**, showing the case's backplate with SCSI ID-select switch.)

**Figure 3** shows the back of the hard-drive mechanism itself (upended). The drive-select pins are to the right of the SCSI internal ribbon-cable connector. Jumper blocks determine a drive's ID by shorting out pairs of pins (completing a circuit). The number of drive-select pins and their positions vary from drive to drive. In one model, for instance, the pins closest to the SCSI ribbon cable might be set aside for parity checking (normally not enabled), with the third, fourth, and fifth pin sets from the right assigned to set the SCSI device's ID. They would be numbered, from the right, 4, 2, and 1. If the third and fourth pins were to have jumpers, the ID of the drive would be, according to SCSI convention,  $4 + 2 = 6$ . To set an ID of 5, the third and fifth pins would have jumpers ( $4 + 1 = 5$ ), and so on. Check with your supplier or the manufacturer of your drive mechanism to find out which particular ID-selection scheme your model uses.

**8**

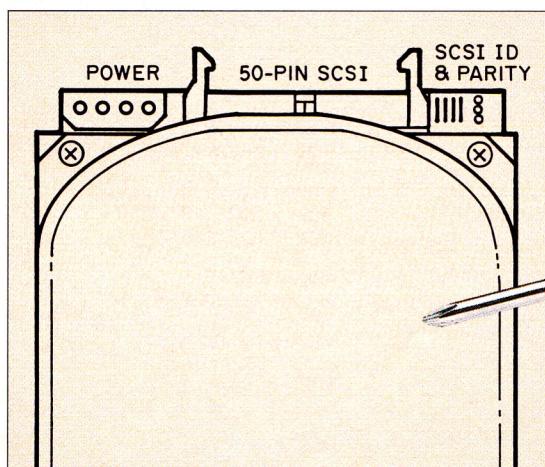
**Install your hard drive in the case's mounting bracket.**

Slide the drive carefully into place and fasten with mounting screws. Don't overtighten. Run the internal ribbon cable (with external connector installed, as in step 3) to the 50-pin connector at the rear of the mechanism. Make sure the connector is straight in and completely inserted. Attach the cable from the power supply to the D connector on the drive mechanism.

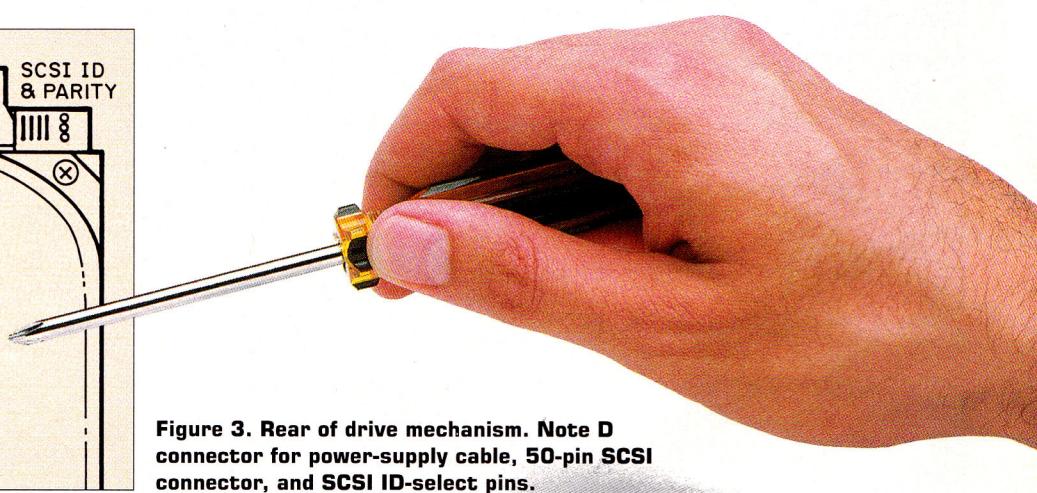
**9**

**Check all connections and turn on the power.**

Your hard drive should click a few times, then spin up to speed. If the drive makes too much noise, or doesn't come on at all, check the connections and try again. If you get the same result, you may have a bad drive — get out your shipping box.



**Figure 3. Rear of drive mechanism. Note D connector for power-supply cable, 50-pin SCSI connector, and SCSI ID-select pins.**



## FURTHER READING

"Do You Need a Hard-Disk Drive?"	March 1989, p. 47
"Do You Know Where Your Data Are?"	May 1989, p. 54
"New SCSI Card"	June 1990, p. 14
"A Good Drive Is Hard to Find"	July 1990, p. 42
"Faster Than a Speeding . . ."	November 1990, p. 96
"Shopping for a System"	January 1991, p. 61
"The SCSI Side of Life"	February 1991, p. 47
"Off the Beaten Track"	March 1991, p. 88
"The Wizard of OS"	April 1991, p. 53
"It Pays to Be Organized"	May 1991, p. 57
"Surviving the Crash"	June 1991, p. 42

Assuming everything is fine up to this point, turn off the drive and attach your external cable to the drive case's SCSI port (on the backplate, as shown in **Figure 2**).

**10**

**Install a SCSI card if you have an Apple II.** Insert it into slot 5, 6, or 7, and run the cable to the back of the computer. On the backplate, remove one of the plugs and use the hex nuts attached to the cable connector to bolt it into place.

You can connect up to four ProDOS 8 devices or hard-drive partitions (which are treated as separate devices) in slot 5, but only two in slot 6 or 7. GS/OS recognizes a larger number of drive partitions from any slot, although both ProDOS 8 and GS/OS are limited to a 32-megabyte partition size. Note that using slot 5 or 6 will disable your 3.5- or 5.25-inch floppy drives, respectively.

Also, slot 7 is the first slot your Apple IIe searches for a bootable disk, and it's the only slot that doesn't have an alternative function in the GS.

**11**

**Configure your SCSI card.** Apple's High-Speed SCSI Card has four DIP switches; CV's RamFast has eight. Among other things, you'll be assigning your computer a SCSI ID number here — usually 7. Consult your card's accompanying manual for details.

**12**

**Connect your drive and external SCSI cable to the Apple II SCSI card or Mac SCSI port.** Turn on the hard drive and let it warm up. Turn on your computer and run a SCSI test program. You'll find one on the accompanying disk that comes with your Apple SCSI card, or in ROM if you're using CV's RamFast SCSI card.

If your software doesn't recognize a SCSI device connected to your machine, you've got a problem. Turn the drive off and check all connections. If you can't get the computer to recognize your hard drive, check to make sure that your drive is properly terminated, and that you have no SCSI ID conflicts.

**13**

**Format your hard disk.** A *low-level* format creates concentric tracks and wedge-shaped sectors on the platter, dividing it into areas known as *blocks*. Track and sector markings serve as roads your computer's operating system will follow to find the blocks where your data is stored. If you have an Apple II, use the appropriate module from the collection provided with Apple's SCSI cards or the RamFast card, or try So What's **SCSI Hacker**, the shareware program **Vanilla**, Chinook's **SCSI Utilities**, or Apple's **Advanced Disk Utilities**, which comes with your GS. For Mac drives, try La Cie's **Silverlining** or **Tulin Formatter**. Make sure your Mac

## PRODUCT INFORMATION

### Apple II High-Speed SCSI Card

Apple Computer, Inc.  
20525 Mariani Ave.  
Cupertino, CA 95014  
(408) 996-1010  
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### BYOD SCSI Kit

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\$29.97/year

### Copy II Plus, \$39.95

Mac Tools, \$129  
Central Point Software  
15220 NW Greenbriar Parkway  
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Beaverton, OR 97006  
(503) 690-8090

### DiskTest

**Vanilla**  
shareware  
check on-line services, BBSes,  
user groups, disk houses

### DiskTimer

**SCSI Hacker**  
So What Software  
10221 Slater Ave. #103  
Fountain Valley, CA 92708  
(714) 964-4298  
prices unavailable at press time

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### ProSel 8, \$40

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Charlie's AppleSeeds  
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San Diego, CA 92126  
(619) 566-1297

### RamFast SCSI

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(513) 453-5743  
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### Redmond Cable

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### SCSI Utilities

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\$29.95 IIe

### Seagate Technology

920 Disc Drive  
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(408) 438-6550

### Silverlining

La Cie Ltd./Quantum  
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Tualatin, OR 97062  
(503) 691-0771  
(800) 999-0143  
\$149

### Tulin A-Hive, \$119/\$169

**Tulin Formatter, \$25**  
Tulin Corporation  
2156H O'Toole Ave.  
San Jose, CA 95131  
(408) 432-9025

### Wetex 2866

Wetex International  
1122 West Washington Blvd. #D  
Montebello, CA 90640  
(213) 728-3119  
\$79

utility will format the make of drive you select; that information should be available from the vendor or programmer.

14

**Determine the optimal interleave (sector sequence).**

Most hard drives spin too quickly for the read/write heads to access each sector sequentially. As the computer reads data from the disk, it must also figure out where to place that information in RAM. If it has to read data from sector 1 first and then sector 2, it doesn't have enough time to process the first block of data before reading the second; it won't read data from sector 2 until the second revolution.

To make reading and writing as efficient as possible, drive formats are designed with staggered sectors. *Interleave*, usually expressed as a ratio, is the term that describes the number of sectors your drive skips for each one it reads or writes (for example, 1:2, meaning every other sector). Don't panic: That doesn't mean you're wasting space. You'll use all sectors, except bad ones you "lock out" — just not exactly in sequence. Your low-level formatting utility should let you adjust drive interleave — put some data on your drive, set an interleave, time data retrieval (use So What's **DiskTimer** or Glen Bredon's **ProSel 16** for the GS, or the shareware program **Disk Test** or Glen Bredon's **ProSel 8** for your IIe), try another interleave, and compare times.

15

**Partition your disk and name it.** If you're using an Apple II, keep in mind that ProDOS won't work with a disk larger than 32 megabytes. It's time to *partition* — divide your disk into smaller "volumes."

Partitioning can be a helpful organizational tool: You may want to store your applications on one partition and your data on another, for instance, with maybe a third partition for GS/OS files only, if you use both 8- and 16-bit programs.

With Apple's Advanced Disk Utilities, Chinook's collection of SCSI Utilities, or the utilities that come with your SCSI card, you can create, add, and delete partitions, and adjust the size of each. You might also try the third-party Apple II programs **EasyDrive** from Quality Computers, ProSel 8 or 16, and Central Point's **Copy II Plus**. For the Mac, try Silverlining, Central Point's **Mac Tools**, or Tulin Formatter.

Following disk partitioning, your hard-drive utility package should also let you do a *high-level*, or *system*, format, which creates an empty "volume directory" (so that the operating system can keep track of the data you store) and gives each partition a name of your choice.

At this point you can run software to check for bad blocks (if you have a Mac, try Mac Tools or Symantec's **Norton Utilities** and **SUM II**; use ProSel 8 or 16 or Copy II Plus for the II), and create a "bad-block file" (also known as "locking out" — your computer will avoid saving to those areas), if necessary.

If it all works, then congratulations and welcome to the club — you've just rolled your own hard-disk drive. □

GARRY HOWARD IS A FREQUENT CONTRIBUTOR TO *inCider/A+*'S REVIEWS SECTION. WRITE TO HIM AT 111 BERMUDA CLOSE NORTHWEST, CALGARY, ALBERTA, CANADA T3K 1G4. PLEASE ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.



**A WORD TO THE WISE**  
**NOTES FOR NON-TECHIES**

You still don't believe it, do you? You're thinking, "It can't be that simple." In a way, you're right. You'll probably have to do some digging to find the parts you need, and fiddling around inside the guts of a component you just paid more than \$300 for can give even the steadiest person grey hair. If this sort of stuff makes you nervous, then don't do it. It's probably worth the extra \$200 to have someone put the box together for you.

But the procedure is almost as simple as it sounds. If you do a little research, ask a few questions, and purchase good components, the entire project should consist of nothing more than an afternoon's worth of plugging cables into sockets and playing games with formatting software. Just remember:

**1. The best solution to most snags is to call the manufacturer of the component in question or ship the piece back.** If it doesn't work properly when you take it out of the box, you probably can't fix it.

**2. Be careful about static electricity.** There isn't a manufacturer in the world that'll refund your money if you zap your controller board.

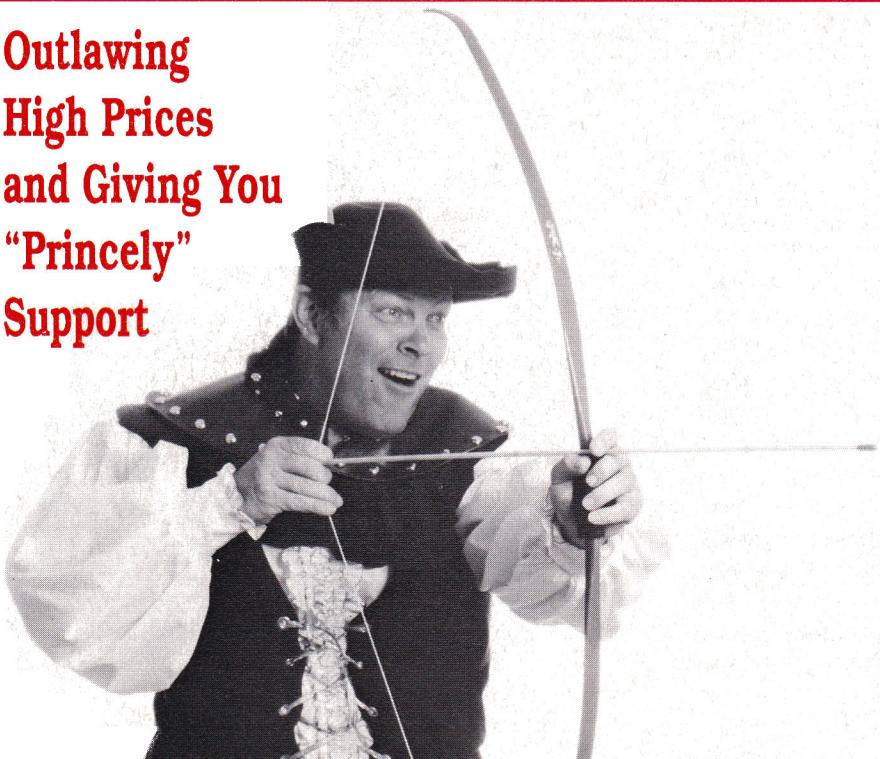
**3. Watch your fingers around that power supply.** If you've got long hair, tie it back. If you wear jewelry, especially rings or long necklaces, take them off. Good hunting!

— Cameron Crotty, Associate Editor



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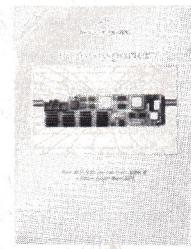
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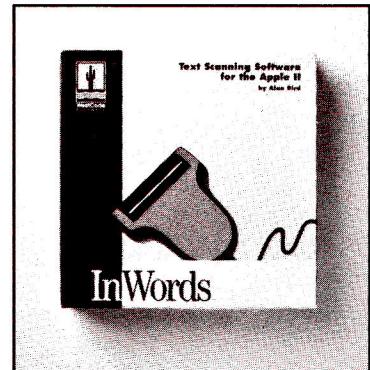
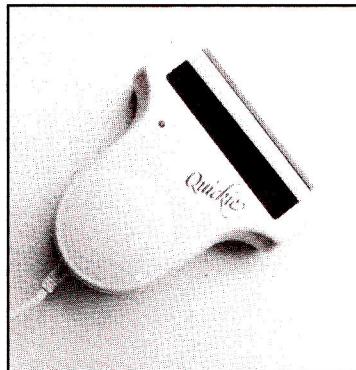
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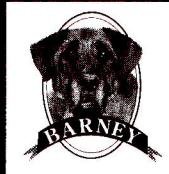
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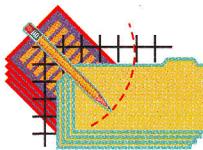
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By RUTH K. WITKIN

### ANOTHER YEAR GONE BY ALREADY?

No way! It doesn't seem possible that I'm writing my annual income-tax column again.

This year's version of the income-tax spreadsheet (see **Figures 1** and **2**) may look a good deal like last year's, but looks can be deceiving. Many subtle and not-so-subtle changes in the tax laws are incorporated into its design, including new tax-rate schedules and tax calculations for self-employment income.

My appreciation goes to John C. Wilson of Upper Montclair, New Jersey, for streamlining the Social Security calculations, and to J. Keith Luckenbach of Madison, Connecticut, for pointing out text inconsistencies in last year's column. Bouquets to George Stein, C.P.A., my favorite tax consultant. As always, George, I couldn't do it without you.

Because this column is written far in advance of tax-filing time, the same caveat applies as in previous years: Check to make sure everything I say is still valid.

### A SPREADSHEET FROM SCRATCH

Load AppleWorks and create a new spreadsheet file named **TAXES91**. Referring to **Figures 1** and **2**, set up the spreadsheet as follows:

- **Long horizontal lines.** Type quotation marks first, then hold down the equal- or minus-sign key. Use Open apple-C (OA-C) and the clipboard as much as possible to copy lines.

- **Long vertical lines.** Type quotation marks and two vertical characters in D1,

center the characters with OA-L, copy into D2 through D59, then copy all of column D to column L.

- **Column width.** Use OA-L to change column A to 63 characters, B to 11 characters, C to 2 characters, D to 4 characters, E to 20 characters, H to 6 characters, I to 10 characters, K to 8 characters, and L to 4 characters. Columns F, G, and J remain at 9 characters.

- **Entries.** Enter all labels and numbers except numbers you see highlighted in the **Figures**; they're generated by formulas. Highlighted numbers may or may not have a formula number beside them. Don't type commas within the numbers. Here's more about entries:

- **Indented labels.** In columns A and E, indent labels as shown in the **Figures**. For example, indent one space before the labels in A4 and E9, two spaces in A20, and three spaces in A34. To indent, type quotation marks and press the spacebar the proper number of times before typing. In J49, indent three spaces, and in F1, indent eight spaces.

- **Outdented labels.** Type a space after typing the labels in H6, I43, and J43.

- **Percentages.** In G45, type .075; in G46, .1; and in G47, .02. Use OA-L to format all three cells for *Percent* with one decimal place.

- **Short lines in column B.** In B19, B30, B32, and B45, type quotation marks, press the spacebar, and type 9 minus signs. In B35, type quotation marks, press the spacebar, and type 9 equal signs.

- **Formats.** Use OA-V to set a standard value of *Commas* with no decimal places.

Use OA-L to center the spreadsheet title in A1 and right-justify the labels in H6, I6, and G43 through K43. When you finish, press OA-S (the *save* command) to store the spreadsheet on disk.

### ENTERING FORMULAS

Now enter the formulas in the locations shown in the highlighted areas in **Figures 1** and **2**. Place the cursor on the cell receiving the formula, create the formula, and press Return.

SUM formulas include the empty cell above the amounts and the line below. Thus, if you ever add a row to the spreadsheet (a bit of a challenge because you're working with side-by-side pages), AppleWorks can adjust the SUM formulas to include the new entries.

**FORMULA 1: Social Security Benefits (Taxable).** Formula 1 copies the amount produced by the formula in I54 to B17.

**Cell location:** B17

**Formula:** +I54

Protect this formula: With the cursor on B17, press OA-L and hit Return to confirm *Entry*. Type PN (for *Protection Nothing*). Protect every other formula as soon as you create it.

**FORMULA 2: Total Income.** Formula 2 adds the income amounts (B4 through B18) to produce the total income in B20.

**Cell location:** B20

**Formula:** @SUM(B19..B3)

Remember, protect this formula now and every other formula immediately after you create it.

**FORMULA 3: Half of Self-Employment Tax.** Formula 3 takes half of the self-employment amount produced in B53 and enters it in B23.

**Cell location:** B23

**Formula:** +B53/2

B53 is empty now, so the formula enters a zero, not the amount shown in **Figure 1**. Patience.

**FORMULA 4: Total Adjustments.** Formula 4 adds the adjustments to income (B23

through B29) to produce the total adjustments in B31.

**Cell location:** B31

**Formula:** @SUM(B30..B22)

Formula 4 enters 4,000 in B31.

**FORMULA 5: Adjusted Gross Income (AGI).** Formula 5 subtracts total adjustments (B31) from total income (B20) to produce the adjusted gross income in B34.

**Cell location:** B34

**Formula:** +B20-B31

Formula 5 enters 86,745 in B34.

**FORMULAS 6, 7, 8: Deductions in Excess.** These formulas copy an amount generated by a formula in the work area.

**Formula #**      **Cell**      **Formula**

6	B37	+K45
7	B42	+K46
8	B44	+K47

Cells K45 through K47 are empty now, so the formulas produce a zero in each cell.

**FORMULA 9: Total Other Deductions.** Formula 9 enters the larger of two numbers — either the sum of the other deductions (B37 through B44) or the standard deduction. The formula finds the standard deduction by using the filing status in F4 as a lookup value and H8 through H22 as a lookup table.

**Cell location:** B46

**Formula:** @MAX(@SUM(B45..B36), @LOOKUP(F4,H8..H22))

Your result should be 8,311.

**FORMULA 10: Personal Exemptions.** Formula 10 multiplies the number of exemptions in F3 by \$2,150, the amount you can claim for each exemption, and enters the result in B50.

**Cell location:** B50

**Formula:** +F3\*2150

Your result should be 8,600.

**FORMULA 11: Taxable Income.** Formula 11 uses the IF function to calculate taxable income. The *Test* statement subtracts total deductions (B46) and personal exemptions (B50) from adjusted gross income (B34). If the result is less than or equal to zero, the *Then* statement enters zero as the taxable income in B51. If the result is greater than zero, the *Else* statement enters the result of the calculation.

**Cell location:** B51

**Formula:** @IF(B34-(B46+B50) <=0,0,B34-(B46+B50))

Your result should be 69,834.

If you have a net capital gain and your taxable income is more than \$49,300 (if

single), \$70,450 (if head of household), \$82,150 (if married and filing jointly), or \$40,075 (if married and filing separately), your tax must be figured on an alternate basis, effecting a maximum tax on capital gains of 28 percent. Refer to IRS publication 505 for more information.

**FORMULA 12: Estimated Income Tax.** Formula 12 copies the largest amount calculated (that is, any amount greater than zero) in the estimated-income-tax cells (K8 through K22) to B52.

**Cell location:** B52

**Formula:** @MAX(K8..K22)

Your result should be zero.

**FORMULA 13: Self-Employment Tax Owed on Business Income.** Formula 13 adds the amounts generated in cells J58 and J59 to produce the self-employment tax owed on business income in cell B53.

**Cell location:** B53

**Formula:** +J58+J59

Your result should be zero.

A	B
11	TAX FORECAST FOR 1991
21	
31	INCOME:
41	Wages, salaries, tips, etc. 72,340
51	Interest income (taxable amount) 4,270
61	Dividend income 550
71	Taxable refund of state and local income taxes 680
81	Alimony received 0
91	Net business/partnership income subject to self-employ tax 10,000
101	Net capital gain or (loss up to \$3000) 1,050
111	Pensions, annuities, IRA distributions (taxable amount) 0
121	Scholarships, prizes, and grants (taxable amount) 0
131	Rents and royalties minus expenses 1,855
141	Farm income or (loss) 0
151	Income from estates and trusts 0
161	Unemployment compensation 0
171	Social Security benefits (taxable amount) 0
181	Other income 0
191	
201	TOTAL INCOME 90,745 2
211	
221	ADJUSTMENTS TO INCOME:
231	One-half of self-employment tax 134 3
241	Deductible IRA contributions (self) 2,000
251	Spouse's IRA deduction 2,000
261	Keogh contributions and SEP deductions (self and spouse) 0
271	Penalty on early withdrawal of savings 0
281	Alimony paid 0
291	Other adjustments 0
301	
311	TOTAL ADJUSTMENTS 4,134 4
321	
331	
341	ADJUSTED GROSS INCOME (AGI) 86,611 5
351	
361	OTHER DEDUCTIONS:
371	Unreimbursed medical/dental expenses (exceeding 7.5% AGI) 559 6
381	State and local income taxes 1,234
391	Real estate and property taxes 4,555
401	Mortgage and investment interest 1,022
411	Charitable contributions 1,500
421	Casualty and theft loss (exceeding 10% AGI) 0 7
431	Moving expenses 0
441	Other deductions (exceeding 2% AGI) 0 8
451	
461	TOTAL OTHER DEDUCTIONS (or standard deduction if greater) 8,870 9
471	
481	
491	
501	PERSONAL EXEMPTIONS 8,600 10
511	TAXABLE INCOME 69,141 11
521	ESTIMATED INCOME TAX 14,939 12
531	SELF-EMPLOYMENT TAX OWED ON BUSINESS INCOME 268 13
541	OTHER TAXES (AMT, retirement plan, other) 0
551	TAX CREDITS (child care, elderly, business, housing, other) 375
561	ESTIMATED TOTAL TAX 14,832 14
571	TAX WITHHELD AND ESTIMATED TAX PAID 14,997
581	
591	AMOUNT YOU OWE OR (REFUND) (165) 15
601	

Figure 1. 1040-like area of tax-forecast spreadsheet.

# APPLEWORKS IN ACTION

**FORMULA 14: Estimated Total Tax.** The *Test* statement in Formula 13 adds taxes (B52 through B54) to and subtracts credits (B55) from the estimated income tax. If the result is greater than zero, the *Then* statement performs the same calculation and enters the estimated total tax in B56. Otherwise, the *Else* statement enters a zero.

**Cell location:** B56

**Formula:** @IF(@SUM(B52..B54)-B55  
    >0,@SUM(B52..B54)-B55,0)

Your result should be zero.

**FORMULA 15: Amount You Owe or (Refund).** Formula 15 subtracts the tax withheld and estimated tax paid (B57) from the estimated total tax (B56) to produce in B59 the amount you owe or the refund you can expect.

**Cell location:** B59

**Formula:** +B56-B57

Your result should be (14,997). This completes the formulas shown in **Figure 1**, so press OA-S to save. Start the work-area formulas in the locations shown in **Figure 2**, protecting each formula as you enter it.

**FORMULA 16: Estimated Tax/Single Filer.** The *Test* statement in Formula 16 compares the filing code in F4 with the status code in H8. If they match, the *Then* statement takes the largest amount produced by the formulas in the single-filer schedule (F27 through F29) and enters the result in K8. If they disagree, the *Else* statement enters invisible double quotation marks ("'"), which make K8 appear empty.

**Cell location:** K8

**Formula:** @IF(F4=H8,@MAX  
(F27..F29),"")

The formula is in the cell, but the cell shows nothing. These double-quotes (also used in Formulas 17 through 19) are an AppleWorks 3.0 feature. If you're working with an earlier version, substitute a zero for the double quotes. The cells will then show zero instead of looking empty.

Now copy Formula 16 into the two cells below. With the cursor on K8, press OA-C to start the *Copy* command. Press Return twice to confirm *Within worksheet* and *Source*. Move the cursor to K9, type a period, move the cursor to K10, and hit Return. To tell AppleWorks which cells are *No change* and which are *Relative*, press Return, type **R**, and hit OA-Return. All three formula cells now look empty.

**FORMULA 17: Estimated Tax/Married Filing Jointly or Surviving Spouse.** Formula 17 enters the estimated tax for married couples filing jointly or a surviving spouse (F31 through F33), or makes K11 look empty.

**Cell location:** K11

**Formula:** @IF(F4=H11,@MAX  
(F31..F33),"")

The formula produces a zero. Copy Formula 17 into the five cells below: With the cursor on cell K11, press OA-C and hit Return twice. Move the cursor to cell K12, type a period, move the cursor to cell K16, and hit Return again. Press Return, type **R**, and hit OA-Return. More empty-looking cells.

**FORMULA 18: Estimated Tax/Married Filing Separately.** Formula 18 enters the estimated tax for married couples filing separately (F35 through F37), or makes K17 look empty.

**Cell location:** K17

**Formula:** @IF(F4=H17,@MAX  
(F35..F37),"")

C	D	E	F	G	H	I	J	K	L
11	11			*** WORK AREA ***				11	
21	11								
31	11	EXEMPTIONS	-->	4	SOC SECURITY BENEFITS -->	0			
41	11	FILING CODE	-->	4	TAX-EXEMPT INTEREST -->	0			
51	11								
61	11	FILING STATUS			CODE DEDUCTION		EST TAX		
71	11								
81	11	Single Filer			1	3,400		16	11
91	11	Same-over 65 OR blind			2	4,250			
101	11	Same-over 65 AND blind			3	5,100			
111	11	Married-Filing Jointly/Surv Spouse			4	5,700		14,939	17
121	11	Same-one over 65 OR blind			5	6,350			
131	11	Same-one over 65 AND blind			6	7,000			
141	11	Same-both over 65 OR blind			7	7,000			
151	11	Same-both over 65 AND one blind/revse			8	7,650			
161	11	Same-both over 65 AND both blind			9	8,300			
171	11	Married-Filing Separately			10	2,850			18
181	11	Same-over 65 OR blind			11	3,500			
191	11	Same-over 65 AND blind			12	4,150			
201	11	Head of Household			13	5,000			19
211	11	Same-over 65 OR blind			14	5,850			
221	11	Same-over 65 AND blind			15	6,700			
231	11								
241	11	TAX SCHEDULES		ESTIMATED INCOME TAX					
251	11								
261	11	Table 1 - SINGLE FILER (SCHEDULE X)							
271	11				0	0 20a			
281	11				20,350	0 20b			
291	11				49,300	17,309 20c			
301	11	Table 2 - MARRIED FILING JOINTLY/SURVIVING SPOUSE (SCHEDULE Y-1)							
311	11				0	0 21a			
321	11				34,000	14,939 21b			
331	11				82,150	0 21c			
341	11	Table 3 - MARRIED FILING SEPARATELY (SCHEDULE Y-2)							
351	11				0	0 22a			
361	11				17,000	0 22b			
371	11				41,075	17,991 22c			
381	11	Table 4 - HEAD OF HOUSEHOLD (SCHEDULE Z)							
391	11				0	0 23a			
401	11				27,300	15,810 23b			
411	11				70,450	0 23c			
421	11								
431	11	DEDUCTIONS		PERCENT		% OF AGI	AMOUNT	EXCESS	
441	11								
451	11	Unreimbursed medical/dental		7.5%		6,496	24	7,055	559 26
461	11	Casualty or theft loss		10.0%		8,761	25	0	0
471	11	Other deductions		2.0%		1,732		980	0
481	11								
491	11	SOCIAL SECURITY TAXABLE CALCULATIONS				SOC SEC EXEMPT			
501	11								
511	11	ENTER SS BENEFITS IN K3, EXEMPT INTEREST IN K4					1	25,000	
521	11	Adj AGI for purposes of tax on SS benefits			0	27	4	32,000	
531	11	Social Security base amount			0	28	10	0	
541	11	Taxable Social Security benefits			0	29	13	25,000	
551	11								
561	11	SELF-EMPLOYMENT TAXES							
571	11								
581	11	Social Security Tax on Self-Employment Income			0	30			
591	11	Medicare Tax on Self-Employment Income			268	31			
601	11								

Figure 2. Work area of tax-forecast spreadsheet.

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# APPLEWORKS IN ACTION

Another empty-looking cell. Copy Formula 18 into the two cells below: With the cursor on K17, press OA-C and hit Return twice. Move the cursor to K18, type a period, move the cursor to K19, and hit Return. Again, press Return, type **R**, and hit OA-Return. More cells that contain formulas but look empty.

**FORMULA 19: Estimated Tax/Head of Household.** Formula 19 enters the estimated tax for filers who are heads of households (F39 through F41), or makes K20 look empty.

**Cell location:** K20

**Formula:** @IF(F4=H20,@MIN  
(F39,F41),"")

Again, the cell looks empty. As you did with Formula 18, copy Formula 19 into the two cells below.

**FORMULA 20a/b/c: Single Filer (Schedule X).** Figure 2 shows four tax tables. Each table contains three formulas (*a*, *b*, and *c*), one of which calculates the estimated tax based on taxable income. The formulas incorporate both the base tax and bracket percentage. Formula 20 (F27 through F29) estimates the tax for the single filer. It uses the AND function to establish the income level at which it works.

In **Formula 20a**, if taxable income (B51) is greater than or equal to the amount in E27 (0) and less than the amount in E28 (20,350), the *Then* statement calculates 15 percent of taxable income. If taxable income is outside these limits (either above or below), the *Else* statement enters a zero. This provides two safeguards: It prevents a negative estimated tax when taxable income is less than zero, and it prevents an improper calculation when taxable income is greater than the first level.

**Cell location:** F27

**Formula:** @IF(@AND(B51>=E27,  
B51<E28),B51\*.15,0)

**Formula 20b** calculates estimated tax when taxable income is greater than or equal to 20,350 (E28) and less than 49,300 (E29). If taxable income is within these limits, the *Then* statement subtracts 20,350 from taxable income, multiplies the result by 28 percent, and adds a base tax of 3,052.50. If taxable income is outside these limits, the *Else* statement enters a zero.

**Cell location:** F28

**Formula:** @IF(@AND(B51>=E28,  
B51<E29),(B51-E28)\*.28  
+3052.5,0)

**Formula 20c** calculates estimated tax when taxable income is greater than or equal to 49,300 (E29). If taxable income is at this level, the *Then* statement subtracts 49,300 from taxable income, multiplies the result by 31 percent, and adds a base tax of 11,158.50. If taxable income is below this amount, the *Else* statement enters a zero.

**Cell location:** F29

**Formula:** @IF(B51>=E29,(B51  
-E29)\*.31+11158.5,0)

Formula 20c produces 17,524.

**FORMULA 21a/b/c: Married Filing Jointly/Surviving Spouse (Schedule Y-1).** Formulas in this group follow the same pattern as the Formula 20 group.

**21a cell location:** F31

**Formula:** @IF(@AND(B51>=  
E31,B51<E32),B51\*.15,0)

**21b cell location:** F32

**Formula:** @IF(@AND(B51>=  
E32,B51<E33),(B51-E32)  
.28+5100,0)

Formula 21b produces 15,134.

**21c cell location:** F33

**Formula:** @IF(B51>=E33,(B51  
-E33)\*.31+18582,0)

**FORMULA 22a/b/c: Married Filing Separately (Schedule Y-2).** Enter the Formula 22 group as you did the others.

**22a cell location:** F35

**Formula:** @IF(@AND(B51>=  
E35,B51<E36),B51\*.15,0)

**22b cell location:** F36

**Formula:** @IF(@AND(B51>=  
E36,B51<E37),(B51-E36)  
.28+2550,0)

**22c cell location:** F37

**Formula:** @IF(B51>=E37,  
(B51-E37)\*.31+9291,0)

Formula 22c produces 18,206.

**FORMULA 23a/b/c: Head of Household (Schedule Z).** Enter the Formula 23 group as you did the others.

**23a cell location:** F39

**Formula:** @IF(@AND(B51>=  
E39,B51<E40),B51\*.15,0)

**23b cell location:** F40

**Formula:** @IF(@AND(B51>=  
E40,B51<E41),(B51-E40)  
.28+4095,0)

Formula 23b produces 16,005.

**23c cell location:** F41

**Formula:** @IF(B51>=E41,  
(B51-E41)\*.31+16177,0)

**FORMULA 24: Deductions as Percentage of AGI.** Formula 24 produces a percentage of AGI (*adjusted gross income*), so that you can see whether certain expenses or losses qualify as a deduction. In I45, Formula 24 calculates 7.5 percent of AGI, the amount you can deduct for unreimbursed medical and dental expenses.

**Cell location:** I45

**Formula:** +B34\*G45

Your result should be 6,506. Copy Formula 24 into I47: Leave the cursor on I45 and press OA-C. Hit Return twice. Press Down Arrow twice and hit Return. Press Return and type **R**. You should now have 1,735 in I47.

**FORMULA 25: Casualty or Theft Loss.**

Formula 25 calculates 10 percent of AGI (the deductible for casualty or theft loss), adds \$100 to increase the limitation on the amount of deductible casualty loss, and enters the result in I46.

**Cell location:** I46

**Formula:** +B34\*G46+100

Your result should be 8,774. The \$100 deduction is applicable to each casualty-loss event — something to bear in mind if you're unfortunate enough to have more than one (or even one) event.

**FORMULA 26: Excess.** The *Test* statement in Formula 26 looks at I45. If I45 contains an amount greater than zero (meaning you've entered a number), the *Then* statement enters in K45 either the amount generated in J45 less I45 or zero, whichever is greater. If I45 is equal to or less than zero (I45 contains a zero or is empty), the *Else* statement enters a zero instead of the negative number you'd get by subtracting the percent of the AGI amount from nothing.

**Cell location:** K45

**Formula:** @IF(I45>0,@MAX  
(J45-I45,0),0)

Your result should be 549. Copy Formula 26 into K46 and K47: Leave the cursor on K45, press OA-C, and hit Return twice. Press Down Arrow, type a period, and press Down Arrow again. Hit Return and press OA-R.

**FORMULA 27: Adjusted AGI for Purposes of Tax on Social Security Benefits.** The *Test* statement in Formula 27 checks the filing code in K3. If that number is greater than zero, the *Then* statement multiplies the Social Security

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benefits (K3) by 50 percent, adds tax-exempt interest (K4) and AGI (B34), and subtracts Social Security benefits (B17) to produce, in I52, the adjusted AGI for calculating the tax on Social Security benefits. If K3 contains a zero or is empty, the Else statement enters a zero.

**Cell location:** I52

**Formula:** @IF(K3>0,K3\*.5+K4  
+B34-B17,0)

**FORMULA 28: Social Security Base Amount.** The Test statement in Formula 28 also checks the filing code in K3. If it's greater than zero, the Then statement looks up your filing code in the Social Security exemption table (J51 through J54) and enters the corresponding base amount in I53. If K3 contains a zero or is empty, the Else statement enters a zero.

**Cell location:** I53

**Formula:** @IF(K3>0,@LOOKUP  
(F4,J51,J54),0)

**FORMULA 29: Taxable Social Security Benefits.** The Test statement in Formula 29 checks to see whether the adjusted AGI (I52) is less than or equal to the Social Security base amount (I53). If it is, the Then statement enters a zero in I54. If it isn't, the Else statement enters the lesser of one-half of Social Security benefits (K3) or one-half of the difference between AGI and the Social Security base amount, rounded to no decimal places.

Reader John Wilson created this nifty formula. He explains: "I added the ROUND function when I found that otherwise the .5 multipliers in my formula produced a hidden fraction in the product when K3 contained an odd, rather than an even, number. The fraction carried to B17, making B20 show as \$1 more than the sum of the individual entries in the column, and the all-important B51 show as 50 cents more than its actual counterpart in subsequent computer applications. A minor matter, indeed, but I have a dislike for columns that don't add up correctly." Way to go, John.

**Cell location:** I54

**Formula:** @IF(I52<=I53,0,  
@ROUND(@MIN  
(K3\*.5,(I52-I53)\*.5),0))

**FORMULA 30: Social Security Tax on Self-Employment Income.** The Test statement in Formula 30 checks to see whether 92.35 percent of the business income in

B9 is less than 400. If so, the Then statement enters a zero in J58. Otherwise, the Else statement enters the maximum of zero (which prevents a negative number from appearing in J58) or the lesser of the result of two calculations: wages in B4 subtracted from 53,400 or 92.35 percent of the self-employment income in B9. The formula then multiplies this result by 12.4 percent, the Social Security tax on self-employment.

**Cell location:** J58

**Formula:** @IF(.9235\*B9<400,0,  
@MAX(0,@MIN(53400-B4,  
.9235\*B9))\*.124

**FORMULA 31: Medicare Tax on Self-Employment Income.** Formula 31 looks and works a good deal like Formula 30. The Test statement checks to see whether 92.35 percent of the business income in B9 is less than 400. If so, the Then statement enters a zero in J59. Otherwise, the Else statement enters the maximum of zero (which prevents a negative number from appearing in J59) or the lesser of wages in B4 subtracted from 125,000 or 92.35 percent of the amount in B9. The formula multiplies this result by 2.9 percent, the Medicare tax on self-employment.

**Cell location:** J59

**Formula:** @IF(.9235\*B9<400,0,  
@MAX(0,@MIN(125000  
-B4,.9235\*B9))\*.029

Press OA-K to calculate the spreadsheet again. It should now look like the one in Figures 1 and 2. If it doesn't, the cause is probably the forward references — formulas that use the calculations produced by later formulas. Simply press OA-K several more times. Now that the spreadsheet agrees with the Figures, press OA-S to store it on disk.

Press OA-O to bring up Printer Options. Change LM (Left Margin) to .7, RM (Right Margin) to .7, and CI (Chars per Inch) to 12. Press OA-S to save. Now turn on your printer. This spreadsheet prints on two pages: AppleWorks prints as many columns as can fit on the first page, then the rest on the second page automatically. Press OA-P and confirm All. Confirm the printer (or type a printer number, then Return). Type today's date (or, if you have a computer clock, type @ — the "at" sign), and hit Return twice. The printer will whir away, producing your powerful income-tax spreadsheet. □



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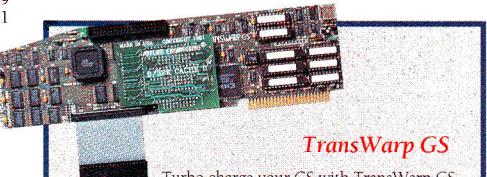
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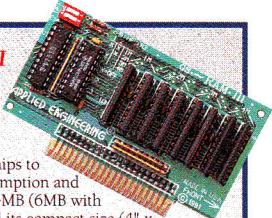
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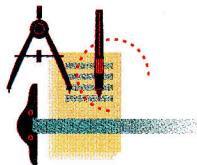
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# PRESS ROOM

## CALLING CARD

**DTP makes designing badges, labels, and Rolodex-style address-and-phone cards as easy as 1, 2, 3.**

By CYNTHIA E. FIELD, Ph.D.

DO THE WINTER BLAHS HAVE YOU longing for an indoor project that's both creative and pragmatic? If so, grab a cup of steaming cocoa and cozy up to this month's desktop-publishing (DTP) template. We're going to design die-cut Rolodex-style cards with Timeworks' **Publish It! 4** on the Apple II and **The Writing Center** from The Learning Company on the Macintosh (reviewed in this issue, p. 26).

Even if you feel right now that you don't have a use for these nifty "address book" organizers, we think you'll change your mind after you print a batch. Moreover, the technique we describe will help you create templates with any kind of single-

Rolodex cards (eight per sheet), and an assortment of brochure formats, including one with a return/reply postcard built in. Brochure stock comes prescored for folding. Die-cut products, including the Rolodex cards we use in this month's project (**Figure 1**), are perforated for easy separation. Making Perfs and Scores Rolodex cards is as easy as 1, 2, 3:

- **Create a template** with your favorite DTP or word-processing program.
- **Customize the template** with text and graphics, fine-tuning as needed.
- **Print the cards** and separate them along the built-in perforations.

With any card or label project, your first job is to take careful measurements. Press Room fans know that Publish It!'s *Show Specifications* feature is one of our favorites because it makes precision layout a snap. All you have to do is give Publish It! some measurements: *Left Start*, *Top Start*, *Width*, and *Height*. The program does the rest.

Sacrifice one sheet of die-cut stock for measurement taking and jot down the numbers directly on the stock itself, or use a printed paper template like the one supplied with Perfs and Scores products. For Press Room projects like this one, we keep two metal rulers handy. One's 6 inches; the other's a foot long.

One of the first things you'll notice is that Rolodex cards have an odd shape that doesn't appear to resemble anything you can mimic with Publish It!'s drawing tools. A closer look, however, reveals that each card actually includes two rectangular printing areas: a tab and a body. Tab text usually consists of indexing information



**Figure 1.** Rolodex card created with **Publish It! 4** for the Apple II.

sheet stationery stock — from disk labels to business cards to name badges.

### STEP BY STEP

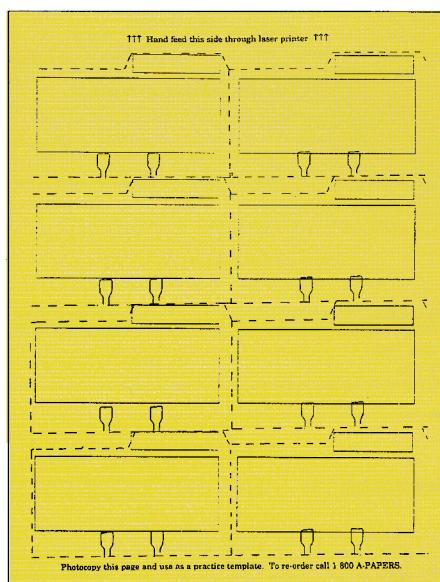
PaperDirect, one of our favorite purveyors of fine papers, sells a **Perfs and Scores** line of 8.5-by-11-inch die-cut products. Among the items offered are postcards (four per sheet), multipurpose cards (ten per sheet),

used to organize the cards in a rotary file — usually your name or your company's name if you're sending these cards out to other businesses or individuals. Body text usually includes address information and telephone numbers.

Accommodating these two text frames on each of the eight cards means the layout should have 16 text frames in all and resemble **Figure 2**. If you want to double-check the measurements you take, compare them to the specifications in the accompanying **Table**. Discrepancies in the third decimal place are inconsequential. You'll probably notice that because Publish It! doesn't print beyond the 8-inch mark we narrowed all text frames in the second column of cards slightly.

Whether you use your own measurements or ours, it's easy to create the required text frames. Using the text tool, draw a frame; press Open apple-M (OA-M) to bring up the *Show Specifications* dialog box, then type in the measurements for the object's *Left Start*, *Top Start*, *Width*, and *Height*.

Click on the *Frame Borders* check box. That way, you can print your computer



**Figure 2.** Paper Rolodex-card template, showing 16 text frames.

template onto a copy of the paper template, or onto an actual sheet of Rolodex card stock, and readily see whether frames fit correctly.

When your template's finished, double-click on each text frame and turn off the *Frame Borders* option. Click on the *Locked Object* check box to lock each text frame so that it won't shift position. Don't forget to save the blank template on a data disk.

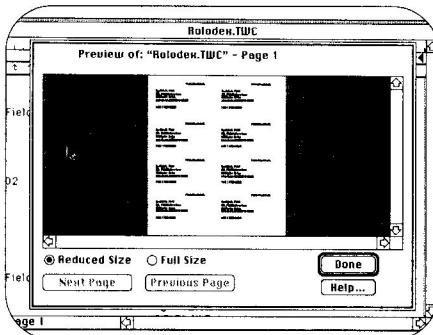
Finish one card before worrying about the rest. Insert the I-beam into the tab of card 1 (the top left-hand card) and type the text you want. Experiment with fonts, but be sure to use a size that fits into the space allotted. If you try to use type that's too large, Publish It! will "beep" at you.

Space limitations may prevent you from exercising much creativity in the tab area, but the body area of the Rolodex card provides lots of room for experimentation. Try different typefaces or styles. From the *Format* menu, center part of the text or incorporate a logo or canned clip art.

When the design pleases you, press OA-K for a screen "preview," or print (OA-P) a sample on paper. Copy the contents of card 1 to the other cards on the page: Insert the I-beam into the tab of card 1, press OA-E to select all text, and press OA-C to copy the text to the program's invisible clipboard. Then insert the I-beam into the tab of card 2 and press OA-V. The text should appear automatically. Proceed to card 3 and paste text there. Continue until the tabs on all eight cards have text. Similarly, use the I-beam to copy and paste text from the body of card 1 to the bodies of the other seven cards. Use the pointer to select, copy, paste, and position graphics.

A Rolodex-card template is great for creating sheets of identical cards, but if you're setting up your own file, it's just as appropriate for designing cards that hold differing information. If that's the case, copy and paste any consistent text or graphics and use the I-beam to type new text, such as the name of each student in your class or a description of each product in your inventory. If you need to make a host of different cards, create as many Publish It! pages as you need — or at least as many as your computer's memory allows.

Before printing, closely inspect each card and perform any fine-tuning that's required. Thanks to Publish It!'s four viewing modes — use OA-1 through OA-4 to



**Figure 3. Page preview of Rolodex-card template created with The Writing Center on the Mac.**

switch among them — you can zoom in for a close-up or take an arm's-length look at your work.

## ROLL THE PRESSES

Printing Rolodex cards is a straightforward process. Line up the left edge of the stock with the red line on the paper-bail bar of the ImageWriter II. (Use an analogous marker on other printers.) Hold the sheet against the back of the platen and press the form-feed button once. The printer will "grab" the stock and advance it to the top-of-page mark. If it jams, adjust the paper-thickness lever.

Select Publish It!'s best-quality print

Object	Left Start	Top Start	Width	Height
<b>Card 1</b>				
Tab	2.350	0.525	1.725	0.350
Body	0.426	1.000	3.650	1.450
<b>Card 2</b>				
Tab	2.350	3.000	1.725	0.350
Body	0.426	3.500	3.650	1.450
<b>Card 3</b>				
Tab	2.350	5.500	1.725	0.350
Body	0.429	5.955	3.650	1.450
<b>Card 4</b>				
Tab	2.350	8.000	1.725	0.350
Body	0.427	8.500	3.650	1.450
<b>Card 5</b>				
Tab	6.387	0.525	1.550	0.350
Body	4.475	1.000	3.500	1.450
<b>Card 6</b>				
Tab	6.391	3.001	1.550	0.350
Body	4.475	3.501	3.500	1.450
<b>Card 7</b>				
Tab	6.391	5.501	1.550	0.350
Body	4.476	5.962	3.500	1.450
<b>Card 8</b>				
Tab	6.391	8.001	1.550	0.350
Body	4.475	8.502	3.500	1.450

**Table. Specifications for Perfs and Scores Rolodex cards (all dimensions in inches). Create objects as text frames with the text tool.**

mode. You can print directly on the stock, especially appropriate if you're creating multicolor cards on an ImageWriter II with a four-color ribbon or if you plan to thermograph your cards. (See "Hot Stuff," *Press Room*, January 1992, p. 56.)

Consider printing your Rolodex-card template on good-quality white paper and photocopying the master onto blank Rolodex-card sheets. Although our office copier balks at handling some stock, the Perfs and Scores pages feed smoothly through our machine. If you want your cards to have some color, consider purchasing blue Perfs and Scores stock.

## EASY DOES IT

Who says you need a traditional DTP program to create templates? Your word processor is probably equal to the task. Although we didn't experiment with traditional word-processing programs such as MacWrite II or AppleWorks 3.0, the procedure you would follow is similar to a method we devised for The Writing Center for the Macintosh.

From the main menu, make a *Custom* layout with two columns but no heading.

Choose *Page Setup* from the *File* menu and select *US Letter* and *portrait* printing orientation. Deselect all check boxes in the *Page Layout* area. In the *Margin Settings* box, change top, bottom, and right margins to **0** (zero). Make the left margin **0.5** inches.

In the document window, scroll to the left edge of the page. Drag two left tabs from the tab well to the following ruler settings: 2 and three-eighths inches and 6 and three-eighths inches. These tab settings represent the locations where you'll enter text on the Rolodex-card name tabs.

Insert the I-beam into the left-hand column and select the *9-point Geneva* font from the

# PRESS ROOM

*Text* menu. Press the Return key three times. Through trial and error, we discovered that we had to enter these three small spaces at the top of the template to ensure precise alignment when printing.

Switch to the *12-point Geneva* font. Press the tab key once. Type the name you want to use on the Rolodex card's tab — your surname, followed by a comma, then your first name and middle initial. This format makes it easy for recipients to index the card properly.

Press the return key twice. Type your name, company (or school) name, and your address on the next four lines. Press the Return key twice (three times if you use only three lines for your name and address). Type your telephone number and press the Return key five times.

Create the next card by tabbing over to the card's tab area and typing (or copying and pasting) your name. Follow the procedure described in the previous paragraph to complete the second card. For correct

alignment, press the return key four times after cards 2 and 3 and six times after card 4. The sixth keypress should advance the I-beam to the top of the second column.

For cards 5 through 8 use the same method described for the cards in the first column. Switch to the *9-point Geneva* font to add space at the top, then select the 12-point size to complete each card. Save your template and select *Page Preview* from the *File* menu to get an overview before printing a test page (**Figure 3**). **Figure 4** shows the template printed on plain paper.

If you use a larger (or smaller) font, your template will no longer align properly with the stock; you'll need to add or delete carriage returns to adjust the layout. You can control line spacing by choosing a smaller (or larger) type size before pressing Return. Recall that at the top of each column of this template we inserted small spaces by first selecting *9-point Geneva*. If necessary, you can use even smaller fonts to adjust line spacing more precisely.

Whether you prefer an Apple II or a Mac — and whether you use a DTP program, a

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Blue #PS1622  
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\$99.95 school  
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IIc, IIc Plus, or IIgs

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Fremont, CA 94555  
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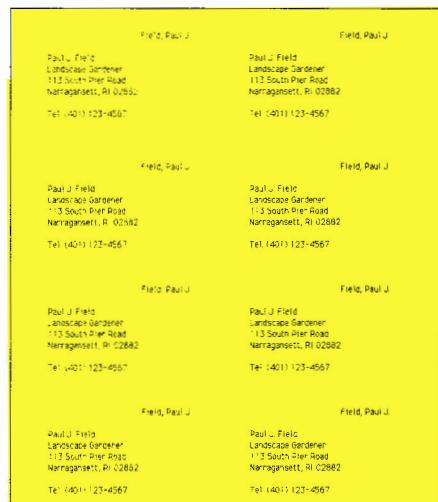
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**Figure 4. Finished Writing Center template printed on plain paper.**

word processor, or a hybrid product — you can design and print publications that until recently would have been impossible to create at home, at school, or in a small-business office. Designing your own Rolodex cards underscores the "personal" in personal computing. □

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# REVIEWS

Continued from page 27

Kids decide whether to begin a page with picture design or text creation. Labeled icons down the left side of the screen provide the tools they need to lay out scenery and any of more than 350 graphics objects.

Storybook's word processor is really only a text editor featuring word wrap, highlighted options for copy, cut, and paste, plus support for upper- and lowercase characters. On mixed-mode pages, a *Spell* button places the word for a selected piece of clip art in the story window automatically at the insertion cursor. Youngsters click on the page-turning icon to move on to the next page.

While far from being a complete desktop-publishing program, Storybook Weaver allows manipulation of entire pages, including cutting, pasting, and re-ordering.

## COMPUTING IN THE '90S

Storybook Weaver is a top-notch educational program with lots of text and graphics goodies. With pictures to give budding authors something to write about, it's bound to instill a love for creative writing in young children. The program isn't perfect, however.

First, the software is copy protected; you can't install it on a hard disk. GS owners with hard-disk systems (the number is steadily rising) won't be able to launch Storybook from a previously installed Finder (or other program selector); you must use Storybook Weaver's own system disk for program launching.

As a result, the product requires two 3.5-inch disk drives. Unfortunately, the standard GS system configuration consists of one 3.5-inch and one 5.25-inch drive. What's a poor GS owner or budget-strapped school to do?

Second, and perhaps even more important, Storybook Weaver has a very limited spelling checker. Writers choose *Spell* from the tool palette to place a word label for a selected clip object in the text window. While clip-art objects are spelled correctly, other story words may not be correct.

If the intent of the product is to "provide an environment that puts students in control of their writing," giving older elementary-school children a text editor

that lacks full spelling-check capabilities limits this control. It's like sending kids up on a trapeze without a net.

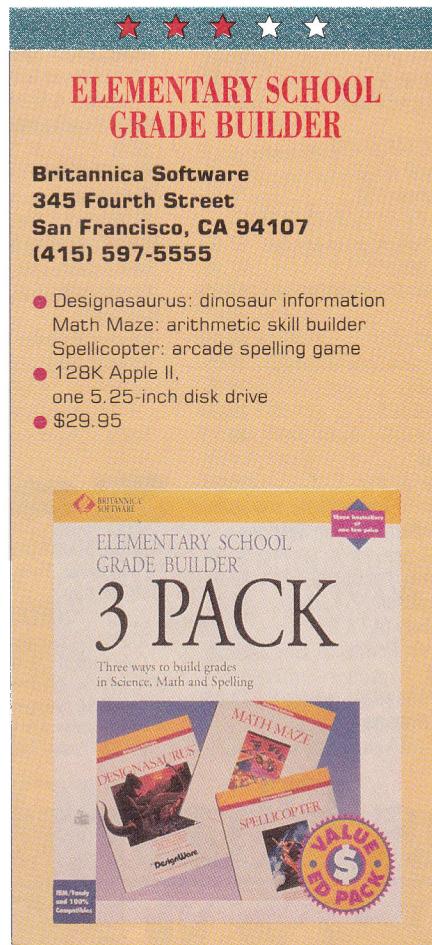
## ON THE WRITE ROAD

Despite these limitations, Storybook Weaver is a good step in the "write" direction. Kids who have difficulty choosing topics will find the program's adventure scenes and clip art helpful as story starters. The product gives them something visual to write about, relieving pressure to come up with creative ideas. The product also provides a wealth of desktop-presentation tools kids need to "publish" a book they can share with others.

For kids in kindergarten through grade 3, Storybook Weaver is definitely the "write" tool for the "write" job. Older children, however, may benefit more from a text and graphics processor that sports a spelling checker, such as AppleWorks GS from Claris or Publish It! 4.0 from Timeworks.

**Carol S. Holzberg, Ph.D.**

**Shutesbury, MA**



Over the 15-year life span of the Apple II, more than 10,000 commercially available software titles have been released. Many of those programs are no longer sold, however, as computer software generally has a one- to two-year "shelf life," after which retailers restock their shelves with newer packages.

That's unfortunate for recent purchasers of Apple II computers, as they've never had the opportunity to experience some of the real software classics.

That's about to change, however, as more and more developers are repackaging older programs and making them available, at bargain prices, to the next generation of Apple II users.

## WHAT'S IN STORE

Britannica Software's three-pack Grade Builder series of educational programs is a good example of this new trend, and just goes to show that good software doesn't deteriorate over time.

The first package, Elementary School Grade Builder, is geared toward younger students and includes three of the company's most popular programs from yesteryear — Designasaurus, Spellicopter, and Math Maze. All three educational programs masquerade as games, and all were big sellers in their heyday.

Apple II power users demanding the "latest and greatest" may think these titles show their age, but grade-school children won't care less that these programs were first published before they were born.

## BACK TO THE JUNGLE

Most elementary-school students are fascinated by dinosaurs, and they're really going to have fun with Designasaurus. Supplied on two double-sided 5.25-inch disks, this program combines three "dino-mite" activities that are bound to produce squeals of delight from youngsters.

In the *Build-a-Dinosaur* module, youngsters have the opportunity to play curator at the Museum of Natural History, with the task of reconstructing a viable dinosaur from fossilized body parts. *Walk-a-Dinosaur* lets the child control one of these creatures as it wanders through various ecosystems, battling for survival and hunting for food. Both modules increase knowledge of

animal survival in the wild and build an awareness of self-regulating ecosystems, with preferred foods, habitats, and natural enemies. The *Print-a-Dinosaur* module can produce single-page printouts of the dozen dinosaur types stored on disk or poster-sized printouts, or kids can flip the image and print it on the special "print and wear" heat-sensitive paper provided. Just iron that image onto a T-shirt for some unique attire.

#### **READIN' & WRITIN'**

Math Maze makes arithmetic practice fun and exciting. Youngsters must navigate through a maze filled with numbers, picking out the ones that'll solve the math problem that appears in a small window. The game is timed; the faster the child solves the problem, the greater the number of bonus points awarded. Forty different math mazes of varying difficulty are supplied on disk, and kids can edit any one of them or design their own. Youngsters can use a joystick or the arrow keys to navigate through mazes.

Spellicopter is a fast-action arcade game that reinforces spelling skills, with 40 word lists supplied on disk, each containing ten terms. As students reach the more-advanced levels, words become increasingly challenging, and even some adults may have difficulty spelling some of them. You can modify the word lists or create entirely new ones from scratch.

To play the game, the child chooses a word list, and the program displays the terms contained therein. If he or she okays the list, the software displays a contextual word problem, in the form of a sentence with a blank space for the missing word. The player must fly a helicopter over mountains and around clouds to pick up the missing letters.

As in Math Maze, each excursion is timed, and the faster the child spells correctly, the higher the score. Kids can navigate via joystick or arrow keys. It's a challenging game, but it's a fun way to practice spelling.

Taken alone, each program in Elementary School Grade Builder is a classic. Combined in a three-pack, they represent a bargain no parent or school district should do without.

**Joe Kohn**  
**San Rafael, CA**

If you're a middle-school teacher or the parent of a junior-high student, check out Britannica Software's Jr High School Grade Builder.

Included in the second in Britannica's three-pack series of affordable software re-releases are The Body Transparent, Grammar Examiner, and States & Traits. If you missed them the first time around, you owe it to yourself and your teenaged children to not pass them up again.

All three programs were initially released in 1984 and 1985 to rave reviews, and, although sometimes it seems that five or six years is an eternity in the computer industry, these programs are as vital and exciting today as they were back then. They cover the subject areas of anatomy, grammar, and geography; because all three programs provide for multiple skill levels and contain modules for customization, they're just as appropriate for high-school kids as they are for junior-high students.

More than a few parents and teachers are going to like them, as well. Animated demos of all modules are provided, so youngsters don't even have to read the

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# REVIEWS

three 30-page manuals included. Parents and teachers, however, will want to consult the documentation to learn how to customize the games and create their own versions.

## SING THE BODY TRANSPARENT

The Body Transparent is a science learning activity disguised as a game. It works with the keyboard, a mouse, or a joystick; three modules are included.

*Assemble the Body* is the first activity; teens learn the locations of individual bones and organs by playing a jigsaw-style puzzle game in which they move body parts on a transparent outline.

*Body Facts and Functions* displays data in an on-screen window; the goal is to point to the corresponding bone, organ, or body part on the transparent sketch.

The third module provides all the tools you need to create your own anatomy games. If you're a teacher using The Body Transparent as an adjunct to a course on health issues, for example, you might try designing a game that includes only the diseases you've already covered in the classroom.

You can edit your custom games to include additional classroom lessons as you go along. You can store a total of 18 games on disk, each containing 30 facts kids can match to body parts.

## ACE REPORTER

In Grammar Examiner each player starts at square one as a cub reporter for one of the four different "newspapers" included in the program's scenario. With each turn, students must proofread and edit a different news story.

Low-level games challenge students to correct simple punctuation and capitalization mistakes, eventually leading the player through more complex grammatical puzzles. Players correct the grammar right on screen, and the computer analyzes the edited copy.

Like the other programs in the series, Grammar Examiner can be easily edited to include new board designs, news stories, and grammar problems.

## GEOSTATION INFORMATION

States and Traits teaches the location of each U.S. state plus historic and current

facts and information about significant land formations in each state.

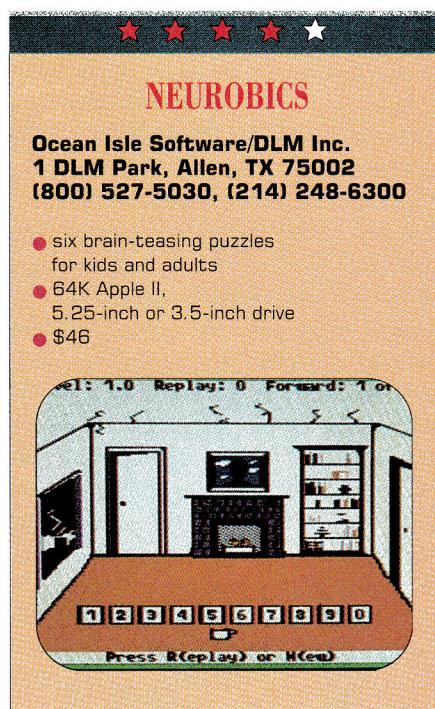
The first activity, *Place States on Map*, asks the youngster to position the outline of a state in its proper location. Kids can use either of two different map templates — one that outlines each state, and one that displays only significant land formations on a map of the United States. Playing either version will reinforce the location of each state.

The second activity, *Match States and Traits*, is filled with important data. Teachers or parents can create their own lists of facts — per-capita income or population information, for instance — and design custom games based on them.

Each of the programs in Jr High School Grade Builder is excellent in its own right. Given their flexibility and multiple levels of skill and difficulty, they're appropriate for students of all ages. That you can add to them with very little effort makes them even more valuable. At the current pricing level, both school districts and parents should consider purchasing this set of teaching tools.

**Joe Kohn**

**San Rafael, CA**



**A**t first glance, Ocean Isle Software's collection of brain teasers, Neurobics, makes a poor impression. By today's standards, the interface shows its

digital age (first released in 1989, now repackaged) with simplistic graphics and minimal sound effects. Neurobics doesn't support either a mouse or a hard-disk drive.

In addition, you can launch the program from the GS' Finder (or some comparable Apple II program selector), but the absence of a quit command requires a reboot to return to the desktop after ending a game session.

But don't be put off by Neurobics' electronic gray hair. Each puzzle in the package has "potato chip" appeal. Crunch down on any one and you won't be able to pull away from your computer until you've solved them all. Here's a brief summary of each activity.

## MENTAL GYMNASTICS

In *Reservation System*, players must assign guests to empty hotel rooms. Keeping track of unassigned rooms isn't as easy as it sounds. It's difficult to prevent double-booking because the hotel's night clerk also handles reservations.

*Reservation System* offers ten levels of play. Each level, in turn, features many game options. Players decide whether rooms appear as blank squares (harder) or with visual references such as letters or numbers (easier).

At the most difficult level, the game plays out on a grid with 70 rooms. Final score depends on how many moves it takes to complete the puzzle, the number of rooms in the puzzle, and the number of incorrect room assignments.

All in all, *Reservation System* is an entertaining mind-bender that could only be a hotelier's worst nightmare.

## UNDER COVER

In *Rain*, players find themselves in a room with a leaky roof. The object of this activity is to place pots beneath those falling drops. Success depends on placing the rain buckets in the same order as the sequence of falling drops.

When the activity begins, only three raindrops fall, one at a time, but players can increase the sequence of falling drops from three to 99 steps or have more than one drop fall per step.

Astute gaming enthusiasts who want a bigger challenge and decide to play in

"reverse" must remember the sequence of falling drops in backwards order.

If you're looking for a game that's sure to strengthen visual sequential memory and concentration, this activity is guaranteed not to rain on your parade.

#### MEMORIES

Remember those plastic hand puzzles you played with as a kid? You know, the ones with 15 jumbled numbers in a grid of 16 spaces. Solving the puzzle involved sliding the numbers around until they rearranged in proper sequence. *Tak* is an electronic version of this geometric game, with a score keeper that counts the number of moves it takes to solve a puzzle.

The game features multiple levels of difficulty, based on the number of squares contained in the grid. At the easiest level, kids work with three numbers on a 2-by-2 grid. At the hardest level, there are 69 mixed-up numbers in a 7-by-10 grid. To complete a puzzle in the fewest possible moves, players must develop strategies based on deductive reasoning.

#### PAIRING OFF

*Déjà Vu* is a game even young children will recognize and enjoy — it's Neurobics' version of *Concentration*. Start out matching pairs of letters (or numbers) on a 2-by-2 grid. Work your way up to matching squares with pairs of letters (two letters per block) on a grid of 70 squares. Sound familiar?

There's a twist. Instead of pairing up exact matches, some *Déjà Vu* rounds will have you matching two values whose sum equals the total number of squares in the grid. For example, if the grid measures 4 by 4 (16 squares), correct matching values will be numbers like 14 and 2, 8 and 8, or 12 and 4, and so on. Don't underestimate this little beast.

#### GOOD FOR BODY AND MIND

Neurobics' *Milk* builds math muscle with style. This activity does more than simply sharpen addition and subtraction skills. Problems challenge players to think critically; youngsters must perform more than one mental calculation to come up with the correct solution.

Game play involves three differently sized milk jugs. When the activity begins, the first jug holds all the milk. Players

must "pour" milk from one jug into another, until one container holds a specified amount. Milk-jug capacities and contents are displayed as youngsters perform their calculations. The computer keeps track of the number of steps it takes to solve the puzzle.

This game offers several challenging options. At the simplest level, it presents problems with two-step solutions — for instance, move milk from A to B, then from B to C. C should end up containing the right amount. At higher levels, problems may require as many as 45 steps to solve. But, at any level, it doesn't take long to discover that "Milk, it does a body good!"

#### PLAY MONEY

*Money Trail* sends players in pursuit of counterfeit cash. Detectives mentally manipulate a series of number (or letter) pairs to track down which item in the chain represents the counterfeiter and which the

bank teller. Players rearrange pairs to form a unidirectional sequence. The counterfeiter is always the first number (or letter), while the teller is always the last.

At the hardest level, challengers work on a 4-by-7 grid involving 28 possible suspects. Final score depends on the number of moves and misses it takes to solve the problem.

#### A MIND IS A TERRIBLE THING TO WASTE

Unlike those mindless arcade zappers, Neurobics puzzles do more than just entertain: They build memory skills and sharpen problem-solving abilities. Even though the program's graphics and sound abilities are limited, players won't be disappointed. This challenging collection of brain-teasers delivers an electronic tray of goodies the whole family will enjoy. Boot up and let your mind chow down. □

**Carol S. Holzberg, Ph.D.  
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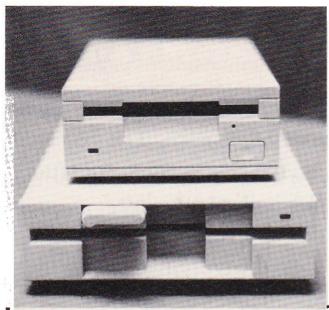
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## LEARNING CURVE

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technologies enable us to access the record of mankind's accomplishments at ever greater speed, yet this access is meaningless unless we know how to use the information. Much of today's teaching still focuses on fact delivery, when facts are much easier to come by than they were just a few years ago.

We must, instead, help students learn to use, and question, all the information they have at their fingertips. CD-ROM databases are proliferating like wildfire. Library research is done with fingers on a keyboard, not with feet walking down aisles of books. And yet most schools sit virtually unchanged since the 1950s. Within a year, today's wonders will be pushed aside by even newer technologies that will bring more information to more people at still lower cost. Without funding for meaningful staff and equipment development, our public schools will become informational backwaters, and access to these powerful resources will be from our homes instead.

Loss of our system of public education will mean loss of the middle class and opportunities for upward mobility. Without public education, the rich will get richer and the poor will get poorer. One need only visit schools in most Third World countries to see one tragic vision of America 2000.

What can we do? We need to hold our business and political leaders to their words. If you find that your state government is preaching early intervention but putting all its money into prisons, write to your legislators and explain that if school funding is increased, students will do better and crime will decrease, saving money over the long term.

The Business Roundtable (200 Park Avenue, New York, NY 10166) has commissioned a terrific book called *Primer on Education*. Once you've read it, contact local companies belonging to the National Alliance of Business and let them know you're ready to support the Roundtable's recommendations — and that you need corporate support for your effort.

In other words, it's time to stop predicting rain and to start building arks. Become an ark builder in your community, and help support the best educational system on the planet. □

WRITE TO DAVID THORNBURG AT 1561 LAUREL, SUITE A, SAN CARLOS, CA 94070. ENCLOSE AN SASE IF YOU'D LIKE A PERSONAL REPLY.

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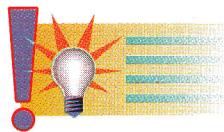
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# HINTS

# ACCELERATOR BASICS

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## **SPEED CONTROL**

Mixing products from different developers can sometimes result in some surprising incompatibilities. With a bit of ingenuity and a little technical support, though, you can often find a “workaround.”

I recently installed a ZipGSX accelerator in my Apple IIgs and discovered that my PC Transporter's Transdrive (a 5.25-inch MS-DOS-format floppy from Applied Engineering) wouldn't work unless the system speed was less than 7 megahertz. Owing to the Transdrive's circuitry, that turned out to be true even when the PC Transporter's slot was set to normal speed via the Zip Control Panel.

I also discovered that although my MS-DOS system disk worked at 81.25 percent (or 7.1 megahertz), Lotus 1-2-3 required speeds as slow as 31.25 percent. To compound my problems, the PC Transporter system disk is ProDOS 8 (for compatibility with Apple IIes), which barred me from using my handy GS/OS ZipGSX new desk accessory.

Of course, there was the option of setting system speed to normal (1 megahertz) from the GS' built-in Control Panel, which turns off the ZipGSX automatically, or using the ZipGSX classic desk accessory; the first solution would slow operations to a crawl, however, while the second would mean popping in and out of the Control Panel all the time. I wondered if there was a way to shut the ZipGSX off on boot-up from an Applesoft startup program.

I called Zip Technology and got the answer: You can switch the ZipGSX on or off from BASIC via a short machine-language routine. I whipped out my trusty 6502 book and looked up the op codes, producing the 25-byte routine shown in Listing 1 below.

The ZipGSX uses I/O (input/output) registers \$C058 to \$C05F. You have to "unlock" them by writing a \$5A to \$C05A four times in succession. That's Zip's way of preventing accidental changes. Once unlocked, one \$00 to \$C05A turns the board off, leaving the GS at its native speed of 2.8 megahertz. Then you lock

the registers back up again by writing \$5A to \$C05A. To turn the card back on, unlock the registers and write any value to \$C05B. (Note that in terms of the code in Listing 1, that means substituting STA \$C05B in the seventh line.)

To POKE and CALL  
this routine, just add  
the lines shown in

**Listing 2** to your startup program, and it will place the routine at \$6000 (24576). (Substitute 91 for 90 as the next-to-last number in line 1020 if you want to turn the ZipGSX back on.) If you don't want to fumble with speed settings every time you use your PC Transporter with your ZipGSX, this is a pretty easy solution.

**— Paul Creager  
San Jose, CA**

## **PRODUCT INFORMATION**

<b>PC Transporter,</b> \$499	<b>ZipGSX</b> Zip Technology 5601 Slauson Ave. Suite 190 Culver City, CA 90230 (213) 337-1313
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**— Doreen Means, inCider/A+ staff**

STA	\$C05A
STA	\$C05A
LDA	#\$00
STA	\$C05A
LDA	#\$5A
STA	\$C05A
RTS	

```
20 FOR I = 24576 TO 24600:  
    READ D: POKE I,D: NEXT I  
25 CALL 24576  
1000 DATA 169,90,141,90,192  
1010 DATA 141,90,192,141,90,192  
1020 DATA 141,90,192,169,0,141,90,192  
1030 DATA 169,165,141,90,192,96
```

### **Listing 1. Turning ZipGSX off.**

**Listing 2. Adding ZipGSX routine to startup program.**

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### About the Author—

**Ruth Witkin** is an author and software specialist in the Apple II field. Ms. Witkin writes *inCider/A+*'s AppleWorks in Action column and is the creator of the popular *Success with AppleWorks* template series. Her AppleWorks books include *The Best Book of AppleWorks* and *Personal Money Management*.

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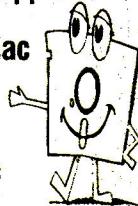
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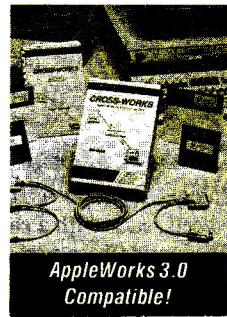
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## SAVING THE SYSTEM

**Time to stop predicting rain: Without funding, our schools will become informational backwaters.**

**H**arvey Long, a friend of mine from IBM, says that those who live by the crystal ball shall eat crushed glass. Even so, it's important to think intelligently about the future, since, as someone else once pointed out, we'll be spending the rest of our lives in it. Apple Computer, for example, makes statements about the future each time it introduces a new product.



By DAVID D. THORNBURG, Ph.D.

Based on its offerings last October, the future seems to lie in faster, less-expensive high-end computers for the business customer and virtual abandonment of products priced for the education market. My point is that you learn much more from what organizations do than from what they say. Similarly, because there's so much talk in the education world today — so much rhetoric and verbal posturing — we need to listen less and focus instead on what our leaders are actually doing to help shape a public-education system that will meet the needs of students in the 21st century.

Education is getting a lot of press these days, but much of the polemic cuts our system down without offering an infusion of resources to improve it. In my opinion, we simply don't value public education anymore. To see what we value in our society, let's look at our investments. They reflect our values, plain and simple.

Many states are cutting back on school programs, claiming that \$4000 or less per child per year is too much to spend; yet we spend \$21,000 per year or more housing a single inmate in a state prison. As long as

our society would rather invest in prisons than schools, none of our proclamations about "educational renaissance" mean a thing. Just look at the information gadgets



that proliferate everywhere — except in most of our public schools. Does the sorry state of financial support for education reflect the fact that children aren't allowed to vote? What are we to make of the observation that many school districts with a high percentage of minority students receive less funding per student than neighboring districts?

Our public-education system is being asked to accomplish wonders without the support it deserves. It amazes me that many of the education bashers — people like Lee Iacocca, for example — blithely preside over companies that lose billions while they beg for protection from foreign competition. These same people tell us that our educational system needs to compete in the global setting, with constant reference to the poor performance of U.S. students measured against those of other countries. Elected officials who let us fall into the S&L quagmire criticize what we're doing in education, and we lap up the bad news.

In fact, we're doing a tremendous job. When comparing science scores internationally, the education bashers forget to mention that *all* our students are being compared with *only* the best and brightest of most other nations. In the U.S., all 13-year-olds are in school; that's just not the case in much of the rest of the world.

Beneath all the hand wringing and misinformation, there lies an issue of concern to us all: Today's students must be prepared for life in the future, yet I've seen not a single document out of Washington that says what it means to be educated for the 21st century. Our Secretary of Education, Lamar Alexander, talks about "world-class standards" for education, yet admits that even he doesn't know what these are.

I do know this much: The educational needs of today's students are different from those of my generation. Information

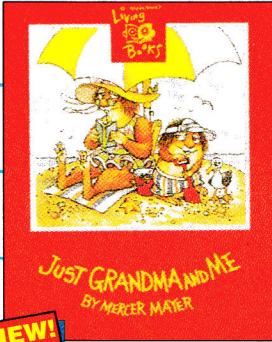
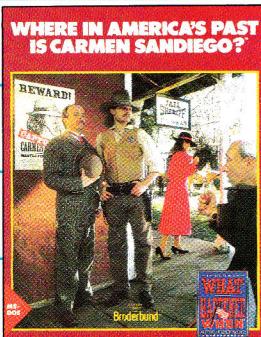
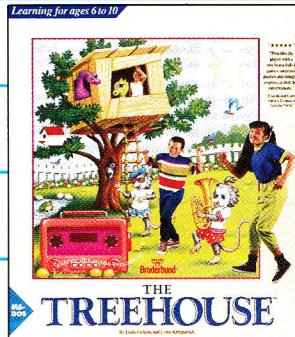
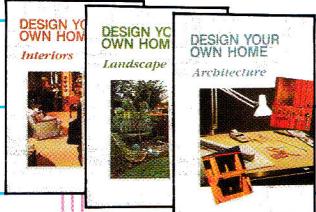
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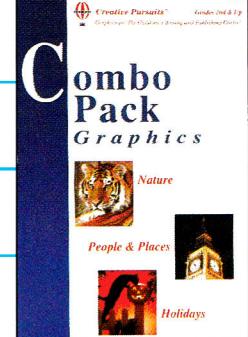
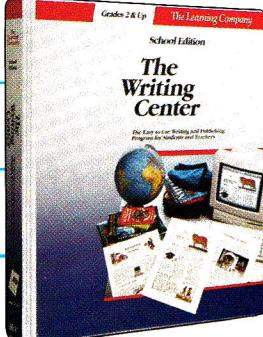
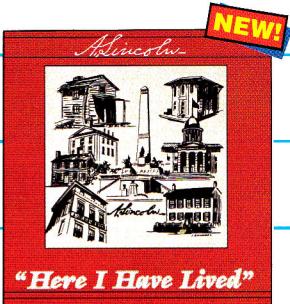
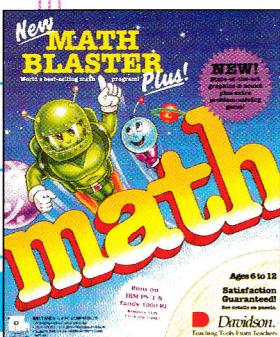
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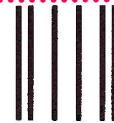
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