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Apple II/Mac
AN IDG COMMUNICATIONS PUBLICATION
February 1991

PIPE DREAMS
Go Plumb Crazy
Editors' Choice, p. 96

New! HyperCard IIGS
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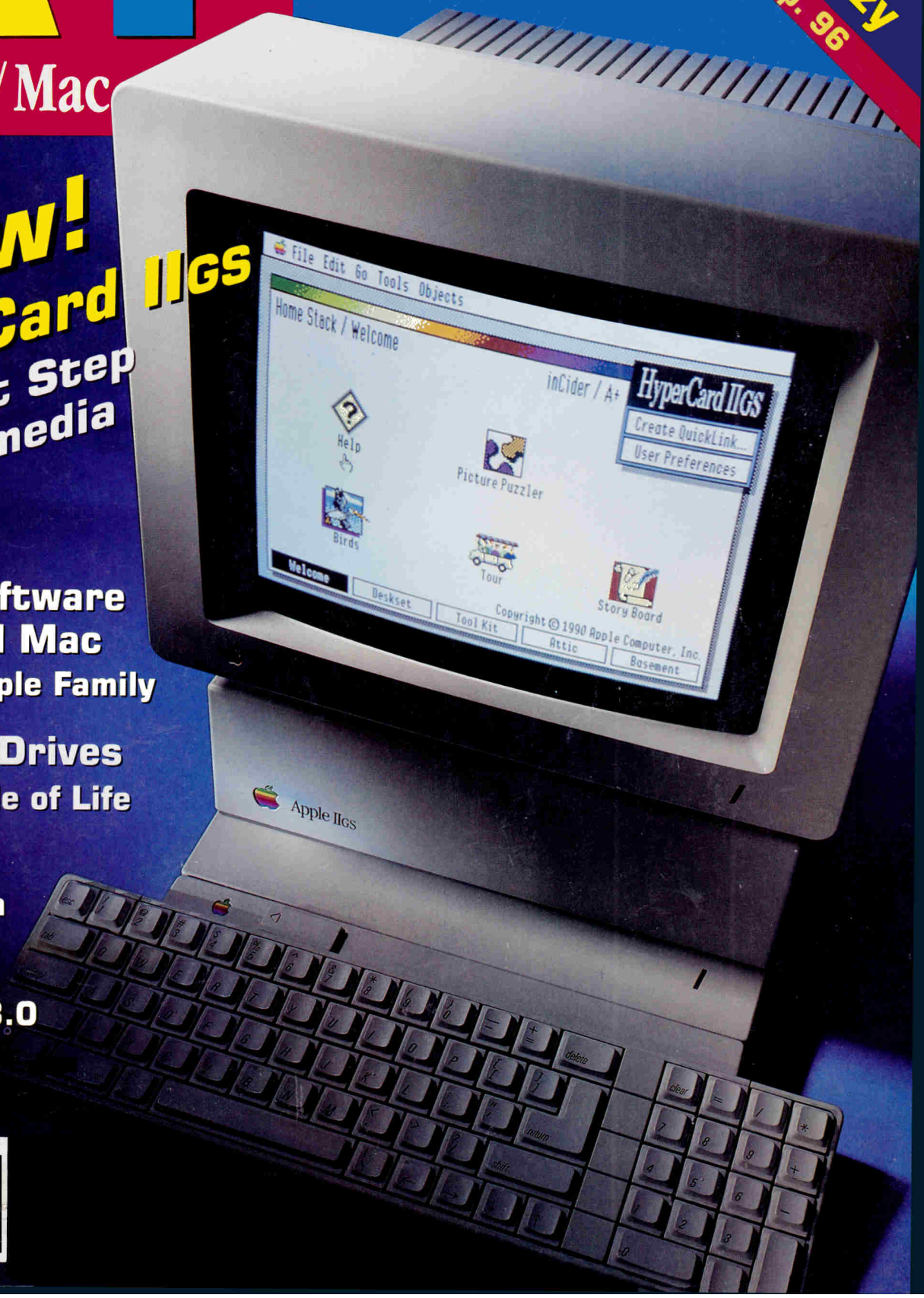

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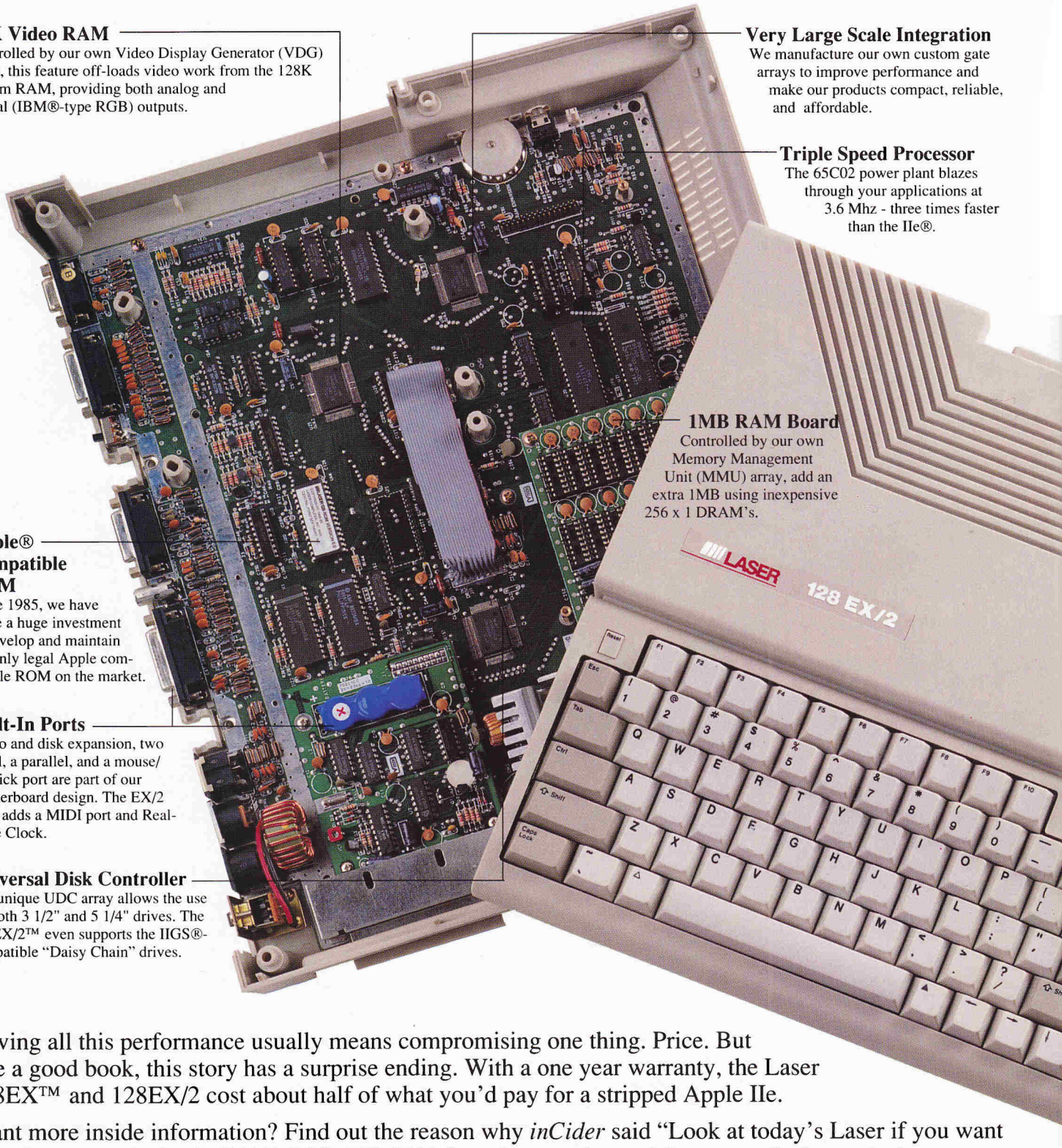

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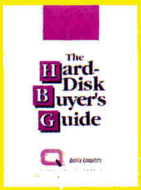

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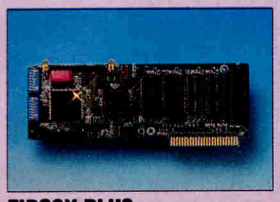

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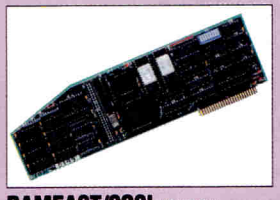

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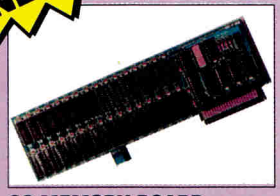

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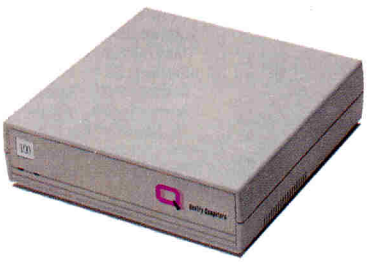

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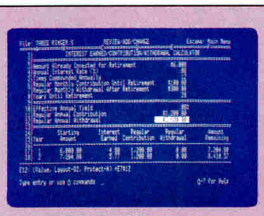

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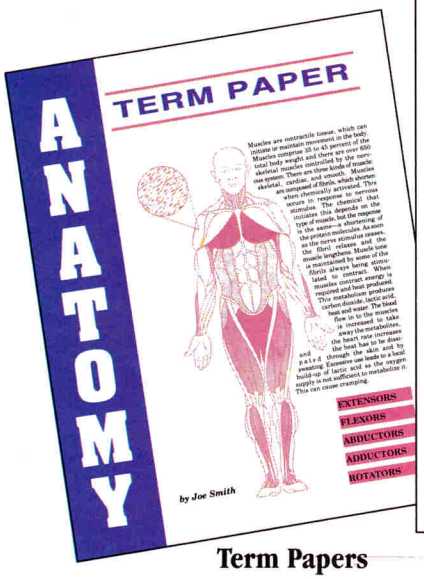

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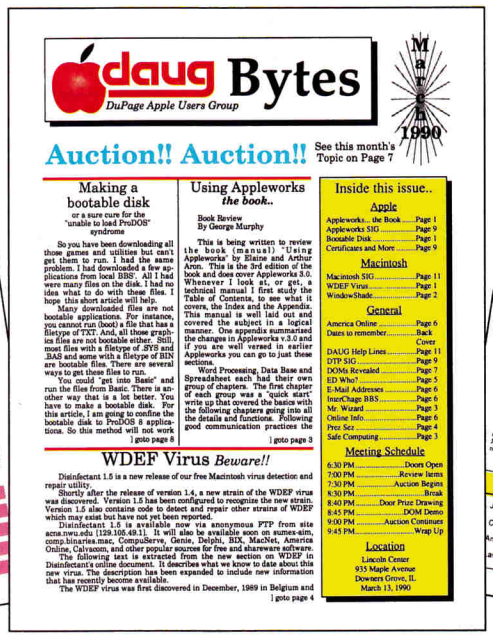

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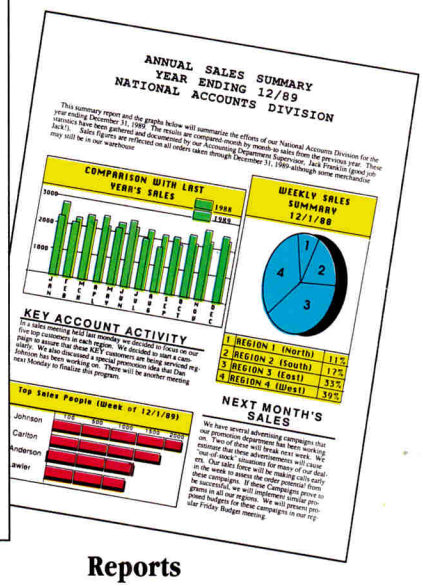

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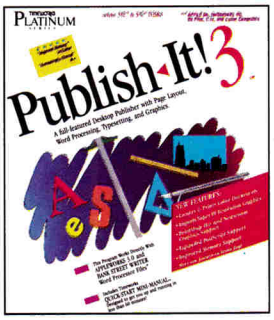

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p. 37

p. 47

FEBRUARY

1991 Vol. 9 No. 2

ARTICLES

37 HyperCard IIgs: The Apple II Culture Reborn
Browse through thousands of commercial and public-domain stacks or write your own — for home, school, and small-business applications, Apple's popular multimedia product for the Macintosh is reviving the do-it-yourself spirit of the Apple II.

47 Hard-Disk Drives Made Easy: The SCSI Side of Life
Tired of the floppy-disk shuffle? Get a SCSI hard drive and "cache" in on speed and storage. In the second installment of our six-part series, we'll put three interface cards to the test — Apple's High Speed SCSI, CV Technologies' RamFast, and CMS' SCSI.

52 Family Ties: A Striking Resemblance in System Software
Nowhere are Apples' shared traits more evident than in the machines' system software — an integrated, consistent method of file and program organization and maintenance. Master the GS' Finder and system tools and you've got it made on the Mac.

COLUMNS

inCider's View • *Dan Muse*
The Heat of Battle 8
Reporting from the front lines, our intrepid editor in chief takes on the critics as we gear up for another month of expanded II/Mac coverage.

AppleWorks in Action • *Ruth Witkin*
The Taxman Cometh 60
It's that time of year again — so get organized with the help of an AppleWorks spreadsheet.

Bridging the Gap • *Gregg Keizer*
Macintosh Odyssey 66
The lure of the Mac doesn't mean you have to give up your II — the two machines *can* achieve a peaceful coexistence.

Press Room • *Cynthia E. Field*
Top Form 70
If you're drowning in a deluge of bureaucratic paperwork, Publish It! 3 can bail you out.

Apple IIgs Basics • *Joe Abernathy*
Tools of the Trade 76
Tap into the power of the Toolbox and make a splash on your GS' screen.

Learning Curve • *David D. Thornburg*
Pursuit of Knowledge 84
We need more hackers — in all areas of scholarship. Can computers keep kids' intrinsic love of learning alive?

DEPARTMENTS

Letters to the Editor 12

What's New
Hardware, Software, Education Notes, APA Notes, Shareware Solutions 16

Apple Clinic
Wrap That Rascal: Got a Virus?, Ejecting Disks, AppleWorks Crash, File Transfer: IBM to Apple, Can't Copy Disks, Using Classroom Monitors, AppleWorks Clinic 28

Reviews
BannerMania, LogoExpress, Gold Rush!, EuroWorks 3.0 32

Hints & Techniques
ColorWorks: Bright Ideas 88

Editors' Choice
Plumb Crazy: Pipe Dreams 96

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INCIDER'S VIEW

THE HEAT OF BATTLE

By DAN MUSE * EDITOR IN CHIEF

There's no retreat. They don't call us the F-Troop of magazine publishing for nothing.

"The terrible grumble, and rumble, and roar,
Telling us that battle was on once more . . . ."
— with apologies to Thomas Buchanan Read

PETERBOROUGH, NH — Month 3 on the front. Heavy artillery fire from Apple II on-line services and user groups keeps *inCider/A+* editors and writers on the defensive, while strong support from loyal readers keeps troop morale high. A decisive victory at the Minnesota Educational Computing Conference in November reinforces staff objectives. HQ expects a tough battle at Long Beach in early December, though, where critical forces are sure to launch a heavy offensive at AppleFest.

IF *INCIDER/A+*'S DECISION TO ADD coverage of the Mac were described as a war, the above depiction would be appropriate. Given the shots fired in all directions, maybe the battle metaphor applies. Since our December issue hit the streets, emotions have run high and attacks have been numerous. Each conversation with a reader is a battle in itself. We win some and lose a few. The mood in our otherwise peaceful New England offices has ranged from the contentment that comes from knowing we're on the right track to a shell-shocked numbness that goes with a steady barrage of verbal and written attacks. (And, please, let's leave my mother out of this.)

The decision to expand our coverage to address the Macintosh in education and home uses has incited battles that are not without casualties. We expected that. But there's no retreating now. They don't call us the F-Troop of magazine publishing for nothing. We remain convinced that the Apple II — *inCider/A+*'s bread-and-butter — and the Macintosh share many traits. This month's cover story on HyperCard IIGS (p. 37) discusses the similarities between it and the Mac version. "Family Ties — A Striking Resemblance in System Software" (p. 52) explores the many common attributes of the Mac and GS Finders. In short, if you've used a Mac, using an Apple IIGS comes naturally, and vice versa.

Also this month — while our critics launch bombs — we're launching a new column called Bridging the Gap (p. 66). According to columnist Gregg Keizer, Bridging the Gap is all about "ingenuity in building links between two powerful computers." Notice, naysayers, that the column isn't called "Killing the II" or "Better Living Through Macintosh."

Then why discuss the Mac at all, you ask? The ammunition to defend our position is plentiful. Look at the statement issued recently by Robert Puette, president of Apple USA. To understand Apple's position on the Apple II doesn't require reading between the lines, it just requires reading: "We have no plans at this time to introduce new, stand-alone Apple II models. However, we will incorporate Apple II technology into current and future platforms . . . . We believe that this compatibility strategy will preserve customers' investments in the Apple II, while allowing them to move to new technology platforms if they wish."

That's about as black-and-white as Apple can say anything. Puette didn't say, "We cannot comment on unannounced products," even once. Say what you will, but that's progress.

We don't agree with Apple's decision to not develop new Apple II platforms. After all, six million users can't be wrong. While the decision to not make new IIs is a bad one, the idea of protecting your investment through shared peripherals, networking, new operating systems, and so on is a good one.

If you have an Apple II and don't plan on adding a Mac to your repertoire, great. We'll continue to offer AppleWorks in Action, Press Room, Applesoft Adviser, Apple Clinic, AppleWorks Clinic, Notes from the AppleWorks Programmers Association, reviews of new Apple II products, and so on. But if you're curious about that new Mac in the classroom or office across the hall, we'll report on that, too.

In the meantime, the battle rages on . . . . ❑

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LETTERS TO THE EDITOR

DEAR JOHN. . .

WE PRINTED THE LETTER AND THE people spoke. The following is a sample of your responses to Apple CEO John Sculley's open letter to the Apple II community. (See October 1990, p. 8.) Some of you said you understood his position, some didn't. Some waxed poetic — some just wanted John Sculley waxed.

JOHN SCULLEY'S LETTER TO Apple II users rang no bells with me. Press releases are just vapor. We need hardware. We have a system that's five years old, but it's still plagued with most of the problems that crippled it when it was released. I'm not asking for a lot. Put a fast-moving processor on it, so that publishers, once again, will see this machine as a platform for meaningful software.

I picked up *Time* magazine and saw a two-page ad from Apple that completely demoralized me. It showed a picture of the MS-DOS Windows software with the caption, "Now that everyone agrees how a computer should work . . . look at the only one that works that way" — and it included a picture of a Mac. Mr. Sculley, there's another computer that works that way. Look around the back halls — your company makes it.

Doyle H. Brown
123 Edward Street
Athens, PA 18810

I READ WITH AMUSEMENT JOHN Sculley's promise to "continue to nourish" the Apple II family. I can assure him that Apple has lost many customers with his decision to discontinue the Apple contract with the Army/Air Force Exchange Service military sales outlets. Customers shopping for their first computer have their choice of anything you can think of except Apple computers. If Mr. Sculley is serious about his commitment to customer support and increasing the Apple community, he should renew his contract with AAFES.

David J. Pollock
P.O. Box 8851
APO NY 09012

I FEEL I OWE A LOT TO APPLE AND they owe as much to me. I've spent several thousand dollars on software and upgrades as an Apple devotee since 1980. I'm now running two II Pluses and a IIe as well as a Mac Plus. It was a real service to the Apple II community for you to print John Sculley's open letter. Unfortunately, he doesn't raise my level of optimism. Mr. Sculley states that he has put the future of the Apple II in the hands of the vice president of software — hardly the most effective company officer to promote hardware improvement.

Arthur Radcliffe
2818 Chaparral Drive
Fort Collins, CO 80526

MR. SCULLEY WROTE US DEDIcated II users in order to look like an angel while he stabs us in the back. Where are the commercials and ads for the II? The support he talks about is a joke — and what about those prices? Why don't all the II users pool their money and gain a controlling interest in Apple Computer? We could make a change for the better.

Ruel Smith
inCider subscriber

I'VE LONG FELT THAT APPLE offered little or no support to its users. Apple users have demonstrated a much greater degree of loyalty to Apple than the other way around.

Jerold Murdock
Rt.4 Box 340-E
Henderson, NC 27536

WE, THE APPLE II FAMILY, ARE the slaves that keep the Macintosh experiments alive with the money we spend on Apple II systems. You give us lip service and nothing concrete to increase our longevity. This is an injustice to the productive brother that keeps the family alive.

Phillip Tulim
P.O. Box 5473
Chevak, AK 99563

MR. SCULLEY REMINDS ME OF the coach of a losing team who's trying to give the troops a pep talk in the hope that somehow it'll make a difference in the outcome of the game. When I read between the lines, I get a completely different view. But, when you think about it, what else could he say?

James Harris
6990 Peters Road
Fairburn, GA 30213

ON THE OTHER HAND

I JUST RECEIVED MY NOVEMBER issue of *inCider/A+* and read "All in the Family" (*inCider*'s View, p. 8). I want to commend you on it. This is the type of attitude and point of view I've wanted to see from you for quite some time. Next, I'd like to see you challenge third-party developers to develop hardware/software so that the IIGS can use Mac software. (I know Apple has announced that the Mac LC will be able to use Apple II software, but I think the other way around is more important.)

Thanks again for taking this major step.

Robert Kielhorn
6147 North Landino Drive
Westlake Village, CA 91361

Sticky Situation

AS FEWER COMPANIES SUPPORT the Apple II, they put more Apple II owners in a bind. While playing Trinity (an Infocom game) I got stuck, so I ordered an *Invisiclues* hint book. A week after I placed my order, the company informed me that it no longer produces this book. If anyone has the hint book, I'd like to either buy it or trade it for one of mine.

This lack of customer support is another sign of the declining world of the Apple II. If companies can't even provide the necessary information to sustain today's old programs, what kind of support will we receive when tomorrow's programs become old? I encourage all software producers to stand by their customers or they may end up losing them.

Brian Devendor
5742 N. 96th Street
Milwaukee, WI 53225

We can't help you with your search for the Invisiclues *hint book, but* Quest for Clues *($25), from the people who bring you* Questbusters, The Adventurers Journal *is the next best thing. To order your copy, contact Questbusters, P.O. Box 5845, Tuscon, AZ 85703. (The company doesn't list a phone number because it doesn't take orders or give hints over the phone.) The last part of your letter shines light on a crucial flaw in the thinking of many manufacturers of hardware and software for the Apple II market. Not supporting older products sets a dangerous precedent indeed.* — *eds.*

LaserWriting with IIe-ase

IN THE OCTOBER 1990 LETTERS column you stated that using a LaserWriter with Apple II computers requires an Apple II Workstation card. (See "Staying Loyal," p. 12.) This is true only if you want to network several computers with your printer. If you're using only one computer, you can connect your computer to the RS-232 25-pin port on the LaserWriter IINT, IINTX, and PLPNT via a SuperSerial card or the IIc/IIc Plus serial port If you have a LaserWriter SC or PLPSC, you must use an Apple High-Speed SCSI card to connect to an Apple II Plus, IIe, or IIGS. The IIc/IIc Plus can't connect to the SC printers, because there's no way currently to convert its serial port to SCSI.

There are also many non-Apple laser

The Apple IIGS: What the Mac LC Should Have Been?

YOUR POINT IN DECEMBER'S article "Meet the Mac LC: What the Apple IIGS Should Have Been?" (p. 40) suggests that if the Mac LC had been introduced in 1986, rather than the IIGS, people would've been fairly happy with a transition to the Mac. History doesn't accommodate "what ifs," however, so at this point, we should ask, "Is the Apple IIGS what the Mac LC should have been?"

The unexpected factor today is the world of multimedia — and the Apple IIGS is arguably the ideal multimedia (or hypermedia) machine. Regardless of what term you use, this environment will be more significant in the '90s than desktop publishing was in the '80s, particularly in the classroom. The ideal multimedia machine should have color graphics, excellent sound, and the ability to connect to laser discs, CD-ROM, and VCRs. It should be easy and intuitive to use, as well as affordable. Users should be able to present their work, and record and transport it easily to share with others. The Apple IIGS has all this and more.

Let's suppose a student creates a multimedia report and presents it to the class. With the Apple IIGS, he or she can use a standard classroom monitor or a TV — without special hardware. Although a TV isn't great for displaying 80-column text screens, multimedia presentations with graphics, larger text, and video sequences from a laser disc look fine. On a Mac or a PC, a projection system that can handle true color probably costs $2000–$3000 or more.

Laser discs combined with a Video Overlay Card let anyone create exciting results. On the Apple IIGS, a school can buy a such a card for about $400. On the Mac LC (if a card were available), using the slot for a video card would preclude using the IIe card. On other Mac models, cards that work similarly to the Video Overlay Card cost around $2500. On the Mac the projector and Overlay Card combined translate to an additional $4000–$5000.

You can also route the Apple IIGS video through any common VCR and record both the audio and video portions of the presentation. With this capability, parents can see what their children do at school and keep a permanent record of the moment. Also, businesspeople can go to conferences with just a videotape — without lugging tons of computer hardware. Macs and PCs require a special adapter (an NTSC converter), which can be an expensive addition. Once you're aware of what the GS can do, hearing that another computer can't be recorded with a VCR is like hearing it can't be attached to a printer.

Schools that purchase Mac LCs, hoping for a color multimedia machine, will be surprised to discover that HyperCard on the Mac is only black-and-white. A limited ability to display single-color graphics images is available, but to just draw a line or two in color, you'll need a IIGS with HyperCard or HyperStudio. Want to use the microphone on the LC? You'll have to leave HyperCard, run a separate program, and go through some additional steps to incorporate the sound. On a IIGS with HyperStudio, you can easily integrate sound into the overall environment.

Last of all is the GS' working environment. Stack building on the GS is significantly easier. Thousands of schools are using the Apple IIGS for multimedia right now, and projects created entirely by first-graders are by no means unusual. Through user groups, mail-order catalogs, and on-line services such as America Online, CompuServe, and GEnie, you'll find almost 200 megabytes of all kinds of hypermedia applications (stacks) — all for the IIGS.

What does the future hold for the IIGS? The machine is *not* outdated technology. It sports features that aren't currently available in any machine, and offers a solution that's relevant to the next revolution in computing. If you haven't seen yet what multimedia and the Apple IIGS are all about, now is the time to find out what the future holds and how you can make that future a reality. If you have a IIGS already, you'll be happy to know you own the best machine with which to enter the '90s.

Roger Wagner
Roger Wagner Publishing
1050 Pioneer Way, Suite P
El Cajon, CA 92020

and ink-jet printers with RS-232 interfaces. The Hewlett-Packard DeskJet and DeskJet+ even have Epson FX emulation cartridges available that'll let you print 300 DPI resolution graphics. There's no such cartridge available for the HP LaserJets, but HP's technical service says that one may be available soon.

Gregg D. Brekke
Beagle Bros Customer Support
6215 Ferris Square, Suite 100
San Diego, CA 92121

UPDATE

At press time, Quality Computers was shipping version 7.0 of SuperPatch (January 1991, p. 37). Some of the new patches include turning on the zoom immediately after loading a file, customizing page breaks, disabling the delete-file option, customizing and disabling various displays and messages, and automatic date insertion in reports. Registered owners of version 6.1 can upgrade to version 7.0 by calling Quality Computers at (800) 966-1508. The upgrade costs $12 plus $3 shipping and handling. If you purchased version 6.1 after October 1, 1991, you can get a free update by sending your original disk and a copy of your sales receipt to Quality Computers.

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Circle 297 on Reader Service Card.

CORRECTIONS

In our July 1990 issue we stated incorrectly that Magic Window is a discontinued product ("Spell it Right," Letters, p. 10). According to Jon Gurr, Managing Director, MGA SoftCat, 41 Clinique Ports Street, Rye, East Sussex TN31 7AD, England (FAX 011-44-797- 226721) MGA SoftCat stocks ArtSci's whole range of productivity tools for the Apple II series, and ships worldwide. Magic Words is a spell checker specifically for Magic Window, and the company can supply Magic Window users with a copy for $29.95 (originally $69.95). The package requires 48K and DOS 3.3, and works with Magic Window, Magic Window II, and Magic Window IIe. For a catalogue and price list giving details of other "discontinued" products, write or fax the address above.

To execute command 4 (unlock) before command 2 in December's "IIc Plus Speed" program listing (p. 22), add:

```
145 POKE L=1,4 : CALL :
    REM Unlock the accelerator
```

Thanks to Chuck Stites from Ormond Beach, FL, for calling our attention to the omission. Special thanks to Steve Bernacki, an eighth-grader from Northboro, MA, who tested the patch.

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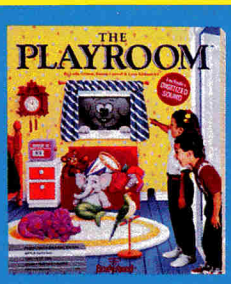

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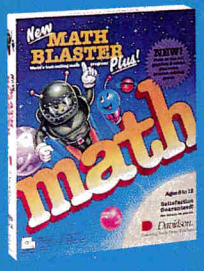

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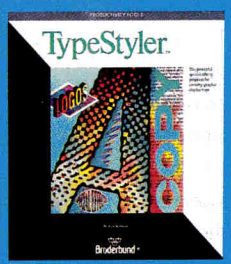

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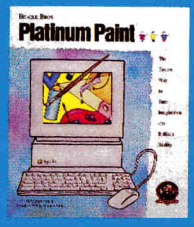

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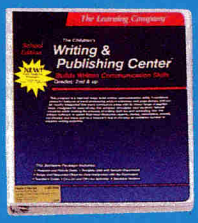

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SOFTWARE

WHAT'S NEW

edited by Paul Statt

Apple II Per Sempre!

When you think of Italy, you probably think of wine, sports cars, designer fashions, and great food. (Us, too.) Thanks to reports from Applied Engineering's President and Chief Executive Officer Bob Carroll and Sales Manager Tom Milks, though, we now know that we can add Apple IIs to the list of Italian favorites.

Carroll told inCider/A+ that the Apple II spirit is alive and well in Italy. The enthusiasm toward the Apple II at Rassegna Del Computer e Attrezzature Ufficio — a conference for Apple and MS-DOS computer users — was reminiscent of the "enthusiasm you'd find at AppleFest," Carroll says.

The conference, which ran from October 19–21, was organized by Claudio T. Alfieri, managing director of The Wozniak Foundation. Alfieri, whose organization has no official ties to the Woz, played host to Carroll and Milks and treated the pair like "kings," according to Carroll.

Applied Engineering — a hit in Italy.

Each morning Carroll and Milks were picked up in a limousine and driven to the conference. According to Carroll, someone signaled the conference directors as the two were about to enter the hall, and the duo was serenaded with "The Star Spangled Banner." This tribute occurred on each of the three days of the conference.

Carroll said that both he and Milks had interpreters, who made it easier to get a true sense of exactly how Italian Apple II users feel. You may be surprised to learn that they feel much the same way most Apple II users feel in America — angry and frustrated. In fact, Carroll brought back 1500 letters to Apple expressing support for the II line.

How do Italians feel about the Mac? True Apple II lovers reacted as expected. "Some put their fingers in their mouths, but those were the hard-core types. Others expressed some interest in the just-announced LC, IIIsi, and Classic," Carroll said.

Most of the enthusiasm centered around the IIgs, according to Carroll, who also said that the hot Applied Engineering products at the conference were the TransWarp GS and the Sonic Blaster. And just how had all these Italians heard about Applied Engineering? "They had inCider/A+," Carroll claims. (Yeah, we knew that.) — D.M.

SOFTWARE

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The Visionary GS video digitizer reviewed in the September 1990 issue of inCider (p. 36) is now available from New Concepts, 665 West Jaskson Street, Woodstock, IL 60098, (815) 338-8658 or (800) 869-9152.

UPDATES

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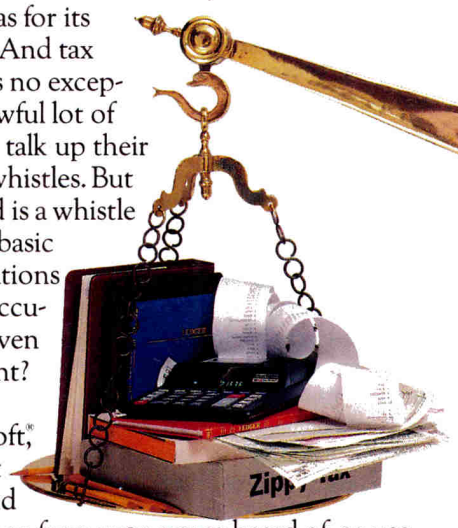

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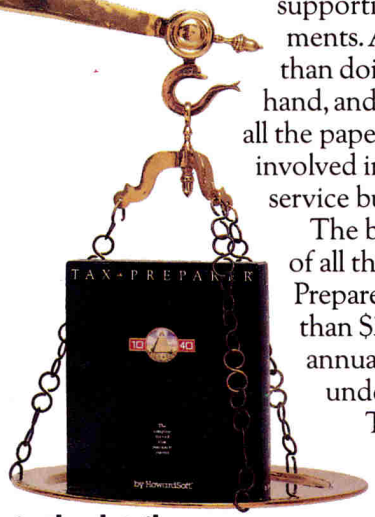

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All this is why, for the past 10 years, Tax Preparer has received kudos from such diverse sources as The Wall Street Journal, Business Week, PC Magazine, PC World, A+ and InCider. And why, despite its rather stuffy reputation, it's been featured on the Today Show and Good Morning America. Even their manual consistently gets rave reviews for its clarity and completeness.

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▼ NOTES from the AppleWorks Programmers Association

Users & Programmers Sharing the Power to Create

▼AW tip: APA member Jack Countryman has a great new tip that can save you hours of rekeying data. Now you can transfer data into AppleWorks from about any program or operating system — including those that support non-Apple computers.

Some programs print data only on paper, others print to non-ASCII disk files, still others print to non-ProDOS disk files or files that are unreadable by AppleWorks. To make matters even more complicated, you probably have difficulty transferring DOS 3.3, Pascal, and MS-DOS files. But by using this technique, conversion of data from Bank Street Writer, PFS Write, various educational programs, spreadsheets, databases, and other applications into the AppleWorks word processor is relatively easy and inexpensive. (You can't transfer graphics, though, only text.)

You'll need two computers and a connecting modem cable, but you won't need a modem. The first (source) computer may be any brand, use any operating system, and run any source program that will print data to most printers.

An Apple II is the second (destination) computer. You'll need an Apple II telecommunications program that will capture a ProDOS ASCII (TXT) file or an AppleWorks word-processing file on the Apple II side. Connect one end of a modem cable with an RS-232C or an appropriate cable connector to the serial printer port of the source computer. Then connect the other end of the cable with appropriate cable connector or adapter (RS-232C or DIN mini-8) to the Apple II's modem port.

Apple IIe owners who normally use the Apple Super Serial Card (SSC) for their printer can configure it easily for a modem port (RS-233C). The Apple IIc and IIgs have built-in modem ports (DIN mini-8).

Your Apple II terminal program settings should be set to text capture, half-duplex (host), 9600 baud, DCD off, and DSR/DTR off.

To start the transfer, boot your Apple II terminal program, get into terminal mode, and turn on the recording buffer. Then from the source computer use the source program to print the desired data from the source computer as if to the printer. The text data will appear on the screen of the Apple II and your recording buffer file will captured it. Save this file to disk.

Now quit the terminal program. From the AppleWorks AWP, create an AWP file from an ASCII (TXT) if necessary, then read the file with your AppleWorks word processor. If you're using TimeOut TeleComm (see the AW enhancement below) you need not make the ASCII-to-AWP conversion.

You may need to clean up the file to remove spurious characters caused by control printer codes sent by the source program. Once in the AWP, you can manipulate the data and transfer it to a database or spreadsheet. If you can print data to paper, you can usually capture the same data to an AppleWorks file.

▼AW enhancements: APA members Mark de Jong and Mark Munz have upgraded Beagle Bros' TimeOut TeleComm to version 1.2. This program works within AppleWorks Classic and provides full-featured telecommunications, an on-line or off-line editor, full-range downloading capabilities, and outstanding conferencing facilities. It also lets you paste an AppleWorks file directly to modem output without going off line. You can save the data you capture from information services or BBSes directly to an AppleWorks AWP file. TeleComm v1.2 is a solid terminal program worthy of interest to all AppleWorks users.

▼AWpersonality: APA member Mark de Jong is the originator and co-author of TimeOut TeleComm, and author of other popular AppleWorks enhancements. When he's not programming for the Apple II or solving computer problems, Mark likes to enjoy the warm sun of Southern California by sailing an 18-footer on San Diego Bay. Mark and his wife Sharon live in the Point Loma district of San Diego, CA, with their two daughters, Janessa and Nicole.

Mark often shares his musical expertise playing his much-loved guitar for friends or at church-sponsored events. In his role as technical support manager at Beagle Bros Inc., Mark is widely known for his friendly and helpful support of Apple II users. He's a frequent visitor to on-line services and the Pro-line telecommunication network.

▼AW macros: Many times users don't know how to create an AppleWorks word-processing (AWP) file from an ASCII (TXT) file they've downloaded from an information service, a BBS, or another computer. Here's a time-saving UltraMacros macro for veteran users that will make this process easy.

To use this macro, compile with the TO.Macro.Compiler, set your path (prefix) to the location where the file is stored, hold down the solid-apple key (option key), and tap the t key.

```
T:<all : oa-Q esc rtn>3<rtn>2
   <rtn : {display files list}:
msg ' Highlight ASCII (TXT) file
   to convert to AWP & press
   Return key ' :
keyto 13 : {wait for
   Return Key}:
rtn ahead>.wp<rtn : {load
   file & add suffix}:
oa-O>Im<rtn>O<rtn>
   rm<rtn>O<rtn esc>!
   {zero margins}
```

▼AW news : APA member Dan Crutcher (Macro City) has released an interesting set of original macros that include a hangman game, a check writer, and a workhorse macro.

Don Aquilino (ACTAsoft) is receiving praise for his full-featured professional double-entry bookkeeping system, Alpha Check Plus.

If you don't have the Patcher that fixes some annoying AppleWorks 3.0 bugs (it's freeware from Beagle Bros, Inc), contact your local Apple User Group or APA. They have a copy reserved for you.

APA members contributing to this month's notes include Don Aquilino, Jack Countryman, Dan Crutcher, Mark de Jong, Dave Gair, and Mark Munz. For a 5.25-inch disk that includes a set of templates, macros, and detailed documentation for tips described above, send $4 shipping to APA at the address below. Please include the *inCider/A+* issue date with your request. For membership information contact the AppleWorks Programmers Association, 6531 Lexington Avenue, Los Angeles, CA 90038, modem apa@pro-apa.cts.com (213) 463-9289, voice (213) 469-9916. The AppleWorks Programmers Association is registered with the Apple User Group Connection.

HARDWARE

FOREVER AMBER

One of the drawbacks to using Macs in school systems has been the cost — not just of the computers, but of the peripherals, as well. Although the ubiquitous amber monitor that most classroom Apple IIs use won't work with a Mac, Amdek (now a part of Wyse technology) has introduced the Amdek **PowerPage**, a low-cost monochrome 14-inch video-display subsystem for the Mac.

The advantage over the Mac monitor is obvious — the PowerPage monitor is 200 percent larger than the built-in 9-inch monitor on the Mac SE or Classic. You can use the PowerPage monitor and your built-in monitor at the same time, and display different windows on each. The 14-inch screen means that every student in the classroom, not just the ones in the front row, will be able to see.

An advantage you won't see is that the PowerPage systems — the Amdek monitor and a Lapis video card — costs only $599. Also you can use the Amdek monitor with IBM PCs and compatibles, if your school has them. The video output is IBM-standard VGA.

The monitor, by the way, isn't amber at all — it's a flat, high-contrast, non-glare, paper-white display. For details, contact Amdek at 3471 North First Street, San Jose CA, 95134-1803, (800) 722-6335, or circle 350 on the Reader Service card. — **P.S.**

GENERIC HARD DRIVE

Quality Computers, the big mail-order dealer, has been selling a lot of hard-disk drives from many different manufacturers. But now company president and founder Joe Gleason has decided that his firm can make a hard drive better than the competition's. The result is the **Q Drive**.

The Q Drive features Conner's reliable drive mechanisms, Apple's High Speed SCSI Card, and Apple's Finder for the IIGS. It also sports the new ProDOS 8 mini-selector for other Apple IIs. (For a generic drive it certainly uses brand-name parts.)

The Q Drive manual gives you a lesson on GS/OS and ProDOS as it helps you set up the drive. In fact, the Q Drive software is so easy to use that it practically sets up the drive itself. You also get Quality Computers' technical-support service, and the satisfaction of buying from an Apple II leader.

A 40-megabyte Q Drive sells for a competitive $599.95; the 100-megabyte drive sells for $999.95. (Add $100 for a RAMFast SCSI card instead of the Apple card.) For more information contact Quality Computers at 20200 E. Nine Mile Road, Box 665, St. Clair Shores, MI, 48080, (800) 443-669, or circle 351 on the Reader Service card. — **P.S.**

CYCLOPS BY PROXIMA

Anyone who has taken a public-speaking class or has given a presentation knows how frustrating visual aids can be. Even the recent advances that let you project a computer screen on a wall have their limitations — in order to manipulate the machine, you must tap away at the keyboard or scrape a mouse across a desk.

Imagine, though, being able to stand at the front of the lecture hall and maneuver through a HyperCard or HyperStudio stack using only a pointer. Proxima, a division of Computer Accessories Corporation, has just introduced **Cyclops** ($1995), a system for controlling your Apple II or Mac while you use a projection screen.

The system has two components — a camera and a pointer. The camera mounts on the back of a liquid-crystal-display monitor manufactured by Computer Accessories Corporation. The pointer is about the length of a yardstick and has a red LED (light-emitting diode) at the tip. Once you position the camera properly, you show it the edges of the screen with the pointer, and your Apple II/Macintosh will have a point-and-click interface. The camera senses the bright LED against the room's ambient light, and translates the position into the Apple Desktop Bus.

No special software is necessary. Proxima also offers a pen-sized laser that will project a red dot on your screen from up to 25 feet away. For details, contact Proxima at 6610 Nancy Ridge Drive, San Diego, CA 92121, (619) 457-5500, or circle 352 on the Reader Service card. — **C.C.**

EDUCATION ❊ NOTES ❊

❊William K. Bradford (Acton, MA) has released **Legends of Raven**, the second in its multicultural Explore-A-Folktale series. The Raven legend comes from the early native civilizations of western Canada, Alaska, and the Pacific Northwest. It costs $75, runs on an 128K enhanced Apple II, and input from a mouse is optional. Call (508) 263-6996 for details.

❊MindPlay (Tuscon, AZ) has recently released **Money** ($19.95), its fifth issue of Kid-Leidoscope. This current-events magazine on a disk (Apple II) and its accompanying four-page newspaper feature stories of spending, earning, and saving money wisely. For the subscription rate of $79 you'll receive four issues — Wildlife, Living in Space, Fitness, and Dinosaurs. Send $3 shipping fee for a free introduction. Call (602) 322-6365 for details.

❊**The Milliken Storyteller** for the Apple IIGS (Milliken Publishing, Saint Louis, MO) brings the classics to life. Three familiar stories —*Henny Penny, Little Red Riding Hood*, and *The Ugly Duckling* — come alive with graphics, sound, and animation. The Storyteller also includes quizzes and coloring screens to get kids involved in what they're reading. The Milliken Storyteller costs $49.95; a **Story Collection Disk** with *Peter Rabbit, Jack and the Beanstalk*, and *Aladdin and the Magic Lamp* is $24.95. The program requires an Apple IIGS with 768K of RAM and a 3.5-inch disk drive. Call (800) 325-4136 for details.

❊ Intellimation (Santa Barbara, CA) has published its first **Intellimation Library** for the Macintosh — it catalogs 115 software and multimedia products developed by educators for educators. Many of the programs use HyperCard, and come on CD-ROM or videodisc. Programs range from an imaging program for chemistry classes to instruction in Chinese. For a copy of the catalog, call (805) 685-8587.

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SHAREWARE SOLUTIONS

Imagine a combination of computer hardware and software so sophisticated that it creates interactive multimedia presentations complete with text, graphics, digitized sound, animation, and video — yet so simple that even a first-grade student can master it. Picture the price tag on a system that lets even a non-programmer build beautiful games, cookbooks, appointment calendars, visual databases, and interactive educational tutorials. Do you think it's out of your budget? Well, guess again. With Roger Wagner Publishing (El Cajon, CA, 619-442-0422) and your Apple IIGS, you can make it happen.

With a 1-megabyte Apple IIGS you can use run-time stacks created with **HyperStudio**. Although authors need HyperStudio ($149.95) to create the stacks, you can buy these run-time versions for considerably less. In fact, Roger Wagner Publishing offers 10 demonstration disks that include stacks, clip art, and sound, for $10. The package includes some of the best public-domain stacks available and a version of HyperStudio, so that you can modify any of the stacks in the demo or create your own. Because these are run-time versions, however, you can't save your work to disk.

Another source is **The HyperStudio Network** (P.O. Box 103, Blawenburg, NJ 08504, 609-466-3196). Founded by two New Jersey teachers who saw the potential of HyperStudio and decided to put out a newsletter, this network provides its members with access to a library of public-domain stacks, clip art, and digitized sound files. (Membership is $29 a year.) The HyperStudio Network specializes in educational stacks, many of them for young children.

Probably the most creative HyperStudio stacks have appeared in the public domain. Public-domain software refers to both freeware and shareware. Freeware costs you nothing. Shareware is distributed at no charge on on-line services and through user groups, but if you use it, you must pay the author. Public-domain software is usually copyrighted by the author.

Two of the most talented individuals writing low-cost or free stacks are Scott Everts and Jim Hirsch.

In the introduction to his **Star Trek: The Next Generation** stack, Everts (P.O. Box 227, Placentia, CA, 92670) offers some insight into the motivation of all stack developers: His ten-dollar shareware stack is a labor of love that contains volumes of little-known trivia about the crew of the USS Enterprise and their three-year TV voyage. By combining beautifully digitized graphics images with sound effects, and providing details of every Star Trek episode ever aired, Everts has produced a stack so packed with information, that "trekkies" will think it's Star Trek heaven. The first sound you hear is the Star Trek theme. The eight 3.5-inch disks cover the first three seasons of Star Trek.

Jim Hirsch (12310 Jonquil Street NW, Coon Rapids, MN 55433) is an educational-technology consultant who's produced a series of imaginative, artistic, and informative HyperStudio stacks. Hirsch often presents multimedia and hypermedia programs to groups of teachers, but he believes that everyone, not just teachers, can learn from his work. One of Hirsch's stacks teaches youngsters about the value of money; another offers a self-paced tutorial for the AppleWorks GS word processor; another introduces the Apple IIGS, its components and peripherals; and another showcases the visual appeal of animation.

Hirsch is also a fan of NASA and a follower of the space program, so he has created a stack about the October 1989 Atlantis space-shuttle mission STS-34 that launched the Galileo probe to Jupiter. NASA prepared all the text in the **HyperShuttle** stack, so it provides an insider's detailed overview of the mission. Digitized sound and detailed graphics images make it seem true to life.

Your imagination is the only limit to what's available in HyperStudio stacks. Some stacks hold data about Academy Award winners, the Apple IIGS Finder, or the Beatles. Others cover adventure games and the Simpsons. Best of all, you don't have to be a nerd to create your own stacks. All it takes is a mouse and an active imagination.

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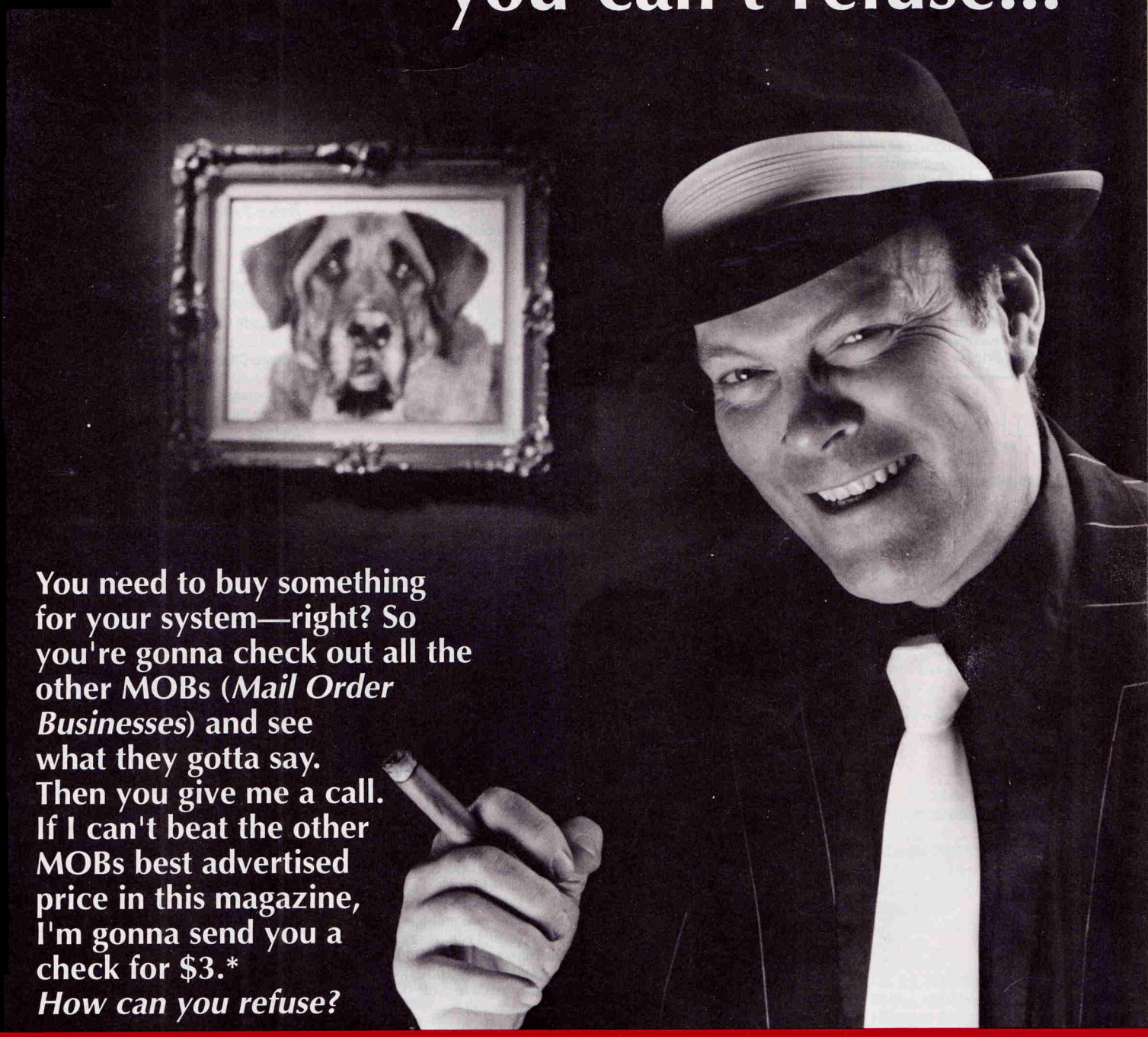

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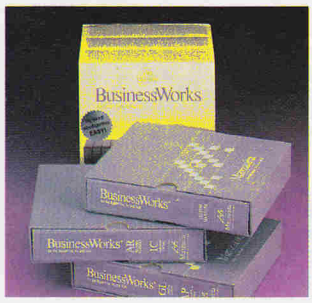

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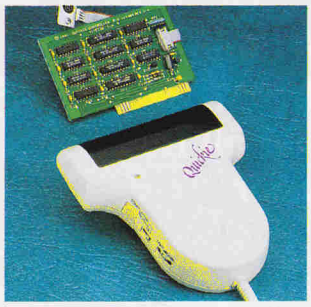

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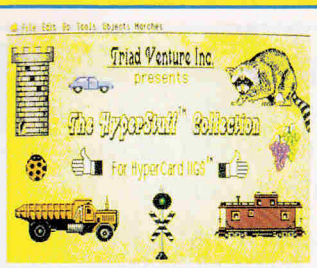

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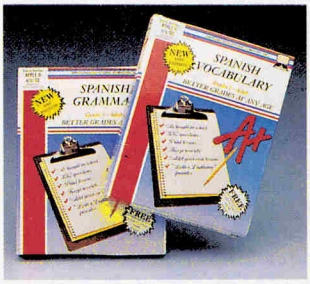

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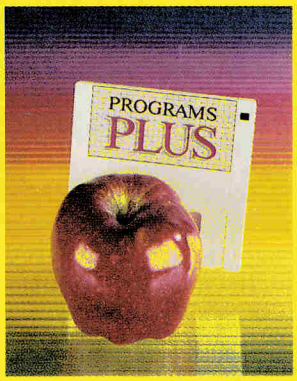

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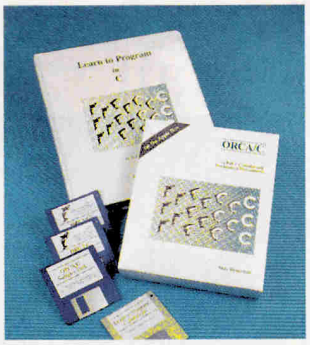

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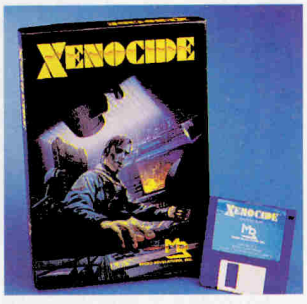

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Abracadata
Architecture Library 1, 2, 3 or 4 *(AP or GS)*.....19.
Design Your Own Home:
Architecture *(3.5)*.....47.
Interiors *(3.5)*.....47.
Landscape *(3.5)*.....47.
Architecture *(5.25)* .....37.
Interiors *(5.25)* .....37.
Landscape *(5.25)*.....37.
Design Your Own Railroad .....32.
Design Your Own Train.....32.
Electronic Drawing.....32.
Interiors Library 1, 2 *(AP or GS)* ....19.
Landscape Library 1 .....19.
Baudville
816/Paint .....42.
Award Maker Plus *(AP & GS)*.....28.
Beagle Brothers
Beagle Draw *(GS)*.....53.
Platinum Paint *(GS)* .....58.
Berkeley Geoworks
GEO Publish .....58.
GEOS V2.1, GEOCalc or GEOFile .....43.
Big Red Software
PS Lover's Utility Set *(3.5)* .....26.
PS Lover's Utility Set *(5.25)*.....26.
Broderbund
Bannermania *(AP or GS)* .....22.
Dazzle Draw .....37.
New Print Shop *(AP or C+)* .....30.

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New Printshop Graphics Party *(C+)*..19.
New Printshop Graphics Sampler Ed. *(AP)*.....31.
New Printshop Graphics Sampler Ed. *(C+)*.....19.
New Printshop School & Business Ed. *(AP or GS)* .....31.
Print Shop Companion *(GS Specific)* .....31.
Print Shop Graphics Library Party Edition *(GS)*.....22.
Print Shop Graphics Library Sampler Edition *(GS)*.....22.
PrintShop*(GS)* .....36.

Creative Pursuits
Clip-Art for Writing & Publishing Center
Combo Pack *(AP)* .....48.
Holiday Disk *(AP)*.....20.
Nature Disk *(AP)*.....20.
People, Places Disk *(AP)* .....20.

Eclat
Fractal Explorer *(AP or GS)*.....26.

El Kassir Software
COLOR+ *(GS)* .....42.
Supergraphix II w/music *(GS)*.....52.

Electronic Arts
DeluxeWrite w/Deluxe Paint II *(GS)*.....26.

Orange Cherry
Super GS Award Maker .....49.

Roger Wagner
Graphic Exchange *(GS)* .....29.
Hyper Studio *(GS)* .....82.

Saddleback
My Paint *(GS)*.....32.

Seven Hills Software
Font Factory *(GS)*.....22.
SuperConvert *(GS)*.....22.

So What Software
Iconix *(GS)* .....26.

Spinnaker
Certificate Maker.....24.
Certificate Maker Library #1 .....19.
Newsroom .....19.
Newsroom Clip Art Collection Vol. 1, 2 or 3 .....14.

Triad Venture
GDL Graphic Disk Labeler *(GS v2.0)*.....SPECIAL 25.
The HYPERSTUFF Collection:
Cliptunes.....SPECIAL 25.
Clipart Plus .....SPECIAL 25.

VersaCAD Corp.
CADapple *(3.5)*.....199.

MODEMS & MONITORS

Anchor Automation
2400E.....129.

Apple Computer
Apple Color Composite Monitor ...325.
Apple GS Color Monitor.....454.

Applied Engineering
DataLink 1200 .....95.
DataLink Express *(ext. 2400)* .....158.
Dataline Express w/MNP 5.....197.
DataLink Modem 2400B *(Int AP & GS)* .....159.

Hayes MicroComputing
Hayes 2400 SmartModem .....335.

Practical Peripherals
Practical Modem 1200 SA Mini.....80.
Practical Modem 2400 MNP .....219.
Practical Modem 2400 SA .....185.

Prometheus
Pro Modem 2400A Internal w/Software .....119.

Supra Corporation
SupraModem 2400 Plus.....149.
SupraModem 2400 *(Hayes Compatible)* .....99.

U.S. Robotics
Courier HST 9600.....599.

PRINTER INTERFACES

Apple Computer
Apple Super Serial Card .....105.

Applied Engineering
Parallel Pro .....74.
Serial Pro.....99.

Orange Micro
Grappler 9 pin .....79.
Grappler Plus *(AP & GS)* .....69.

SMT
Envoy.....53.
No Slot Clock.....29.
Print Tech II.....29.

Thirdware
Finger Print GSi verIII *(Includes Desktop Accessories-GS)* .....83.
Finger Print Plus *(Parallel, Serial, or ImageWriter II)*.....83.
Upgrade Kit *(FingerPrint I & II)* .....29.

Vitesse, Inc.
Harmonie *(GS)*.....29.

Xetec Inc.
Superwriter 924 *(GS, C+, C)*.....44.

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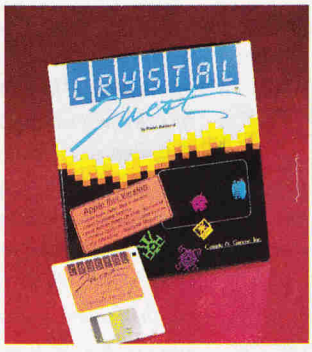
Apple Computer
ImageWriter II .....455.

Brother
M1109-AP Printer .....179.

Hewlett-Packard
Deskwriter (requires Harmonie) ....747.



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SCANNERS AND SOFTWARE

Digital Vision
Computer Eyes *(GS)*.....195.

Thunderware
Lightningscan *(GS)* .....194.
Thunderscan *(AP & GS)* .....148.

Vitesse, Inc.
Quickie *(AP & GS)* .....SPECIAL 193.
Quickie Update .....80.

WestCode
Inwords .....77.

UTILITIES AND LANGUAGES

Absoft
AC/BASIC *(GS)*.....79.

ByteWorks
ORCA C w/Learn to Program .....119.
ORCA/DeskTop *(GS)*.....34.
ORCA/C *(GS)*.....79.
ORCA/Design Master *(GS)*.....49.
ORCA/Disassembler *(GS)*.....32.
ORCA/M Assembler *(GS)* .....39.
ORCA/Pascal *(GS)*.....80.
ORCA/Pascal w/Learn to Program.....SPECIAL 119.

Micol Systems
Micol Advanced Basic IIE.....59.
Micol Advanced Basic *(GS)* v3.0 ...89.

Morgan Davis Group
MD-Basic.....25.

Roger Wagner
Macro Mate *(GS)* .....35.
Merlin 8/16 *(AP & GS)* .....75.
SoftSwitch *(GS)*.....34.

Seven Hills Software
Disk Access *(GS only)*.....32.

So What Software
Call-Box *(GS)*.....69.
Disc Commander *(GS)*.....29.
Hyper Launch *(GS)* v3.0 .....35.
Sonix *(GS)*.....34.

Zedcor
ZBasic v4.21.....39.

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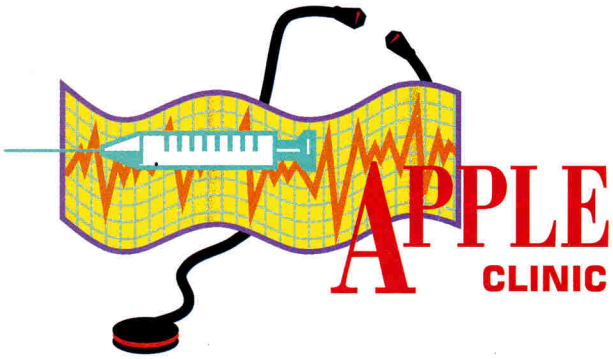

WRAP THAT RASCAL

Prevention is the key to dealing with potentially damaging software viruses.

By CECIL FRETWELL

GOT A VIRUS?

WHAT IS A COMPUTER VIRUS, and what should I do if my system gets one?

Corwyn Y. Miyagishima
Highland Park, NJ

Contracting a computer virus isn't fun. In fact, it can be downright messy. Computer viruses are mini-programs with "life cycles" similar to those of the viruses that invade your body. When you launch an "infected" program on your computer, you execute the virus code, too (but you usually won't know it). This code then makes a copy of itself and inserts itself into either GS/OS or ProDos, and/or the program laucher you're using.

While some viruses are designed to cause serious damage such as erasing your hard drive, others are simply meant to be funny. Because a virus alters any program it infects, however, even the simplest message can cause catastrophic damage. A virus that places a "Merry Christmas" message into your edit menu on December 25th may be amusing, for example, but when your Finder crashes and takes your hard drive with it, you won't be smiling.

The only way to be safe from viruses is to avoid them. If you don't have a hard drive, write-protect all your program disks, and write exclusively to special data-only disks. If you have a hard drive, use programs only from disks you've bought commercially, and back up your data frequently.

The first thing I do with any new software I receive is write-protect it even before I insert it into a drive. Then I make copies for future use. Be extremely careful with shareware or freeware programs you download from electronic bulletin boards or receive from friends. If possible, check them with antiviral software. If that's not available, keep the new programs in "quarantine." When you use them, boot up from the disk they're on, then when you're finshed, turn your computer off and let it sit for several minutes before you boot another disk. If you have a hard drive, don't access it while you're using the quarantined disk.

To recover from a virus, you must first locate the disks that contained the virus originally and destroy them. If you miss just one disk, sometime in the future the virus will rear its ugly head again. To be safe if you have a hard-disk drive, reformat and reconstruct it completely using the disks you purchased originally. If you don't have a hard disk, re-create your 3.5- or 5.25-inch boot disk using the original disks from Apple Computer.

Because data files are used by programs and not executed by themselves, they can't be infected by viruses . . . yet. I'd like to close this response, however, with the three important "B's" of computing: backups, backups, backups!

EJECTING DISKS

UNDER THE PRODOS 8 BASIC interpreter, how can I make a program eject a floppy disk from a 3.5-inch drive?

John Chang
Terre Haute, IN

See the accompanying ***Program listing*** *for a fragment of code we took from the newsletter* Open-Apple *(now* A2- Central*), volume 2, number 5, page 2.38. You can locate this code in any free space in memory. Line 100 gives the starting location, and line 110 specifies the slot and drive. Line 180 prints an error code:* 0 *(zero) shows no error,* 39 *indicates ejection failure, and* 40 *indicates that no device is available.*

Program listing. Make your 3.5-inch drive eject a disk.

```
100 L = 768
110 S = 5:D = 1: REM ASSUME SLOT 5, DRIVE 1
120 FOR I = L TO L + 17
130 READ J: POKE I,J
140 NEXT I
150 POKE L + 2,S + 192
160 POKE L + 11,D
170 CALL L
180 PRINT PEEK (L + 17)
190 DATA 32,13,197,4,10,3,141,17,3
```

APPLEWORKS CRASH

I UNDERSTAND THAT IF APPLEWORKS version 1.1, 1.2, or 1.3 crashes, you can restart the program. Can you describe the procedure?

Jonathan Salz
Birmingham, MI

The newsletter Open-Apple *(now* A2-Central*), volume 3, number 4, page 3.32, is*

one of many sources detailing the procedure you need. If AppleWorks or your system "hangs up" or crashes to the monitor prompt (*) for any reason, try the following steps:

1. If necessary, use Control-Reset to obtain the monitor prompt (*) at the beginning of a line on screen.

2. Now after the prompt, enter the following two lines:

*C073:0 <RETURN>

*3 <CTRL-P> <RETURN>

3. You should now be in 80-column mode with the monitor prompt in the upper left-hand corner of the screen. If you don't see it, repeat steps 1 and 2. If that doesn't work, you have no choice — you must reboot.

4. Next, if the prompt does appear, enter the following line:

*2F0:2C 83 C0 2C 83 C0 4C <RETURN>

5. Now enter the appropriate line:

AppleWorks versions 1.1, 1.2, or 1.3:

*:33 10 <RETURN>

AppleWorks version 2.0:

*:27 11 <RETURN>

*6. Now enter this line: *2F0G*

You should be back at the main menu. If not, try the procedure again. If it still doesn't work, you must reboot. The main menu may contain some garbage. If it does, hitting the escape key may clear up the problem.

If the display shows screens continuously and never stops, use Control-Reset and repeat the procedure. If that still doesn't clear up the problem, you must reboot.

If you're successful, save any desktop files immediately and reboot your system. The problem that caused your dilemma in the first place may have left some hidden bombs around, so start with a fresh system via the reboot.

AppleWorks Clinic

By Claris Corporation and the National AppleWorks Users Group

Printing on Envelopes

I use a typewriter to type addresses on envelopes. Are there any easy ways to prepare these envelopes with AppleWorks?

There are probably as many "favorite" ways to print envelopes as there are versions of AppleWorks. Here are some tips for smooth operation:

1. Use windows and you'll often avoid typing addresses on envelopes. For best results, start typing the inside address about 1.5 inches from the top of the page, then fold the letter to expose the address. This is the fastest and easiest approach — if you don't mind using window envelopes.

2. Printing standard envelopes with an ImageWriter II or other late-model tractor-feed printers is easy. The trick is to learn to insert the envelope without disengaging the paper from the tractor-feed mechanism. These steps work with ImageWriter II printers:

- Print your letter and remove it from the printer.

- Flip the tractor-feed switch (the large switch near the platen knob) to the back (pressure-feed) position.

- Turn the platen knob backward until you back the paper out of the printer. It'll remain caught by the tractor mechanism and won't fall on the floor. Pull out about one-half inch of additional paper from the back of the printer, so that the paper doesn't feed into the platen with the envelope.

- Insert the envelope behind the platen through the opening at the top of the printer, much as you'd insert an envelope into a typewriter. Now print.

- Flip the tractor-feed switch back to the tractor-feed position and turn the platen knob until the paper returns to the correct printing position.

3. AppleWorks users who type a lot of envelopes in an office environment should consider buying an inexpensive second printer just for envelopes. AppleWorks can support up to three printers, so you can add an "envelope printer" easily to the AppleWorks printer menu.

If you don't use a modem, connect the second printer to the Apple IIc, IIc Plus, or IIGS modem port. It's identical to the printer port on the IIc and IIc Plus; on a GS, use the Control Panel to configure it as a printer port. If you use an Apple IIe, you can plug a second printer-interface card into slot 2 and connect the printer to that card. You can also use an in-line switch to send your output to the two different printers. Now you can use continuous- or single-sheet-feed envelopes in the second printer without disturbing the continuous-feed paper in your primary printer. Open the flap of each envelope before you insert it into the printer; that way it'll be thin and easy to print.

Printer Installation

A parent donated a printer to our school recently — without the manual. Do you have any suggestions to help me get started configuring the printer to work with AppleWorks?

Here are three steps to follow if you get a printer without a manual and can't get help from the manufacturer or your local dealer.

1. Try adding the printer to the AppleWorks printer menu as an Epson FX series printer and test its operation. Many printers use the same control codes as Epson FX printers; AppleWorks already "knows" the codes for these Epson-compatible units.

2. If this procedure doesn't work, check to see whether the model is listed in the printer-codes database included with AppleWorks 3.0 or in NAUG's (National AppleWorks Users' Group) AppleWorks wall chart. (The printer-codes database is on the sample-files disk included with 5.25-inch versions of AppleWorks 3.0 and in the /APPLEWORKS/SAMPLE .FILES/ADVANCED subdirectory on the 3.5-inch AppleWorks Startup disk.) Then add the model to the AppleWorks printer menu as a "custom printer."

3. If all else fails, offer a student extra credit for getting the printer to work with AppleWorks. You'll be surprised how many times this approach solves your AppleWorks problems.

AppleWorks Clinic is a forum for answering your questions about the popular integrated package AppleWorks — Classic, 3.0, or GS. Address your correspondence to AppleWorks Clinic, *inCider*, 80 Elm Street, Peterborough, NH 03458. Mention of third-party products in this column does not imply endorsement by Claris Corporation.

By the way, if you use AppleWorks 3.0, Control-Reset should return you to the main menu after a crash.

File Transfer: IBM to Apple

MY IBM XT IS EQUIPPED WITH a high-speed modem, which I use frequently to download both Apple and IBM programs from local bulletin-board systems (BBSes).

Now I'd like to transfer the Apple files from the IBM XT to my Apple IIGS. Is there an inexpensive, fairly simple way to transfer the files (with no file conversion necessary) between these two different computer models?

Fong Vang
Banning, CA

Quality Computer's **Cross-Works** *($69.95) will transfer Apple II and IBM files either way, and will also translate other formats, including AppleWorks, WordPerfect, and Lotus 1-2-3.*

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Circle 103 on Reader Service Card.

Can't Copy Disks

AFTER ADDING A HARD DRIVE to my Apple IIGS recently, I discovered that I get I/O errors when loading many of my games and educational programs to the hard drive and launching them from the hard drive. I experience no problems if I switch the Control Panel to boot the disks from the external disk drive.

Jeffrey A. Wheeler
New Vernon, NJ

It sounds as if you're experiencing the woes of copy protection. Educational-software houses and some game vendors produce disks that are virtually impossible to copy to other disks, including a hard disk. These companies provide a modified operating system on disk, meaning that these pieces of software have their own algorithm to read from and write to other disks.

Although some utilities can bypass copy protection schemes, using them may result in legal problems. I encourage you not to pirate software.

Using Classroom Monitors

I'M A TEACHER WHO'D LIKE TO hook up an Apple IIGS to one or more large monitors (such as those available from Sony or Zenith) and a IIGS RGB monitor. Using this arrangement, I'd be able to demonstrate computer programs to my students. A so-called Y connector won't do the job, because the IIGS can't provide a strong enough signal.

Reese Crispen
Hudson, MA

Communications Specialties Inc. *(516-273-0404) will provide you with a one-in-four-out distribution amplifier (part #IN3055) for $425. Make sure you mention that you'll be using this device on a GS, because you'll need adapters (free of charge), plus other adapters to connect the monitor cables to the amplifier. (CSI will make them for you for about $75 each.) Call and talk to the tech-support staff.* ❑

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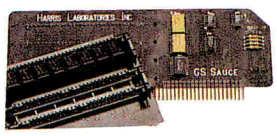

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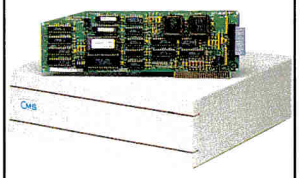

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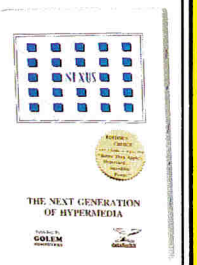

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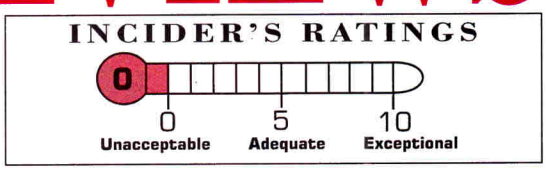
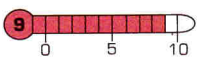


BANNERMANIA

BRODERBUND SOFTWARE

17 PAUL DRIVE, SAN RAFAEL, CA 94903-2101, (415) 492-3200

Banner-making program;128K Apple II; 5.25- or 3.5-inch format; printer required; no copy protection; $34.95; $49.95 school edition, $89.95 lab pack;
1M Macintosh Plus/SE/SE30/II/IIx/IIcx; System 5.0 or later; 800K disk; hard drive or two disk drives recommended; no copy protection; $59.95; $69.95 school edition, $139.95 lab pack



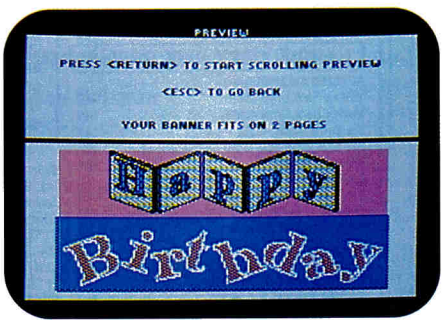
As the foundation of a burgeoning cottage industry, desktop printing and publishing programs, designed originally for home and school, have broken into the small-business market in a big way. Now Broderbund, the company that created the phenomenon with the original Print Shop program, adds to its reputation as the leader in the field with its latest product, BannerMania, in Apple II and Macintosh versions.

As the name indicates, the product lets you create banners of all types, shapes, sizes, and colors. With the same intuitive icon-based operation popularized by The Print Shop and The Print Shop Companion, BannerMania for the Apple II guarantees both the familiarity and the simplicity of the design process.

The program's Macintosh version follows the same intuitive interface that is the calling card of all Mac software. Broderbund has made optimal use of every point-and-click option, every pull-down menu and pop-up window inherent in that environment.

EASY DOES IT

The step-by-step selection process inherent in the product makes BannerMania a ready-to-use program immediately upon loading. Decide on a layout, type in the text you want, select a font and any special effects, pick color combinations or gray shading, designate a shape, and print. That's it.



BannerMania: All kinds of options.

Don't confuse simplicity of operation with simple programming, though. One look at the choices and options available in BannerMania makes it clear that Broderbund wasn't releasing a "rip-off" product to capitalize on The Print Shop's popularity.

Want to hear some basic numbers? Two-

Photography by ✦ Ed Judice

line messages with up to 45 characters per line; 68 colors and 134 color combinations (plus Custom Color in the Mac version); four patterns and 13 shades of black, white, and gray in the Apple II version, 18 in the Mac; 19 print fonts, each with 28 additional special characters, such as pointing fingers, arrows, hearts, and more; 40 ready-to-use, all-occasion banners you can modify on the spot; 34 special effects such as shading and 3D; and more than two dozen banner shapes, such as arch, pennant, and ribbon. The Mac version can also employ compatible PostScript fonts in Adobe Type 1 format: Use the *Import* Fonts command found on the *File* menu.

When you combine those options with the ability to vary the size of the document, the program's applications are virtually unlimited. Unlike other publishing programs that let you select just small, medium, or large, BannerMania lets you compress the length of a banner to 10 percent of its original size or increase it to 400 percent without altering its height; reduce both the height and length of a banner by the same ratio; and create a series, for banners of unlimited length. Just by designing a single document ("Go Team" in school colors, for example) and changing its size, you can create a 30-foot paper banner, a pennant, a sign, a bookmark, a t-shirt iron-on, and a bumper sticker.

BannerMania also features some innovative and impressive utilities. Most intriguing is the software's *Transmogrify* option. The program presents a stream of modified banners on screen, eliminating the need to go through the menus one by one to experiment with new designs; when you see a layout you like, just interrupt the flow and lock in the new banner. Your text message will remain unchanged, but layout, justification, special effects, color, shape, and length will be altered automatically.

You can revert to your original design, keep both the new and the original, or page forward or backward to get a second look at any of the other variations. You can modify any design created with the *Transmogrify* feature in any of the ways available for an original banner.

You can preview your banners before printing at any stage of the creative process. Dotted lines appear on screen to indicate page perforations. BannerMania's Mac version is sophisticated enough to recognize whether your computer is connected to a laser printer or a dot-matrix; just click on the appropriate buttons in the *Page Setup* dialog box to tell it whether you're printing in color or black-and-white and whether your printer is PostScript compatible.

QUIRKS

Any "flaws" in the program are indigenous to all software of this type. The first is the amount of time needed to print a design, which varies with the size of your creation — from less than a minute to several hours. You can leave your machine unattended, but sometimes that results in costly hardware problems. As the manual clearly states, you should give your printer at least a 5-minute break every half hour to avoid damaging the printhead.

Also, unless you're certain you have unimpeded paper paths both in and out of your printer, you'll need to make sure bunching won't occur on either end of the operation, or you can easily waste paper, ribbon, and time as a result of jams. Cost of operation is another factor to consider, and, again, that's directly proportional to the complexity and size of the design. You'll go through ribbons and paper fast.

Still, time and cost are factors that most BannerMania users will gladly accept — the program's benefits strongly outweigh the negatives. BannerMania boasts enough new features, variety, and potential applications to make it as either a stand-alone program or as a companion to Broderbund's other home-printing products. It mirrors not only their ease of use, but also the excellence of their output, and can be an enjoyable and useful tool for small businesses, schools, and individuals. It would be a challenge for any user to find a feature that has been left out of BannerMania.

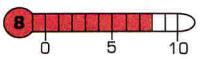
Once again, Broderbund has designed a software package that lets you do your creative best. Get some fresh ribbons and a box of printer paper — you'll need them once you discover what you can do with BannerMania.

James Trunzo
Leechburg, PA

LOGOEXPRESS

Logo Computer Systems, Inc.
3300 Cote Vertu Road, Suite 201, Montreal, Quebec, Canada, H4R 2B7, (800) 321-LOGO

Logo-based telecommunications software; 128K Apple II; Hayes-compatible modem (Apple IIe requires Super Serial Card or compatible); no copy protection; $99



Any software that encourages kids' writing and the free exchange of ideas is worth at least a second look. LogoExpress, LCSI's new telecomm program specially tailored for classroom use, extends the boundaries of the typical learning environment beyond the confines of the single classroom, as youngsters communicate with students in other schools or other classrooms within the same school. Using LogoExpress, kids can auto-dial, log on, and send and receive electronic mail; special software commands let them post or access electronic bulletin-board messages. The application even includes features to simplify setup of a host system on a district-wide or local BBS.

Because the product is a programming extension of LCSI's LogoWriter word processor, most commands and procedures that work with that program also work with LogoExpress. Kids already familiar with LogoWriter will find new LogoExpress communication procedures easy to learn. The software lets them send and receive LogoWriter "pages," complete with procedures on the "flip side." (A page showing a LogoWriter work area with graphics and text is presented first; pressing a key brings up an associated screen displaying the Logo procedures used.) While LogoExpress' programming language doesn't include graphics primitives, kids can transmit LogoWriter pages containing shapes, drawings, and pictures if the two computers are using the same version of LogoWriter (IIe or IIGS).

LCSI's teaching objective is admirable — but how practical a goal can it be when students and teachers typically have no access to school telephone lines? How many classrooms or computer labs have been set up with telephone jacks? School budgets have insufficient funds for computers and software, let alone modems, monthly fees for on-line services, ⇨

and long-distance telephone charges. If budgetary restrictions are a problem, LogoExpress offers a partial solution: It lets you set up a telecommunications system within a single classroom or between classrooms in a single building, linking computers via serial cable instead of modem. If you need help writing procedures that will allow serially linked computers to "chat," contact LCSI for assistance.

LCSI can also help you write procedures to access an in-house bulletin board or electronic-mail system. In this configuration, one computer serves as the LogoExpress host system, managing the mailboxes (private information) and bulletin boards (public information). Kids use a second computer to dial the host system, log on, send messages, and receive mail.

TECHNICALITIES, PLEASE!

If you're lucky enough to go the modem route, you must purchase a Hayes-compatible unit. Internal modems must also be compatible with Super Serial-compatible external modems. (Novation AppleCat and Hayes Micromodem cards won't work.) While LCSI recommends an external modem for the GS, I used an Applied Engineering internal DataLink modem (1200 baud) successfully.

Both user and host-system modems should be set at the same baud rate, and each modem should be able to support that rate. Don't configure the baud rate for 2400 when only one modem supports it. If you intend to use the system with children who can't read quickly, or with kids who aren't confident computer users, consider operating at 300 baud for maximum readability when scrolling.

LogoExpress comes with two setup guides, three manuals, a *Quick Start* reference card, and software for both Apple II and MS-DOS systems. The documentation provides well-written instructions to get your system up and running, with several project ideas for using the program with a LogoExpress bulletin board.

Software setup involves configuring four special LogoExpress telecommunications pages, each with tools to facilitate a particular kind of telecommunication. *Chat* contains procedures for verifying that your hardware setup is in working order and for communication via modem with other systems running LogoExpress; everything you type on screen is sent to the host, and everything the host sends appears on your screen page. You can also use it to "chat" with a host system — including a BBS or service not running LogoExpress.

The *Mailer* page includes tools for communicating with a LogoExpress district host. After logging on to the system, you can check your mail, read messages posted on the bulletin board, send a Logo page, and post a message or text file on the bulletin board. If you run into problems using the system, or if you have technical questions, you can take advantage of the tools provided on the *MailerTS* page, which connects you to LCSI's technical-support host system. Log on to the system, post your questions on the LCSI bulletin board, then log off. A few days later, log on again to check for messages.

The final LogoExpress master page, *MCIMail*, lets you send and receive over the MCI electronic-mail system. You must have an MCI Mail account to use this system. If you need communications tools for accessing Telenet, contact LCSI.

Teachers who want to work on telecommunications projects with their students can prepare *Scrapbook* disks for individual users, with LogoExpress files and pages (containing personalized information such as user name, password, host phone number, and so on), but not the program itself. Because LogoExpress handles all telecommunications protocols automatically, kids can spend their time writing messages or working on projects instead of bothering with protocol configuration.

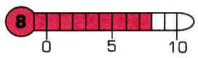
Despite the program's ease of use, I'm still ambivalent about its value. If students are already familiar with LogoWriter and the teaching objective is to provide them with telecommunications experience, then LogoExpress is a good idea, as the software offers kids another way to work within the Logo programming environment. (LCSI even offers LogoExpress tools for directing a videodisc player.) On the other hand, if kids aren't familiar with the LogoWriter environment, they may find it easier to forgo LogoExpress entirely and use a conventional telecommunications package.

Carol S. Holzberg, Ph.D.
Shutesbury, MA

GOLD RUSH!

Sierra On-Line, Inc.
P.O. Box 485, Coarsegold, CA 93614, (209) 683-4468

Simulation of the California Gold Rush; 128K Apple II version; 512K IIgs version; no copy protection; $39.95 (either)



When I was in school, all I needed to know about the Gold Rush could be written on the palm of my hand —1849, California, fortunes won and lost. Those three facts seemed to be all the teacher had any interest in, and those were the things I carried out of high school as my knowledge of this era in American history. I passed the history test, but learned nothing. What a difference Sierra's Gold Rush program has made! History means real people with real stories behind them, and nothing brings it to life better than this simulation. As you play Gold Rush!, you become the fictional character Jerrod Wilson, a reporter for a small local newspaper. He gets restless and decides to follow one of three routes to the gold fields of the West Coast.

Begin by exploring your neighborhood, Brooklyn Heights, New York, to become familiar with your character and his life story — it's a little like coming out of amnesia. On the streets, you hear news of the gold strike and choose to follow the crowd to seek your fortune. Your house sells for a good price; you collect a few things

Gold Rush! brings history to life.

you'll need on your journey — bank statements, some family photos — and pack up to travel with the others who, like you, are off to find a new life in the American West.

If you've always been partial to the sea, you may choose for your first trip to sail from the East Coast south to Rio de

Janeiro. You'll leave there heading south and may pass a bad storm as you sail around Cape Horn. Then it's on up the west coast of South America to California. Take care of yourself — try to keep from falling into bad health or running out of strength. Food won't always be obviously available, for instance — before you get too weak to move, you'll have to look all around the ship and find the things you might need later. Surviving the Cape storm requires some common sense, too. (Don't stand on deck.)

Want to try overland next time? That journey will undoubtedly turn out to be just as difficult. You'll travel by stagecoach, canal boat, steamer, and finally wagon train, as you're plagued by cattle rustlers, hostile Indians, and thieves. And along the way are plenty of other dangers — there's a chance you'll die of thirst at the Green River crossing in Wyoming, for instance.

Your third route takes you by ship from New England to Panama, where you walk overland across the Isthmus (no canal in the mid-1800s). You'll fight your way to the Pacific, where you catch a ship for the next leg of your journey up the coast. Snakes, ants, poison plants, hostile natives, and quicksand are among the hazards that may keep you from completing your journey successfully.

All three routes finally end at Sutter's Fort in California. There, you outfit yourself for the travel and mining work ahead. It's also here that you find (through some ingenious methods) several clues you need before going on.

The challenges continue inside a quaint hotel, where you meet a strange man, find a secret room, and get an important clue that helps you locate a gold mine. During this journey, you're threatened by other miners who are looking out for their own stakes. Claim jumpers ain't welcome in these parts, stranger! After a rough time searching, you find the gold you've been looking for.

But you won't believe what you have to do to get into the mine! Sure, with intelligent play, you find gold, but also find something much more precious. Don't worry, I've left out all details — when you play, there'll be plenty of excitement. It's a complex simulation that will challenge the brightest gamer, but will also entertain motivated 12-year-olds.

Continued on p. 80

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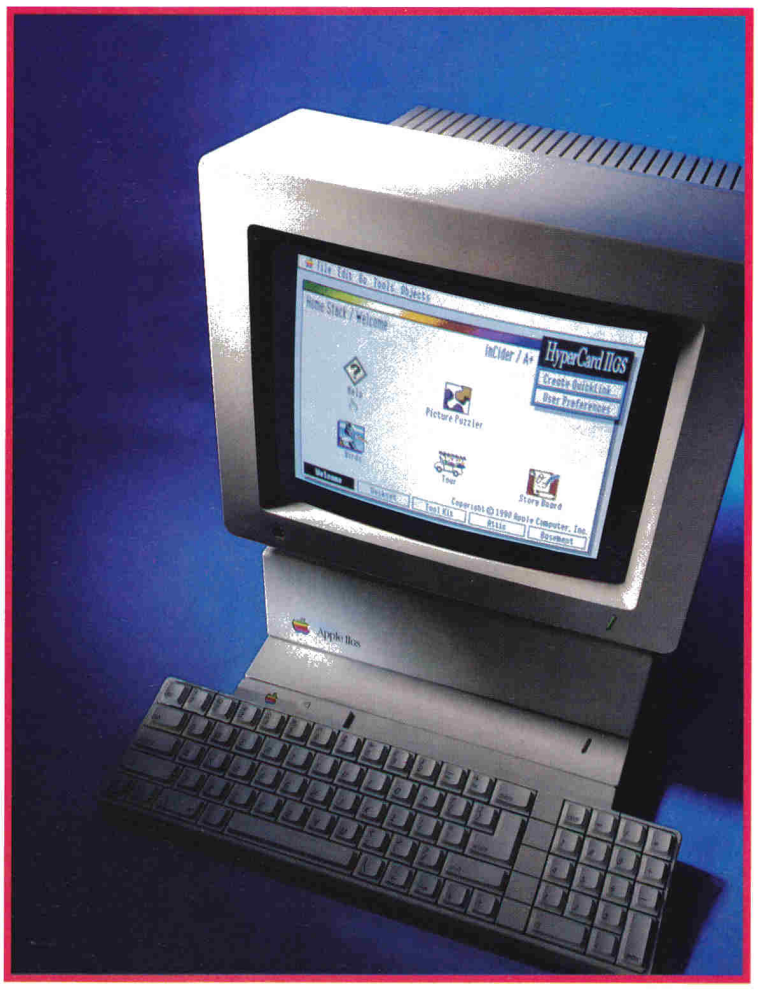
THE APPLE II CULTURE REBORN

By Paul Statt, Senior Editor

HyperCard — Apple's popular multimedia programming product for the Mac — is reviving the do-it-yourself spirit of the Apple II.

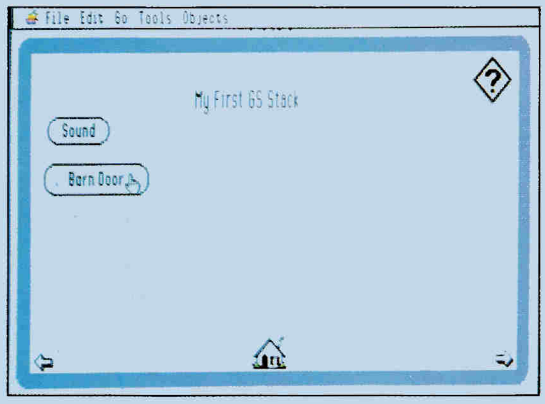


The best thing about any Apple computer has always been its accessibility — that anybody with the urge could learn to program and create unique software. But as Apple's computers have become more powerful and more sophisticated, they've also gotten harder to program. The Apple IIGS and the Macintosh, for instance, don't have a native computer programming language built in, as BASIC was in the original Apple II. Like all Apple IIs, the GS comes with Applesoft — but the machine's native mode is the 16-bit 65816.

HyperCard — for the Mac and now for the Apple IIGS — brings the hacker's spirit back to Apple. HyperCard IIGS is a nearly perfect clone of the Mac version — with all the advantages and disadvantages of Apple's Macintosh HyperCard 1.25. It adds color — a feature not found even in HyperCard 2.0, the latest Macintosh version.

HyperCard IIGS, like HyperCard for the Macintosh, is a way to organize information. But it's much more than a database manager. At its most prosaic, HyperCard is a ➪

Photography ≠ Ed Judice



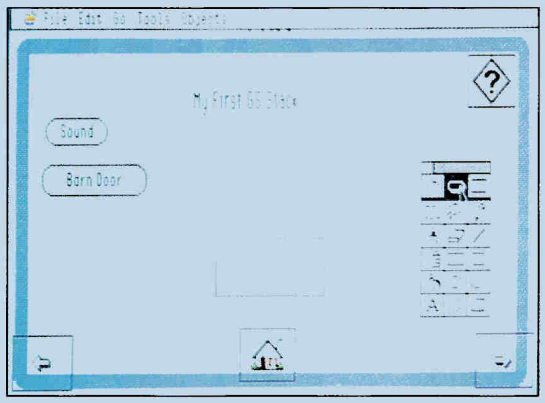
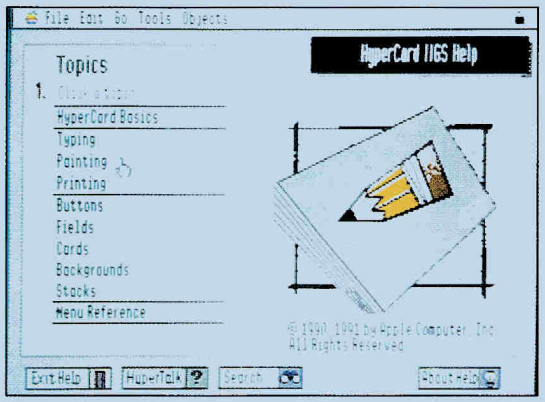


Figure 1.
These two screens both represent the first card of "My First GS Stack." On both cards you see five buttons, clockwise from upper right: "information," "next card," "home," "previous card," "barn door," and "sound." The home, information, next, and previous cards are in the background of this stack: They appear on every card. The text field that reads "My First GS Stack" and the blue border are also in the background. The sound button activates a script that plays a simple tune; the barn-door button initiates a special visual effect. The photo on the bottom shows the same card in "button" mode, which you would use to create or edit a button. Here you also "see" an invisible button, plus the tool menu, which you can tear off from the menu bar.



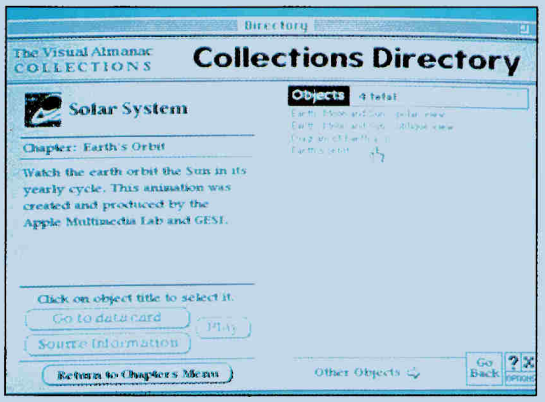


Figure 2.
A background, in HyperCard, is emphatically not the scenery. The painting in the HyperCard IIGS Help stack in the top screen isn't in the background; the boxes labeled Exit Help, HyperTalk Search, and About Help are. The background, whether it's made up of buttons, fields, or a whole card, is simply what you want to appear on more than one card. When creating a stack, the background is an essential part of the design. The card on the bottom, part of the stack that controls the Visual Almanac Mac compact disc, is well put together. The lower part of each card — containing all the action items — is the same on each card, while the upper portion is a table of contents for a particular section of the CD. The HyperCard IIGS Help stack is similarly well designed.

programming language. At its most poetic, it's a way of life. As a language it's up-to-date, making use of what's known as *object-oriented programming*.

Programming with an object-oriented language is like building a car on an assembly line: All the parts are there; your job is simply to put them together. The HyperCard lifestyle is as old-fashioned as the original idea of the Apple computer — that anybody should be able to write a program, that businesspeople should write business software, that teachers should write educational software, that kids can even create their own.

As you read about HyperCard IIGS, you may think you have to learn to write HyperCard programs — called *scripts* — to enjoy it. That's not true. Thousands of programmers have already written HyperCard stacks on subjects ranging all the way from ecological awareness to pornography.

Teachers will appreciate HyperCard's five levels of control, from browsing in the stacks (other people's) to scripting your own, with typing, painting, and authoring in between. But just about everybody who uses HyperCard — a program designed to put you in control — will want to write his or her own stacks. Basically, with HyperCard you can do anything the GS can do. Scripting is where the fun begins.

ON THE BUTTON

The key to understanding HyperCard is understanding the role of *cards*, *stacks*, *fields*, *buttons*, and *backgrounds* — the objects the HyperTalk programming language gives you to play with.

A card is what you see on a single screen (as in **Figure 1**); a stack is a collection of cards. You could think of it as a stack of index cards, but these cards are live, and you control them. In HyperCard IIGS, a card must fill the entire screen, although it's possible to hide the menu bar at the top. (HyperCard 2.0 on the Mac allows cards of different sizes.) The text and graphics you see on the card appear on two levels: background elements, which carry over from card to card, and the material unique to this card alone.

A background (**Figure 2**) can be as simple as a white screen, or as pretty a picture as you can scan, draw, or paint with HyperCard's built-in graphics tools.

Every card needs a background; in general, as we've noted, you put things you want to see on more than one card into the background. If you don't want to see anything repeated on other

cards, you'll include an empty background.

In addition to graphics, most backgrounds contain one or more buttons, the switches or controllers that make something happen (display another card, play music, perform calculations, get help, print, use a modem), and fields, areas containing text or numbers.

Common background buttons include the *home*, *next card*, and *previous card* icons (small pictorial representations, **Figure 3**). One misconception is that a HyperCard stack must have these buttons, but they aren't necessary. (See the accompanying sidebar, " 'Why Did You Do It That Way?' " for a report on button programming.)

Table. Elementary functions used in HyperCard IIgs, as specified by the Standard Apple Numerics Environment on the Apple IIgs' 65816 microprocessor.

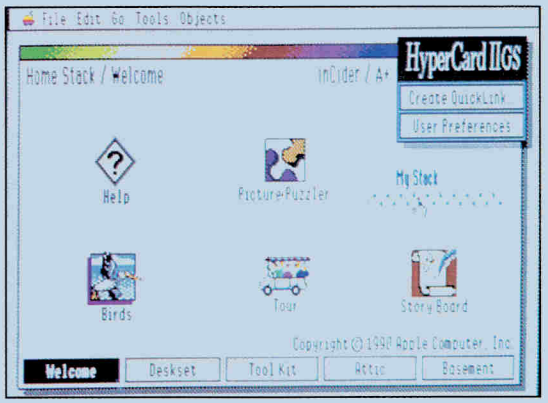
log2(x)	computes base 2 logarithm of x
ln(x)	computes natural (base e) logarithm of x
ln1(x)	computes natural logarithm of (x+1)
exp2(x)	computes 2^x
exp(x)	computes e^x
exp1(x)	computes $e^x - 1$
cos(x)	computes cosine of x
sin(x)	computes sine of x
tan(x)	computes tangent of x
atan(x)	computes arctangent of x
random(x)	computes pseudorandom number with x as its seed
compound(r,n)	computes $(1+r)^n$
annuity(r,n)	computes $1 - (1+r)^{-n} / r$

Buttons, whether background or unique, can appear as almost any graphic (**Figure 4**). Some don't appear at all — they can be invisible. Some buttons look like the electrical switches on which they're modeled, some look like round rectangles, some look like pictures (*icons*). HyperCard includes a number of icons in a special file you can use in your stacks. An *Icon Editor* stack that lets you draw your own is included with HyperCard IIgs (**Figure 5**). Triad Ventures has also written a desk accessory, included in its **HyperCard IIgs Utilities** package, to help you create icons.

WORD AND IMAGE

Buttons are one way HyperCard gets graphics onto the computer screen, but hypermedia includes good old text, too — in objects called *fields* (**Figure 6**), as we noted above.

If you've had any experience with database ⇨



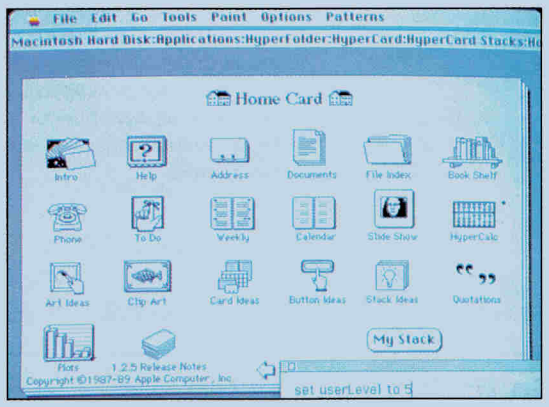
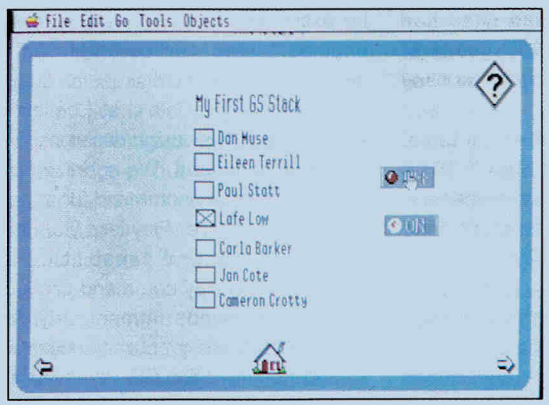


Figure 3.
These are the "home cards," or the first cards you see after starting HyperCard IIgs or HyperCard 1.25 on the Macintosh. A button to access "My Stack" has been added to both home cards. On the Apple IIgs, which uses color, a colorful icon has been created for it; on the monochrome Macintosh, a standard round-rectangle button suffices. The home card for HyperCard 2.0 for the Macintosh looks more like the HyperCard IIgs home card, except that it's limited to black-and-white. On the Macintosh screen (bottom) the user has accessed the "message" (Option-M) feature (also available in HyperCard IIgs) to "set userLevel to 5," which is the highest level possible and lets him or her write HyperTalk scripts.



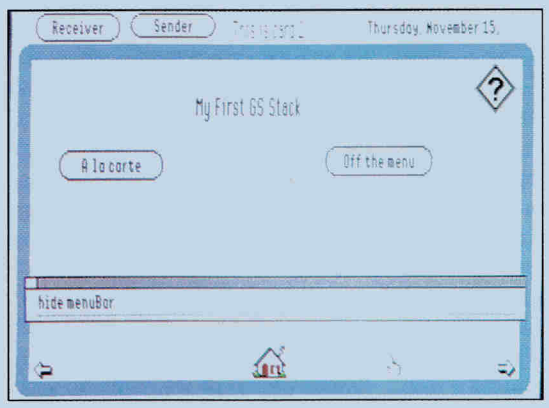


Figure 4.
On these two cards you can see a few of the many kinds of buttons available in HyperCard IIgs. The list of inCider/A+ editors at the top is a "family" of check-box buttons, which means that only one name can be selected at a time. The on and off buttons, which are represented by clip-art icons, are another family. Two buttons on the card on the bottom, "Off the menu" and "A la carte," cause the menu bar at the top of the screen to be hidden and to disappear. ("Hide menuBar" in the message box, Option-M, would have done the same thing.) The text fields with the card's number and the date are "computed" fields that appear on every card — you can see them only on a card whose menu bar is hidden. "Receiver" and "Sender" were practice buttons.

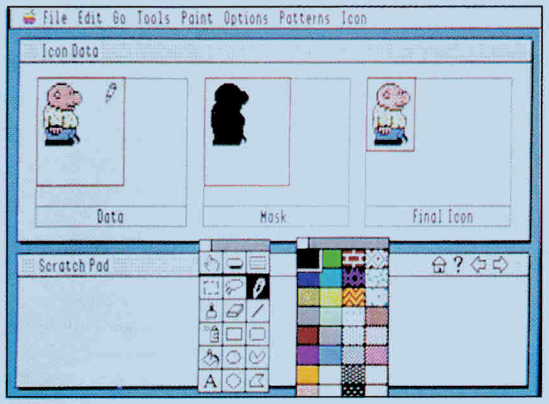


Figure 5.
The Icon Editor program included with HyperCard IIGS is the way to draw icons to use in your own stacks, or in other people's. Whenever you paint or draw in HyperCard, you can tear off the "Tools" and "Patterns" menus from the menu bar and they'll always be available wherever you like on the screen. The "Patterns" menu might have been called "Colors" but for the legacy of monochrome HyperCard for the Mac. The "Home," "Previous," and "Next Card" buttons are in interesting positions in this stack — they don't have to be at the bottom and in the corners.

management, you already know what a field is — a single part of a record. A HyperCard text field, like a database's, can contain either words or numbers; it can appear on a single card, or in every card as a background. You can save the contents of a HyperCard field as ASCII text, and import ASCII text into a stack. HyperCard can also perform calculations, including trigonometric operations, on numbers appearing in a field. (See the accompanying **Table**.)

Stacks are programs written in the HyperTalk language (**Figure 7**). Although HyperTalk doesn't include commands for every possible task — controlling a videodisc player, for example — you can enhance its native abilities with *extended commands*, or *XCMDs*, snatches of code written in C or Pascal that you call from a HyperTalk script. (XCMDs should remind Applesoft BASIC programmers of ampersand commands, which let you call a short machine-language program from BASIC. The effect is similar. See the section below, "Speaking the Language," for more on HyperTalk program-

"Why Did You Do It That Way?"

"In Italy for 30 years under the Borgias they had warfare, terror, murder, and bloodshed, but they produced Michelangelo, Leonardo da Vinci, and the Renaissance. In Switzerland they had brotherly love, they had 500 years of democracy and peace, and what did they produce? The cuckoo clock."

— Orson Welles as Harry Lime, "The Third Man," 1949

While nothing as dramatic as murder and bloodshed occurred during the creation of HyperCard IIGS (well, we did have an earthquake, but that was probably just a coincidence), users are often justifiably curious about the process of designing and creating a program as complex as HyperCard IIGS. Usually the question is posed while screaming for the head of the "idiot who wrote this thing," but nevertheless, what follows are some of the issues we dealt with while writing HyperCard IIGS.

At the most basic level, our major design requirement was to make an Apple IIGS version of HyperCard that was completely compatible with HyperCard 1.25 on the Macintosh computer. At the same time, we wanted to make improvements to the program that would benefit users and take full advantage of the capabilities of the Apple IIGS — hence a color HyperCard with improved printing and reporting capabilities, as well as additional functionality in the HyperTalk scripting language.

A complete description of how we designed and wrote HyperCard IIGS would be extremely long, so as one of the two engineers who worked on HyperTalk, I'm going to confine my discussion to just two features in HyperTalk that I believe represent some of the design decisions we made.

The play command. We agonized over the design of the play command for a long time. In Mac HyperCard, Play lets you utilize the single-voice sound capabilities of that machine. (The play command produces the requested sounds immediately. Multiple play requests are executed sequentially, not simultaneously.) The GS, however, can generate more complex sounds than the Mac.

Naturally, we wanted HyperCard IIGS to be able to take full advantage of the GS' sound capabilities, but we were under several constraints. First and foremost, the GS version had to be completely compatible with the Mac play command. In addition, there were language constraints. HyperTalk, as a language, is supposed to be English-like and simple to read and understand. Whatever syntax we arrived at would have to comprehensible by the average user, not just acoustic engineers. And finally, whatever we came up with had to be useful to the majority of users — we weren't going to add a super-powerful command only three people would need.

Initially we were extremely ambitious, and tried to create a syntax that would give you extensive control over the considerable sound capabilities of the GS. Regrettably, designing a syntax that was powerful, understandable, and backward compatible proved unrealizable, given the time constraints we were under. The language-design issues were difficult because of a rather odd situation — the GS' sound capabilities were too powerful! We simply couldn't figure out a way to unleash all that power and have the syntax understood by nonprogrammers.

We then tried a much simpler approach, a natural extension of the original syntax: one that would let you direct a particular sound to a specified channel, and optionally delay its execution. After setting up several sounds on separate channels, you could then tell the GS to start, and all sounds would play simultaneously. We had high hopes for this approach, but we were tripped up by the problem of synchronizing multiple sounds. Specifically, we had trouble resolving the language issue (and it's a lot more involved than you might think): how to accurately make sound B start 10 seconds, or even harder, 10 beats, into sound A.

Deadlines were looming, so rather than

ming.) You can attach an XCMD either to a single stack or to the HyperCard program itself. Triad Ventures, for instance, has already written some XCMDs to facilitate playing music (available in its **MIDI Music** package).

PLUS AND MINUS

One of HyperCard's secret strengths is that it's a pretty good database manager (**Figure 8**). Apple plays that down because it doesn't want software companies to complain that Apple's controlling the market.

Besides, "information engine" sounds more glamorous than "database manager." But teachers who need class records and individuals who don't need relational structured query language (SQL) just to keep Christmas card lists will find that they can write or buy HyperCard stacks that do the job.

Actually, HyperCard IIGS' number-crunching power would make some database managers envious. Financial functions such as annuity calculation and compounding for computing interest, and mathematical functions such as natural logarithms and trigonometric functions (see the accompanying **Table**), are available — and you won't find those in AppleWorks Classic. HyperCard IIGS uses *Standard Apple Numerics Environment* (SANE) protocol, which gives you access to a wealth of functions, and can speed up calculations considerably if you add a math coprocessor to your GS.

The program's most obvious strength is that your GS will be able to run stacks created for the Mac, and your Mac will be able to run GS stacks. At press time, the pair of stacks that perform the conversion, HyperMover GS and HyperMover Mac, weren't available. But if you compare the look of a Mac stack and its Apple IIGS cousin, you can see that converting one to the other shouldn't be too difficult.

We tried to copy the text of a HyperCard program, called a *script*, from a GS to a Mac LC via an AppleTalk network, but it wasn't quite that simple. The text arrived intact, but the program didn't quite work on the Mac. You'd need to ➪

"Mac or GS, HyperCard brings the hacker's spirit back to Apple."

do a mediocre job on a new syntax, and thus a disservice to the users and to the capabilities of the machine, we decided to stay with the original single-voice syntax from the Mac.

Not wanting to neglect all that power, however, we added two new XCMD callbacks: BeginXSound and EndXSound. XCMDs are user-created extensions to HyperTalk; callbacks are routines that let HyperCard and XCMDs communicate.

BeginXSound lets an XCMD take over the GS sound chip completely; EndXSound gives control back to HyperCard. With these new callbacks, you can extend the sound capabilities of HyperCard IIGS as far as you want, and without the constraints we were under.

You can write sound XCMDs that are as specialized, powerful, or weird as you like, and we strongly urge you to do so. That's what XCMDs are for.

Button families. The members of the HyperCard IIGS engineering team are also experienced Mac HyperCard users, and thus had a great deal of experience creating stacks with sets of radio buttons. Radio buttons, as defined by Apple's Human Interface Guidelines, are used to select one, and only one, choice out of many. If one radio button is highlighted, the other radio buttons must by definition be dark. And each button has to have a script that handles this procedure.

Imagine a stack with five radio buttons. To act properly, button 1's script would look like the following:

```
on mouseUp
   set the hilite of button 1 to true
   set the hilite of button 2 to false
   set the hilite of button 3 to false
   set the hilite of button 4 to false
   set the hilite of button 5 to false
end mouseUp
```

Button 2's script would look something like this:

```
on mouseUp
   set the hilite of button 1 to false
   set the hilite of button 2 to true
   set the hilite of button 3 to false
   set the hilite of button 4 to false
   set the hilite of button 5 to false
end mouseUp
```

And so on. Not very difficult, certainly, but a terrible nuisance. As longtime HyperCard users, we realized that a lot of tedious scripting could be avoided if the machine could handle highlighting and dimming automatically.

As it happens, the Apple IIGS Toolbox made this relatively easy to implement, and thus button families were born. By utilizing button families, a stack developer doesn't have to write any code at all to handle the proper highlighting of radio buttons.

An interesting thing happens when an experienced Mac HyperCard user sees HyperCard IIGS. While the obvious features, such as color, impress them, what really excites them are button families, and for the same reason they excite us — they save HyperTalk scripters lots of time.

As it happens, we decided to make families a property of all button types, not just radio buttons. That's of course their most obvious use, and although there's a danger that by not restricting their use, button families may be used for evil purposes (that is, in violation of Apple's Human Interface Guidelines), we felt it was best to give program writers the extra flexibility. In fact, if you look at their scripts, you'll notice that the rectangular buttons along the bottom of the home stack are implemented with button families.

A personal note. We brought a lot of personal experience as HyperCard users to the table when determining which features should be added or improved for the GS version. This program was written by HyperCard users. We're pretty proud of HyperCard IIGS, and hope you enjoy it and get a lot of use out of it.

— John Lawler, Apple Computer

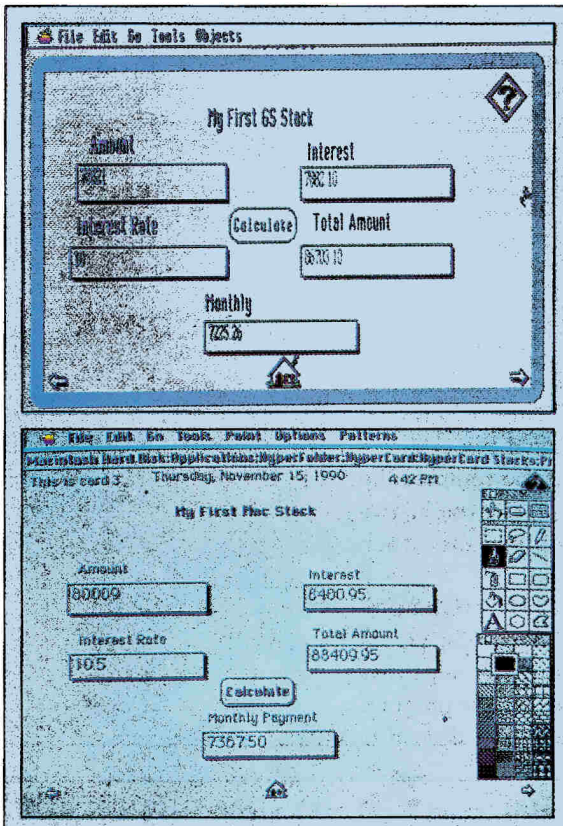


Figure 6.
At the top, HyperCard IIgs; on the bottom, HyperCard 1.25 for the Mac. This card uses the mathematical muscle of HyperCard to compute, in a not very elegant way, the monthly payments on a year's loan. The HyperTalk script for the "Calculate" button is identical on both cards — it was copied from Apple's HyperTalk Beginner's Guide. This demonstrates the relative ease with which Mac and Apple IIgs stacks can be converted to each other's format. With the exception of the background buttons and the "Calculate" button, all objects on these cards are fields.

HyperCard IIgs script

```
on mouseUp
   set numberFormat to 0.00
   get card field "Amount"
   multiply it by card field "Rate"
   divide it by 100
   put it into card field "Interest"
   add card field "Amount" to it
   put it into card field "Total"
   divide it by 12
   put it into card field "Monthly"
end mouseUp
```

HyperCard 1.25 script

```
on mouseUp
   set numberFormat to 0.00
   get card field "Amount"
   multiply it by card field "Rate"
   divide it by 100
   put it into card field "Interest"
   add card field "Amount" to it
   put it into card field "Total"
   divide it by 12
   put it into card field "monthly"
end mouseUp
```

Figure 7.
HyperTalk scripts for the HyperCard IIgs and HyperCard 1.25 versions of a button that calculates interest (Figure 6) are identical, except that in the Mac script, the lines "on mouseUp" and "end mouseUp" appear automatically; in HyperCard IIgs you need to write them out. HyperTalk sounds enough like English that reading a script is painless; writing in HyperTalk requires more discipline.

change some commands, but you could do the translation in a mechanical way — doing a find-and-replace on the offending structures. Tedious for you, but a snap for HyperMover.

The HyperMover programs will be available to developers and user groups. But other challenges remain: Stack conversions will pose a tricky legal question, for one thing. If you buy, say, a company's GradeBookStack for Macintosh HyperCard, do you need to buy another copy or a site license to run it on HyperCard IIgs? If you can legally use any Mac stack, a lot of stacks — commercial as well as public-domain — will be available for HyperCard IIgs.

A number of stacks are already available for Roger Wagner's **HyperStudio** — you don't even need to own HyperStudio to use some of them if they were created with the runtime version of the program. (See "Shareware Solutions," What's New, p. 20 in this issue.) That won't be possible with HyperCard.

It remains to be seen how many stacks will be written for HyperCard IIgs. Mac HyperCard ignited interest initially among commercial developers, but that burned out rather quickly. At press time, we knew the Boston Computer Society was writing a disk of GS shareware stacks, and Triad Ventures had written a commercial **MIDI Music** stack using Apple's new GS **MIDI Synth** tool.

AUDIO AND VIDEO

Given the musical talent of the GS, it's a shame HyperCard IIgs can't sing on its own, or at least play the piano. The version we tested had a choice of two musical instruments: harpsichord and a "boing" sound, which simply doesn't sound very musical. A Scripter's Tools stack included with HyperCard IIgs, however, contains 11 other sound resources for instruments such as piano and guitar, which you can attach to a single script or to the program itself. (See the sidebar, " 'Why Did You Do It That Way?' " for details.)

HyperCard doesn't have built-in sound digitization, however, as HyperStudio does. (See **Figure 9**. HyperStudio also includes a microphone, much like the Mac LC, making it easy to add sound to a stack.) Is Apple avoiding putting too much musical muscle into any of its products because it fears legal complications with Apple Corps, the Beatles' record company?

As we noted above, the current version of HyperCard IIgs also doesn't include commands for running a videodisc player, as HyperStudio does. HyperStudio has to offer lots of extras, because, lacking a HyperTalk-style program-

ming language as it does, adding features to the program is hard.

SPEAKING THE LANGUAGE

HyperCard is a general-purpose database manager, paint program, programming language, and even something of a word processor. The drawback? HyperCard — either version — is slow. HyperTalk simply adds another layer between you and the machine. HyperTalk is an interpreted language, which means that every line of code must be translated into something the GS understands before the machine starts to do anything. The advantage of an interpreted language is that the same code works on different machines. That's especially clear in the case of HyperCard: It's easy to write code that works on both the GS and the Mac.

HyperTalk is a plain-speaking, unaffected programming language, but a programming language nevertheless. You have to mind your Ps and Qs when you write a HyperCard stack — make sure you spell everything correctly and leave the right number of spaces.

HyperTalk is forgiving in some ways. It's unusual in that it lets you use two different words in certain cases to mean the same thing — *slow* and *slowly*, or *go to* and *go*, for instance. But it's about as much like spoken English as the commands players type into a text-adventure game. It requires some discipline to make yourself understood.

Pricing and Availability

At press time, final decisions about the price and distribution of HyperCard IIgs hadn't been made. Jane Lee, product manager for HyperCard IIgs, told us in November, though, that the price "should be around $99." That's what HyperCard for the Macintosh costs. "It will initially be distributed by Apple," Lee said, in contrast to HyperCard Mac, which is now distributed, in part at least, by Claris, Apple's software subsidiary. "It will be available through dealers and APDA [the Apple Programmers and Developers Association, phone (408) 562-3910, (800) 282-3732], and we are pursuing licensing by [Apple-authorized] user groups."

Lee noted that because "you can't use [HyperCard IIgs] out of the box with your new [Apple IIgs] CPU — it needs 1.5 megs and a hard drive or network to run — HyperCard IIgs will not ship with the CPU," as Macintosh HyperCard does.

In addition, Lee said, "HyperMover will be available to developers and through APDA."

— **P.S.**

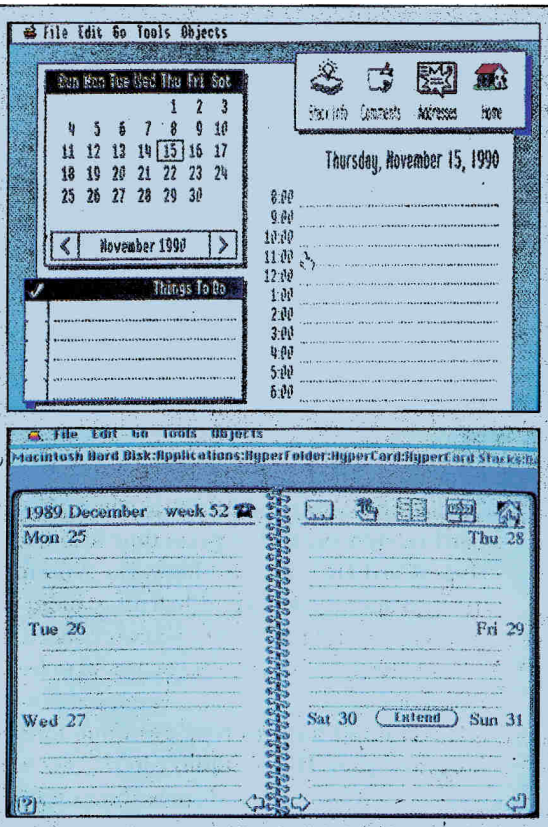


Figure 8.
Calendar stacks for HyperCard IIgs (top) and Mac HyperCard 1.25 (bottom). HyperCard handles a small job like your personal appointment schedule easily; a more taxing task might overpower it. HyperCard IIgs includes this calendar stack and one to file addresses and phone numbers.

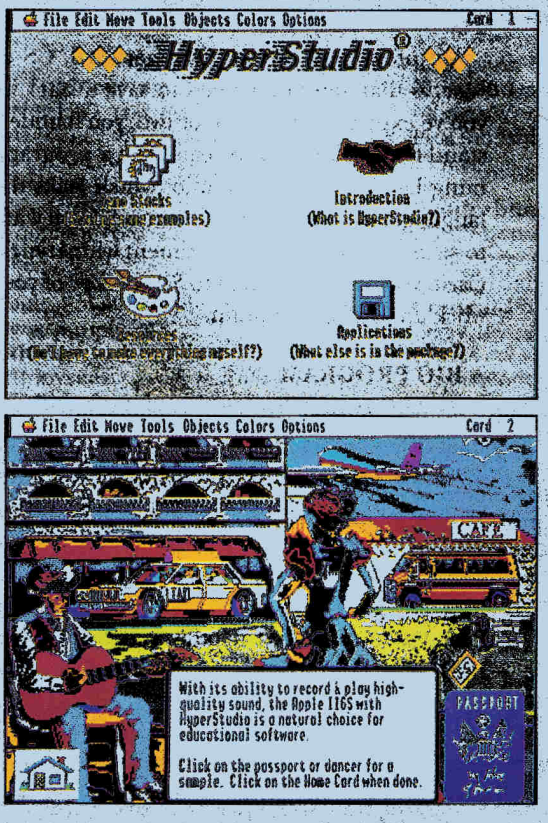


Figure 9.
HyperStudio for the Apple IIgs is a program much like HyperCard IIgs, which has been available for two years already. Its home card, top, is quite a bit like HyperCard's, but stacks aren't compatible. On the bottom, a sample card from a HyperStudio stack. On this card, designed to teach the Spanish language, you can click on the dancer to hear a prerecorded human voice say "la senorita." This kind of sound recording isn't available in HyperCard IIgs.

"At its most poetic, HyperCard is a way of life."

HyperStudio is easier to use than HyperCard, if by that you mean you can write a program without writing a line of code. HyperStudio never gets to the scripting level. It's indeed possible to build a HyperCard IIGS stack without HyperTalk by simply combining elements, but it's like baking a cake from a mix — the result will be edible, but bland. In any case, HyperTalk isn't exactly difficult. It strives to look like English, and although the impersonation isn't always successful, the meaning of a line such as *put the date into field "Today"* should be pretty clear. You'll need to take some time, and perhaps read a book or two, before you can write a script in HyperCard.

Addison-Wesley publishes excellent HyperCard references, and at press time also had a HyperCard IIGS book in the works. You may need to spend a weekend learning about it; an evening might do it. But you won't need to take a college-level course as you would to learn Pascal or C.

If you don't want to type even one line of program code, HyperStudio can do much of what HyperCard can, and some things it can't (such as videodisc control and sound digitization), simply by pointing and clicking a mouse. Some teachers will want their students to have the chance to create stacks without programming; others may want students to learn to write a computer program.

An interesting aspect of HyperCard, GS or Mac, is that you never need to save a stack. If you've experienced a crash or two, you'll understand the wisdom of this feature in a programming language. HyperStudio, which lacks the language, lets you decide when and if you want to save. If you want to experiment with HyperCard, you have the option to *Save a Copy* of your work up to a certain point.

A BIG PROGRAM

To use HyperCard, you need a big GS: 1.5 megabytes of memory and a hard-disk drive or network. Those are the official system requirements. We used a 1.25-megabyte GS with a 40-megabyte hard drive to test a beta version of the program. It was usable with that setup, but delays and out-of-memory messages were frustrating. The system ran more smoothly with 4 megabytes of RAM and an accelerator.

Faster speed really isn't crucial, but the hard drive is. After all, the whole point of HyperCard is that it's a way to manage lots of information — it gets interesting only when you have lots of cards. Some of the best Mac stacks, for instance — such as **The Visual Almanac**, shown in **Figure 2** — run from CD-ROM discs with half a million megabytes. An AppleTalk network would be a good way for a school to run HyperCard IIGS.

Not everyone has hard-disk drives, CD-ROM players, and local-area networks, though. That's the crucial advantage HyperStudio has over HyperCard IIGS: HyperStudio runs on a GS with 512K of RAM and a 3.5-inch floppy-disk drive. You can even create stacks that run with less memory, and run without HyperStudio.

But let's not take anything away from the supreme achievement of HyperCard IIGS — it's a Macintosh program that runs on the Apple IIGS. The hundreds of Mac HyperCard programs that are available are now also available for the GS. HyperCard IIGS should actually help make HyperCard legitimate, and help maintain Apple's dominance in the school computer market.

The irony is that HyperCard may eventually help make the Macintosh legitimate in schools. Schools that have GSes can now use HyperCard IIGS to run existing Mac stacks, many of which are designed for education. Schools, or teachers, who buy Macs can use the new machines to write educational software that will run on both Macs and Apple IIGSes. The twain have met. ❑

PRODUCT INFORMATION

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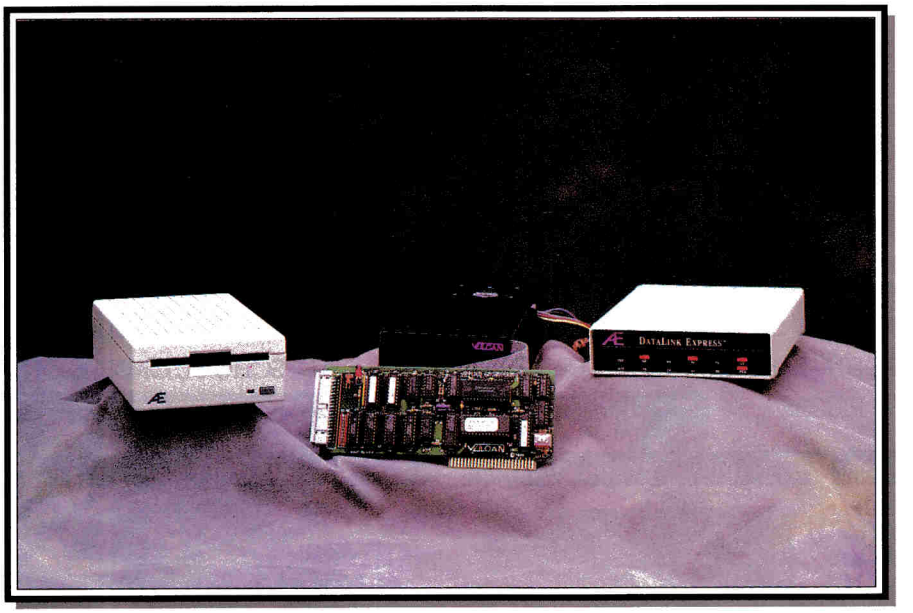

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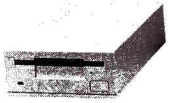

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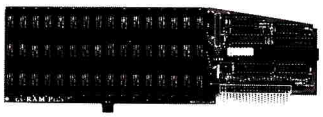

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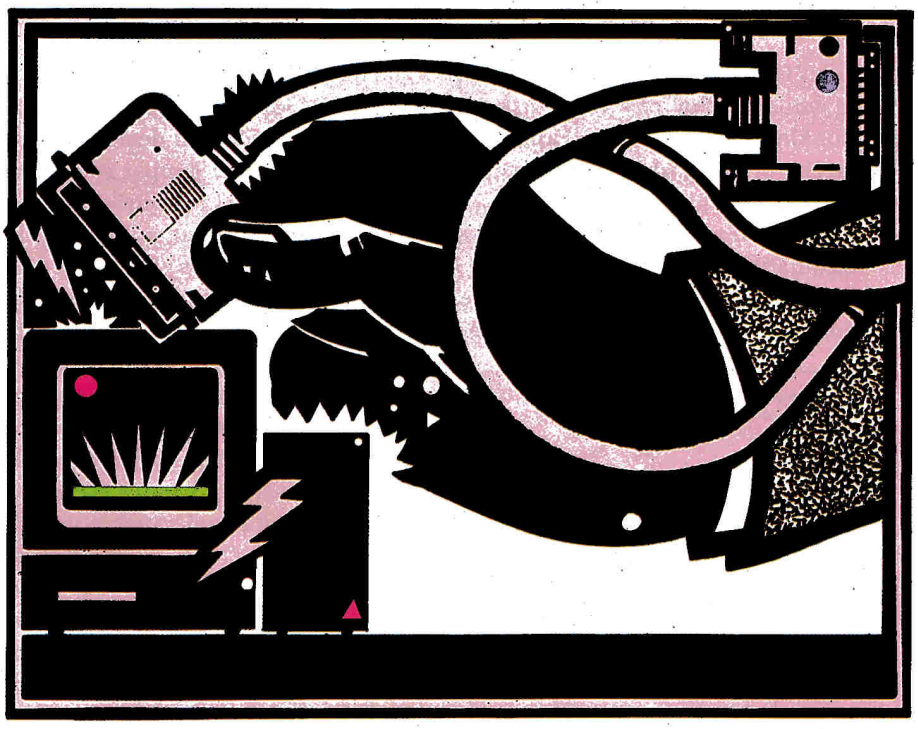

Are you tired of doing the floppy-disk shuffle? With a SCSI card and a hard drive you can "cache" in on speed and storage.

By Gary R. Morrison and Walker Archer

As any good advertiser knows, consumers will buy any product marketed to save time. But while most of you wouldn't dream of cooking in a conventional oven or brewing your morning coffee in a percolator, some of you still stare blankly at the monitor as you swap floppy disks and wait for your computer to load your programs. With a hard-disk drive, however, you won't need to suffer any longer. Because buying a hard drive can be as big a decision as it is an investment, this six-part series takes a look at some questions to ask before you pull out your VISA card. This month we focus on several SCSI interface cards (pronounced "scuzzy," *small-computer-systems interface*) that work with a host of SCSI hard drives. Read on and see how the **Apple High-Speed SCSI**, the **RamFast SCSI**, and the **CMS SCSI** cards stack up.

A STANDARD TO FOLLOW

The Apple High-Speed SCSI card is the worthy successor to the original Apple SCSI card. Its most notable new feature is its capability to do DMA (*direct memory access*) transfers. DMA lets the interface card put data directly into memory, without using the computer's microprocessor. (See **Figure 1**.) Information is transferred faster and more efficiently because it travels a shorter path to the final memory location.

Depending on the configuration of your computer, however, you may not be able to use this feature. Make sure you have no other cards in your computer that also utilize their own DMA, for example. If you have an Apple IIGS with a memory card, make sure that the card can handle DMA transfers. If you can't use this DMA transfer capability, disable it by setting a switch on the card during installation.

A well-illustrated installation and owner's guide is included with the Apple II High-Speed SCSI card, as well as all the hardware you need to install the card and mount the connector to the back of your computer. You'll also find software for formatting and partitioning a new hard drive, as well as drivers and installation scripts for use with GS/OS on the Apple IIGS. (More on ➪

Illustration + Chris Spollen

card installation and configuration below.) In addition, you'll find a copy of Backup II software for safeguarding the data on your hard drive. This updated version the program includes support for GS/OS forked files, and uses the full 80-column screen.

"Information moves faster — it travels a shorter path to RAM."

A SPEEDY ALTERNATIVE

The RamFast SCSI card also uses DMA to achieve quick data transfer. It keeps up to 256K of the disk data you use most often in a bit of RAM called a *cache*, a scheme perfected by Ohio Kache Systems. The *cache* (or *look-ahead* memory) temporarily remembers information that has been transferred to or from the hard disk. (The access speed of cache memory is similar to that of a RAM disk.) By thinking ahead, the RamFast card is capable of taking advantage of each spin of the drive.

The RamFast SCSI card comes with an installation and owners guide and is illustrated only with several screen dumps. This card doesn't include any software on disk; everything you'll need to use is included in a clever ROM-disk scheme built into the card.

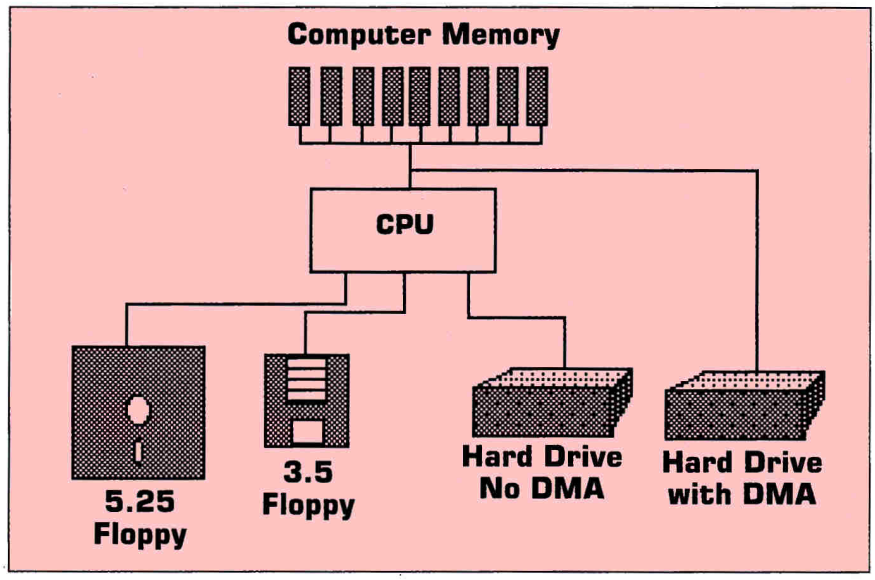

Figure 1. Data flows from a floppy disk, a hard disk, and a hard disk with DMA capability.

drive. If the RamFast card receives another request for the same data, it will take it from cache memory instead of accessing the hard drive. In other words, when you request a block of data, the RamFast card actually reads that block and a number of other consecutive blocks into look-ahead memory. (See **Figure 2**.)

Because GS/OS or ProDOS attempts to store most programs and data consecutively on a hard drive, the result is faster access from the RamFast internal memory and fewer reads from the hard drive. Reading data from look-ahead memory is like reading data from a RAM

AN UNDERCOVER OPTION

The CMS SCSI card is usually bundled with CMS hard drives, but you can use it with just about any SCSI-compatible hard drive. With it you can partition a hard drive using the card's jumper pins instead of its software. As a result, you'll have an easier time setting up the CMS SCSI card to share one hard drive between two computers.

Although the Apple High-Speed SCSI card lets two computers share a hard drive, both machines will see the drive exactly the same way, because partitioning information is in a table on the drive. The CMS partitioning information, however, is on the SCSI card, so each machine will see the drive differently. In other words, you can configure the cards so that one computer owns one partition and the other owns the second partition.

The CMS SCSI card comes with an installation guide that details many of the most common jumper configurations. In addition, CMS provides configuration software that will report the card's jumper settings. The latest CMS SCSI-card ROMs also supply an initial boot screen so that you can change the priority of the partitions and boot from the second partition. With this setup you can easily install GS/OS on one partition and ProDOS 8 or GEOS on another. By using the initial boot screen you can boot quickly into either operating system.

CARD INSTALLATION

Actually seating one of the SCSI cards is no more difficult than installing any other card in an Apple computer. Simply insert it into the slot and run the cable to the back of the computer. On the back plate, you can remove one of the plugs and use the hex nuts attached to the cable connector to bolt it in place. This procedure is common to all three cards. Most of the time you'll want to place the interface card in slot 7, because it's the first slot in which your Apple IIe searches for a bootable disk device, and it's the only slot that doesn't have an alternative function on the Apple IIGS.

Configuring the card is another matter entirely. The configuration steps vary widely for each card. The following is a description of the steps and considerations for configuring each card.

HIGH-SPEED ID

The Apple High-Speed SCSI card has a set of four DIP switches located toward the front of the card. Switch 1 controls whether the card will use DMA; the other three switches select the SCSI ID number for the computer. Every device on the SCSI chain must have a different ID

number. The computer's SCSI ID is usually 7. On an Apple II, the hard drive can have any SCSI ID between 0 and 6. Apple has attempted to set a convention by assigning a 0 to the Macintosh's internal hard drive and a 3 to the CD-ROM drive. Scanners and the LaserWriter IIsc will also have SCSI IDs; therefore, you may want to assign an ID of 1, 2, 4, 5, or 6 to your external hard drive for future compatibility and expansion. Once you've assigned the proper ID to the card, you're finished configuring your Apple SCSI card. You have few decisions to make, so installation is simple.

It's also important to note that the Apple High-Speed SCSI card treats terminator power differently from the older Apple SCSI card. If you have the older card and want to upgrade to the High-Speed SCSI card, you may need to use a different number of terminators. Also, we've found that some Mac hard drives won't work correctly with the Apple High-Speed SCSI card — some manufacturers have cut one or more of the lines inside the drive unit that the Mac SCSI interface normally doesn't need. You can correct this problem by replacing the internal cable with one that has all the lines intact, but getting the vendor's assurance that the drive works with your SCSI card before you buy would be easier.

FROM RAM TO ROM

The RamFast SCSI card has a set of eight DIP switches on board. Similarly to the Apple High-Speed SCSI card's switch 1, this card's switch 4 controls whether the card will use DMA transfers. Switch 1 on the RamFast SCSI card lets you choose whether the RamFast will supply the terminator power that allows the card to work easily with a wider variety of hard drives than does the Apple card. Other DIP switches specify what kind of machine you're running, the amount of time to search for a drive on power-up, and whether the ROM disk should be disabled.

After installing the RamFast card, boot up the accompanying software and you'll see the configuration screen. (You don't need any additional software to set up a new hard drive.) This screen will let you override many of the DIP-switch settings that you set up initially, do a low-level format (including setting the interleave), and partition your hard drive. (See the sidebar in "A Hard Drive Is Good to Find," July 1990, p. 45, for more information on low-level formatting and setting interleaves.) You can also set the size of the look-ahead buffer. Experiment with this value freely, but we've found that 12K produces the best general results, especially when booting GS/OS.

"By thinking ahead, RamFast takes advantage of each spin of the drive."

Also, with the RamFast card you can set up slot-allocation priorities for partitions beyond the first two allowed under ProDOS 8. When you buy a hard drive for use under ProDOS 8 you can normally use only 64 megabytes of storage, because ProDOS 8 allows only two devices per slot, with a maximum of 32 megabytes per device. The RamFast lets you use a drive larger than 64 megabytes. The card maps the partitions it can't access to other slots, such as the IIe slots it doesn't use and the IIGS internal ports it does use (a printer or a modem port, for example). Another feature is its ability to lock or write-protect any partition via the configuration software.

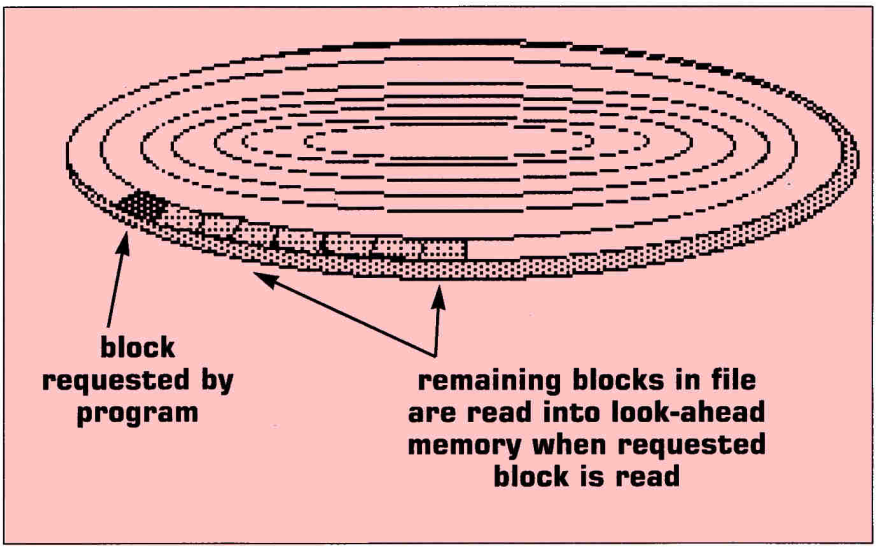

Figure 2. RamFast cache – look-ahead memory.

After you finish configuring the drive and booting the operating system, a special ROM disk is available that contains configuration software and drivers for GS/OS. This software is actually contained in the ROM chips of the RamFast card, but you can copy them to your hard drive as though you were copying the files from a floppy disk. Don't worry: You can't lose the software that comes with the RamFast card. After copying the software, you can then disable the ROM disk so that it doesn't take up a slot/drive allocation or clutter your IIGS desktop.

One of RamFast's weaknesses of the is its lack of support for removable-media drives such as removable hard drives and SCSI tape drives. Support for these devices, however, has been promised in the near future and should come in the form of a simple ROM upgrade.

The RamFast card does currently support a number of SASI standard drives (Shugart Associates Standard Interface), however, such as First Class Peripherals' Sider models.

COMPLICATED CMS

Initial configuration for the CMS SCSI card is considerably more difficult. In most cases the card comes configured from the factory exactly the way you'll ➪

want to use it. If you want to change any of the factory settings (size of partitions, or SCSI IDs) there's quite a bit to learn. With the card's accompanying software, you must set SCSI IDs for both the card and the hard drive.

In addition, you'll need to understand the concepts of partition size and position to physically set the jumper-pin settings for both partitions. There are no configuration options for DMA because the CMS SCSI card doesn't support DMA transfers. Also, no native drivers are available for the CMS SCSI card for use under GS/OS despite persistent rumors that CMS has been working on them.

Although the initial setup may seem complicated, the up side is that it's possible to configure the system so that two Apple II computers can share one hard drive. It's even possible to share a hard drive between a Macintosh and an Apple II.

"The optimum card will make your work time more productive."

THE RESULTS ARE IN

We performed all our tests by connecting the same hard drive to each of the SCSI cards. The test unit was a 40-megabyte Conner hard drive with an average seek time of 25 milliseconds. This drive mechanism also had a built-in 8K track-cache buffer, so we expected to see more comparable timings between the RamFast and Apple SCSI cards. As you'll see, the results were surprising.

We implemented three different "real-world" tests under both ProDOS 8 and GS/OS version 5.02. (See the accompanying **Table**.) All results are shown at a 1:1 interleave that turned out to be the best interleave for all cards tested. You'll probably find a 1:1 interleave to be optimum on most drives with DMA equipped cards. The CMS card, however, will probably require a different interleave for mechanisms that don't have a track-cache feature. We performed all tests on a ROM 1 Apple IIGS computer with 3 megabytes of memory with an Applied Engineering GS RAM+ extended-memory card.

These tests are in no way a comprehensive evaluation of the performance of these cards, but they should help indicate what you can expect if you install one of the cards in your computer.

Some of the results were surprising. You'd expect the Apple card to outperform the CMS card during a boot of GS/OS, but it didn't — possibly because the Apple card pauses when booted and loads a driver.

You'd expect the comparably slow performance of the CMS card under GS/OS, because no loaded driver device is available; GS/OS must create a driver internally that simply transfers program control to the ROM code on the card every time it requests disk I/O. When it transfers control, the GS must slow down to 1 megahertz and shift to 6502 emulation mode. The CMS card, however, performed quite comparably to the Apple card under ProDOS 8, even though it doesn't support DMA transfers.

The difference in speed between the RamFast and the Apple cards was particularly noticeable under ProDOS 8. The Apple High-Speed SCSI card performs most admirably under GS/OS where it has access to special operating system features, such as multiblock reads and caching. Under ProDOS 8 where these features aren't available, the Apple card's only advantage is DMA transfers. Because the RamFast cache is built into the card, it performs well under both GS/OS and ProDOS 8.

Each of these SCSI cards has its strengths and weaknesses, so base your decision to buy one on your needs and your system's requirements. The manufacturer of each of these cards has taken the extra effort to provide detailed instructions for installing and configuring it. Selecting the optimum card for your system will make your work time more productive. After all, isn't that what using a computer is all about? ❑

Table. Putting SCSI interface cards to the test.

	Apple	RamFast	CMS
Boot to GS/OS Finder	00:43	00:18	00:33
Boot to ProDOS 8 (BASIC.SYSTEM)	00:07	00:04	00:04
Verify 32 meg partition (Finder)	02:28	01:19	19:31
Verify 32 meg partition (Copy II Plus)	19:04	03:55	19:05
Copy 1 meg file (Finder)	00:15	00:13	01:20
Copy 1 meg file (Copy II Plus)	02:04	00:30	01:58

GARY R. MORRISON IS AN ASSOCIATE PROFESSOR IN THE DEPARTMENT OF CURRICULUM AND INSTRUCTION AT MEMPHIS STATE UNIVERSITY, WHERE HE TEACHES COURSES IN INSTRUCTIONAL DESIGN AND TECHNOLOGY. HE'S THE AUTHOR OF REPAIRWORKS, PUBLISHED BY QUALITY COMPUTERS, AND *THE APPLE II HARD DISK PRIMER*, PUBLISHED BY NAUG. WALKER ARCHER IS MANAGER OF SOFTWARE DEVELOPMENT AT QUALITY COMPUTERS AND IS THE DEVELOPER OF EASYDRIVE AND RAMUP. ARCHER AND MORRISON HAVE ALSO WRITTEN AN ON-LINE COURSE ON C PROGRAMMING FOR THE GS. WRITE TO THEM C/O *INCIDER*, 80 ELM STREET, PETERBOROUGH, NH 03458. ENCLOSE AN SASE IF YOU'D LIKE A REPLY.

Product Information

Apple II High-Speed SCSI Card
Apple Computer
20525 Mariani Avenue
Cupertino, CA 95041
(408) 996-1010
$129

RamFast SCSI Card
CV Technologies
9431 Saddlebrook Lane
Suite #2C
Miamisburg, OH 45342
(513) 453-5743
$289

CMS SCSI Card
CMS Enhancements
2722 Michelson Drive
Irvine, CA 92715
(714) 222-6000
$129

We don't recommend plucking your Vulcan™ off a table and dragging it along the ground.

But it's nice to know you could.

October 30, 1990

Gentlemen:

I use my Apple IIGS with a Vulcan and an AE A/D converter at professional waterski tournaments to measure jump distances. I wish to commend you on the durability of your Vulcan Hard Drive.

I was using the computer at the U.S. National Waterski Championships in August when a gust of wind picked up the canopy under which we were operating. Wires running to my system were attached to the canopy and when the canopy blew away, it pulled the computer with the Vulcan off the table and onto the ground, dragging it along the ground some twenty feet. I was actually in the process of writing data to the hard disk at the time.

Even though the incident pulled many of the attaching wires out of the computer, no damage occurred to the computer or the hard drive. I subsequently verified all of the data on the hard drive and found no errors and no bad or damaged blocks in either ProDOS or MS-DOS (I use half my storage for my PC Transporter's MS-DOS files and half for ProDOS).

Needless to say, I am very grateful for a soundly built and well-engineered product.

Sincerely yours,
Roger Dilling
Milledgeville, Georgia

We hope you never drag your hard disk through the dirt, but can appreciate the engineering required to make the above letter possible. Until recently, if you wanted a hard disk for your Apple, you had to add an outdated, external box to your desktop clutter. Now, with Vulcan™ on the scene, you have an internal to consider. One that's lightning fast, clean, powerful and affordable.

A glance at the other computer manufacturers; IBM, Compaq, Dell, Mac, tells you something. They're all very different systems, but all come with internal hard disks (it's hard to even find a Mac these days without an internal hard disk). The reason? Internals are the latest advance. The modern storage solution. They become a transparent part of your system, and in the case of Vulcan, actually enhance the rest of your system.

Enhancing the rest of your system. Many feel Apple's standard power supply is insufficient. Add a Vulcan and you make a significant improvement to the rest of your system. The high efficiency power supply in Vulcan is rated in excess of 70 watts, nearly double the capacity of Apple's standard power supply and that of other drives. Vulcan power supply components are heatsinked to the aluminum case for cool operation and long life. And we added an ultra-quiet, flush-mounted cooling fan to keep things cool inside. Vulcan actually beefs up your power supply. External hard disks drain it.

Ease of use. Most hard disks are pretty intimidating. It's frustrating to bring home a new hard disk, only to discover you've got to spend a lot of time setting up for your particular operating system, partitions and formatting. Vulcan comes pre-formatted, pre-partitioned and includes the latest Apple Operating System. You'll be using your Vulcan within minutes. Just pull out your old power supply, plug the Vulcan in it's place, insert the card and turn on the computer. Vulcan will boot to your familiar Apple Finder in a few seconds. Now *that's* ease of use.

Incider/A+ Magazine put it simply in their "Best of the Best" Holiday Shopping Guide: *"The best internal hard disk is the Vulcan from Applied Engineering - you can use it with DOS 3.3, ProDOS or GS/OS, and it comes with its own fan and power supply".* Vulcan incorporates the most popular standard protocols for a hard disk and includes an ultra-fast 16-bit data bus controller, not the less expensive 8-bit others use. And since Vulcan is fully compatible with our PC Transporter, you can create ProDOS or MS-DOS storage space, in addition to GS/OS, DOS 3.3, CP/AM or Pascal 1.3. No

other hard disk works with all these operating systems.

Vulcan gives your Apple IIGS, IIe, II+ or II upgradeability (20-100 MB), useable speed, safe power (its FCC certified and works on 110/220 VAC, even European 115/230 VAC at 50-60 Hz), practically unlimited size and AE's famous tech support and one-year warranty.

Order today! To order or for more information, see your dealer or call (214) 241-6060 today, 9 am to 11 pm, 7 days. Or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 8 1/4% sales tax. Add $10 outside U.S.A.

Vulcan 20 MB.....**$699**
Vulcan 40 MB.....**$899**
Vulcan 100 MB.....**$1795**

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FAMILY TIES

No one's going to claim they're twins. The Apple IIGS and the Macintosh, both born and raised in Cupertino, California, may be siblings, but they're not always on speaking terms. Jealousy often colors judgment — the GS wants the respect that everyone seems to give the Macintosh automatically, while the Mac pines for a place in the classroom and den — and sometimes everyone forgets to be polite. Defenders of both machines argue merits and demerits like parents taking sides. And public squabbles, like siblings fighting in the supermarket over who pushes the cart, let everyone know that even Apple doesn't think of its two children as equals.

On the surface, the GS and the Mac may seem to have little more in common than the striped logo on the front of the case. But scratch that surface and you'll find strong traits both share. Nowhere is this more evident than in system software. Moving from one machine to the other, even daily, takes little mental effort simply because the ways in which you use the two computers are so alike.

That's no accident. Compared to MS-DOS computer users, who are only now seeing ways to bind together different programs under one interface's umbrella, GS and Mac owners have had it easy. From the beginning, Mac and GS system software created an integrated and consistent method for doing everything from copying files to launching programs. Master the GS' Finder and system tools and you

A STRIKING RESEMBLANCE IN SYSTEM SOFTWARE

By Gregg Keizer

can sit down at the Macintosh and feel right at home.

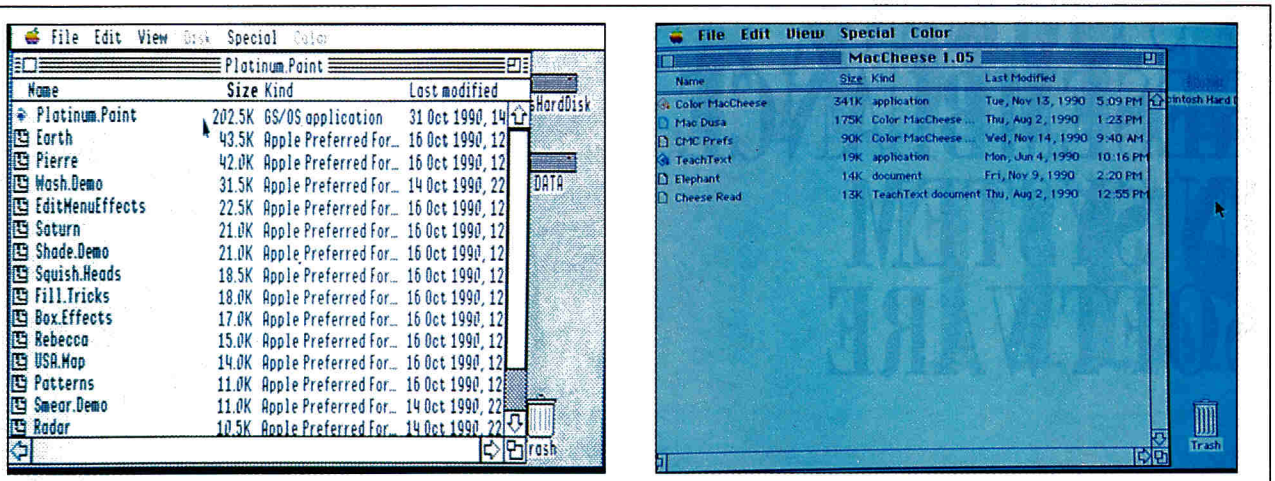
The rewards are stunning. As Apples and Macs increasingly find themselves cheek-by-jowl in classroom networks or on home desktops, shifting from a GS to a Mac and back again will be commonplace. (See "Connecting in the '90s," December 1990, p. 66, for details on how Apples and Macs can share information over networks.) The less trouble the transition, the smaller the amount of relearning of commands and procedures you have to do, the more you can concentrate on turning the computer into a tool. Apple IIGS System Software 5.02 and Macintosh System Software 6.0.5 share more than they segregate. That's a boon for any Apple computer user.

FIND THE LOOK AND FEEL

The GS and the Mac put on their faces with the Finder, the program that creates their desktop-like environments. It's in the Finder where you handle the maintenance chores of copying files and disks, viewing contents of disks, making new folders (subdirectories), initializing and erasing disks, and launching applications. Like any good spokesperson, the Finder is slick, polished, and nearly flawless.

The GS and Mac Finders are almost identical, the legacy of Apple's across-the-board *Human Interface Guidelines*. Both sport windows you can resize, close, and move with the mouse. (See the **Figure** at the bottom of p. 54.) The menu bar, a consistent feature of all GS and Macintosh applications as well, puts the *Apple*, *File*, *Edit*, *View*, and *Special*

Photography * Ed Judice



The GS and Mac operating systems let you view the contents of a disk by name, date, size, or type. Here the disks' contents are organized by size.

selections across the top of each machine's desktop. In fact, many choices under each menu are the same, whether you're pulling it down with a Mac mouse or one connected to a GS.

Cdev Heaven

One of the most striking features shared by Macintosh and GS system software is the Control Panel, and the way it uses the utilities known as "cdevs." A cdev (control-panel device) is a small program you access from the Control Panel.

To add a cdev to the Control Panel, drag its file into the System folder (Mac) or into the Cdev folder within the System folder (GS). Reboot your machine and the cdev is available by going to the Control Panel and clicking on the cdev's icon.

Cdev development is more than a cottage industry on the Macintosh, but it's just getting started on the GS. Much like a desk accessory in its specific focus, a cdev is usually a small one-shot application. One popular Mac example is Soundmaster, which lets you assign sounds to a variety of Finder actions, such as Startup, Disk Insert, Disk Eject, and Empty Trash.

Although many Mac cdevs are commercial programs, most cdevs for the GS are distributed as shareware or as public-domain software. A quick tour through GEnie's A2 Roundtable turned up several interesting cdevs, from Twilight (blanks the screen) to Desk Color (changes the desktop from the standard blue to any pattern or picture).

Keep watch for more GS cdevs in the future, especially on such telecommunications services as CompuServe, GEnie, Delphi, and America Online. **— G.K.**

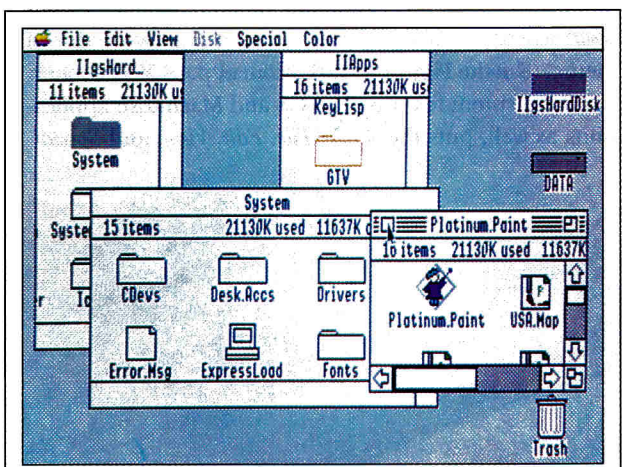
To see a disk's contents, for instance, pull down the *View* menu, then choose to display files by name, date, size, type, or icon (regular and small-sized). Pick *Size* and the resulting file and folder lists are remarkably uniform between the GS and the Mac. (See the **Figure** above.)

Copying files — never an easy proposition in ProDOS, the operating system 8-bit Apple II computers used for years — is a simple point-and-shoot operation on the GS or the Mac. Dragging files from subdirectory to subdirectory, from disk to disk, or from disk to the Trash are the metaphors for moving, copying, and erasing files. Learn how to do it on the GS and you know how it's done on the Mac. It's that simple.

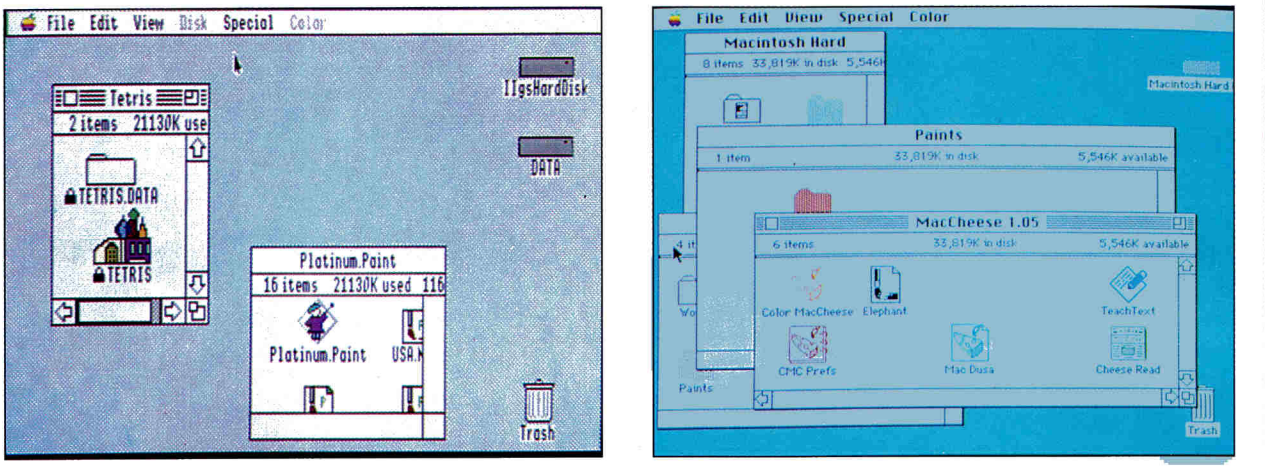
More-involved Finder functions (nothing is even close to what you'd call difficult) include initializing disks and shutting down the computer. Both the GS and the Mac make the former automatic when an unformatted disk is stuck in a drive, though the latter differs slightly from GS to Mac when you're using a II-series Mac (You don't have to turn off the machine physically when you choose *Shut Down*.)

Color, long the GS' greatest advantage over its bigger siblings, is now shared with modular Macs, from the Finder to applications, games, and even utilities. Tinting file, folder, and disk icons is easy, and helps organize crowded displays, especially of a hard disk's contents. (See the **Figure** at the top of p. 55.)

Not everything's share-and-share-alike. One of the biggest differences between GS and Mac versions of the system software is something the GS is missing — Multifinder, a Mac program manager that lets you open several programs, then switch quickly from one to another with a single mouse click. (See the **Figure** at the bottom of p. 55.) Multifinder is a RAM hog, and though it works in 1 megabyte, it's really useful only if your Mac has 2 or more. Still, it makes the Mac much more versatile



Like the Mac, the GS lets you open multiple windows.



Both the Mac and the GS Finders are live and in color. You can colorize icons and folders for fun or to help organize your hard-disk drive's contents better.

when your application set includes two or more programs. Imagine a beefed-up GS that could switch instantly among AppleWorks GS, Publish It!, and the Finder, cutting and pasting between the two applications and dropping to the Finder to create a new folder. That's what Multifinder does for the Mac.

Except for this admittedly major difference, GS system software and its Mac counterpart present much the same look and feel with their Finders. Learn one Finder and you've learned them both. No other element of either computer does more to make you feel comfortable with both machines.

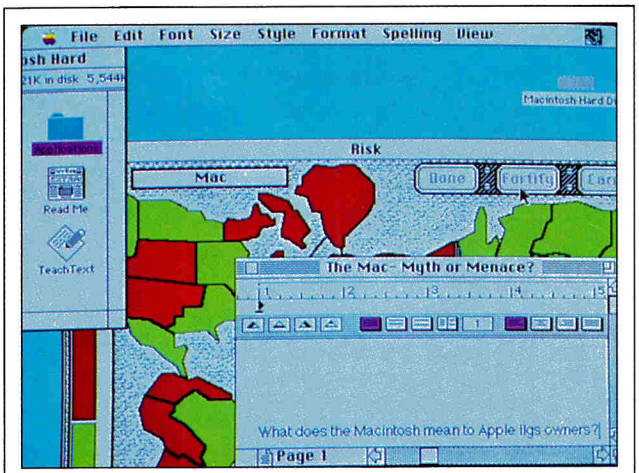
SIBLINGS SHARE TOYS, TOO

But the GS and the Mac share more than just a common look and feel. Each machine's system software includes ways to control and customize the computer and your computing environment. Though the methods vary in some respects, they're much more alike than different.

Take the *Installer*, for example. During your computer's lifespan (whether GS or Mac) you'll probably update its System, Finder, and associated files several times as Apple releases new versions. The Installer is particularly crucial to the Mac, simply because of the way the machine adds fonts and desk accessories to the System file; using the Installer saves a lot of time you'd otherwise waste re-creating your font and DA set in a new System. Even on the GS, though, the Installer is a time saver, especially if you have several startup disks.

The GS and Macintosh versions of the Installer are similar, though not identical. In both you select the update items — from *AppleShare* and *SCSI hard disk* on the GS to *Laser-Writer SC* and *32-bit QuickDraw* on the Macintosh — and the Installer automatically updates the startup disk software. (See the **Figure** at the top of p. 56.)

But it's really in the Control Panel that these two machines show off their relationship. Want to change the speed with which the mouse moves the cursor across the screen? Simple. Just pull up the Control Panel and click on the Mouse icon. The Mac display is more graphical and icon-oriented, while

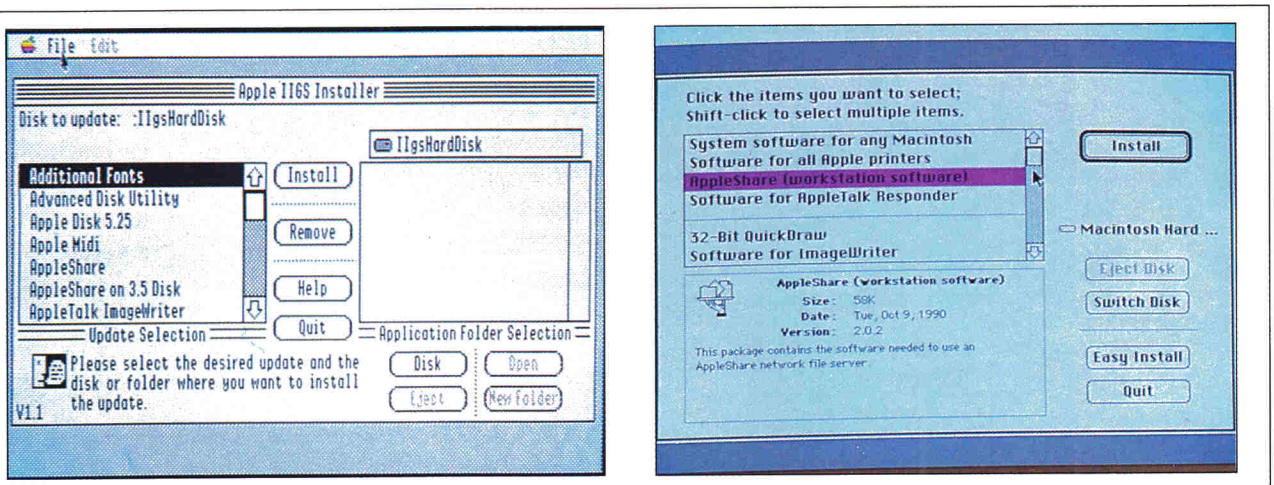


Multifinder lets you have more than one program active at a time, so you can switch quickly from play to productivity.

Tips for Better System Living

Here are some quick hints to help you work faster and better with the GS Finder and other system tools:

- Hold down the option key when you click on a window's close box. This nullifies any changes you made to the window (enlarging it, moving it, or switching views). When you reopen the window, it's in its original shape, size, and location.
- Rather than write-protect an entire disk, use the Locked box to ensure that vital files and folders aren't copied over or deleted accidentally. Select the file or folder, then choose Icon Information from the Special menu. Just click on the Locked box to lock (or unlock).
- Erase a disk and you haven't destroyed the data. (All you've done is eliminate the disk's directory.) To destroy confidential data, use the Advanced Disk Utility. Its Zero option writes across the entire disk, obliterating everything.
- Normally when you copy a floppy disk to a hard disk (or a 5.25-inch disk to a 3.5-inch disk), the source disk's files are stored in a folder on the destination disk. To simply add the files to the contents of the destination disk (without segregating them in a folder), hold down the option key while you drag the disk icon. The Disk Copy Alternatives box appears; click on the third button and then click on OK. **— G.K.**



As you can see, the GS Installer and the Mac Installer aren't identical; on both machines, however, the Installer lets you update your system.

the GS simply lists boxes you click, but the choices are identical. (See the **Figure** at the top of p. 58.) You can speed up or slow down the mouse tracking speed, or change the way the mouse reacts to double clicks. Changing other characteristics is just as simple. Both the GS and Mac Control Panels manage everything from the amount of memory set aside for a RAM cache to sound volume and monitor type.

But just as in the Finder, the comparisons don't stretch everywhere. The way you add fonts and desk accessories to your GS and Macintosh system software is quite different — at least for now.

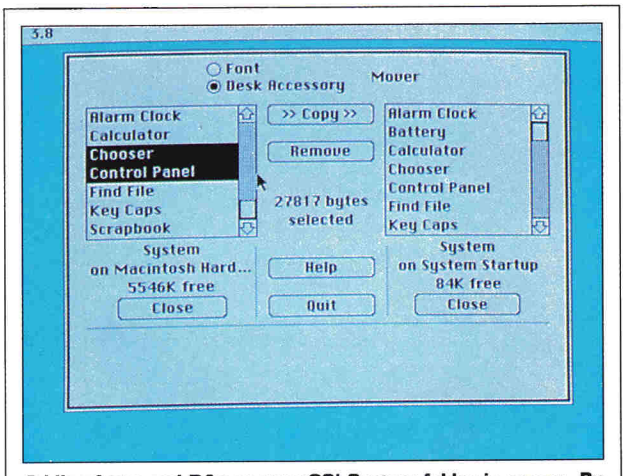
The GS makes its simple. Drop new font and desk-accessory files into the *Fonts* and *Desk.Accs* folders, reboot, and you're through. It's not as easy on the Macintosh. You've got to use a utility called Font/DA Mover to append font and DA files to the System file. (See the **Figure** below.) The process isn't hard, but it can be time-consuming if you're adding several fonts and desk accessories, or if the System file is already huge. Apple's new System 7.0 for the Macintosh will reportedly take a page from the GS' playbook and make font and DA installation as easy as copying files to the *System* folder.

System tools are another example of the consistency that Apple brings to both its lines. This uniformity proves its worth the first time you move from a GS to a Macintosh. You can't carry your tools with you, but you can sure carry your knowledge of how those tools work and what they're for.

WIRES AND WORDS

You may not particularly like your family, but you can always talk to them. Networks bind the GS and the Mac in much the same way.

Using LocalTalk cabling, AppleShare software, and a Macintosh as a file server, you can set up networks that link Macs, Apples, printers, and other peripherals. One of the major benefits of an Apple/Mac network is that it lets Apple users share data files with Mac users without going through the cumbersome necessity of using a file transfer program. Just save or print that document as a text file to your file server, and anyone on the network can use it.



Adding fonts and DAs to your GS' System folder is a snap. By contrast, Mac users need to wrestle with Font/DA Mover.

Wild for Windows?

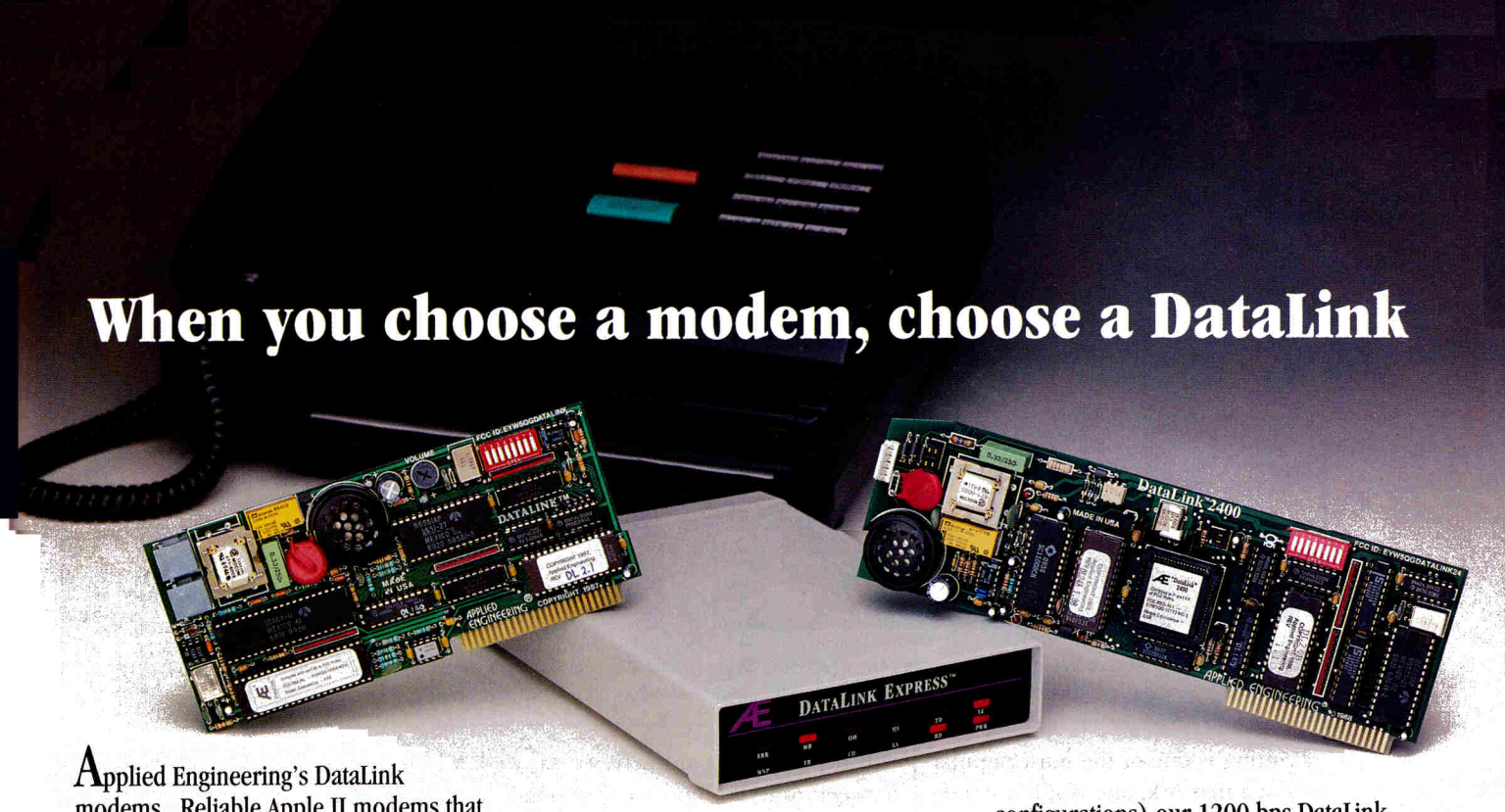
Last May, the PC world went wild over Windows 3.0. What's the big deal? Well, to the graphical-interface-starved PC crowd, Windows is like manna from on high. "Finally, my PC looks and works like an Apple," they're saying.

Not quite. Windows 3.0 may be an operating environment similar to the Mac and GS Finders, complete with windows that move, resize, and overlap; it may launch software by clicking on an icon with a mouse pointer; it may even handle file and disk chores. But it's not the Finder; and it's nowhere close to the operating systems your Mac and GS already enjoy. For instance, Windows 3.0 separates two common Finder jobs — organizing and launching files from windows, and copying, moving, and renaming files — into two separate programs: the Program Manager and the File Manager.

The bottom line? Windows 3.0 is the PC's first foray into a graphical user interface (GUI) that works fast and dependably. It's not equal to Apple system software, Mac or GS. Not yet. But GUIs aren't the domain of Apple alone. To stay ahead, Apple must continue to improve its interface and its system software. The Mac's System 7 (scheduled for release in 1991) should push up to that next GUI plateau.

It better. PCs are breathing down Apple's GUI neck. **— G.K.**

When you choose a modem, choose a DataLink



Applied Engineering's DataLink modems. Reliable Apple II modems that are easy to use and have just the right combination of simplicity and complexity - with enough features to let you custom tailor the modem's setup to suit your own needs.

Whether you're looking for an internal, external, 1200 or 2400, MNP-5 or AE Send-Fax™, Applied Engineering has the right modem for you. Choose from our upgradeable DataLink Express™ external (center), DataLink 2400™ internal (right) or the economical DataLink 1200™ (left).

All three DataLink modems feature AE's communications software - on disk and in ROM - everything needed to get you immediately up and running. Our powerful DataTerm software for the IIGS and IIe supports VT-52 screen emulation, macros, file transfers, on-line time display, recording buffer and more. It even handles hundreds of phone numbers for auto-dialing and log on.

With the new AE Send-Fax™ option, DataLink 2400 and DataLink Express owners can fax text and graphics directly from their computer screen, without even printing a "hard copy" of the information. And an upgrade path is being made available for AE customers with earlier versions of the DataLink 2400.

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- Full Hayes AT compatibility
- Compatibility with Bell 103, 212 and European CCITT V.22 BIS, V.22 and V.21
- Super Serial Card "Front End" for highest software compatibility (unlike some competitors)
- Adaptive equalization and descrambling
- Hardware configuration for DSR and DCD
- PC Transporter (MS-DOS) compatibility
- FCC certified designs

DataLink 1200 reduced. Loaded with all the features of the 2400, (except CCITT, DSR/DCD and non-volatile ROM configurations) our 1200 bps DataLink modem, complete with software and freebies, is an affordable alternative.

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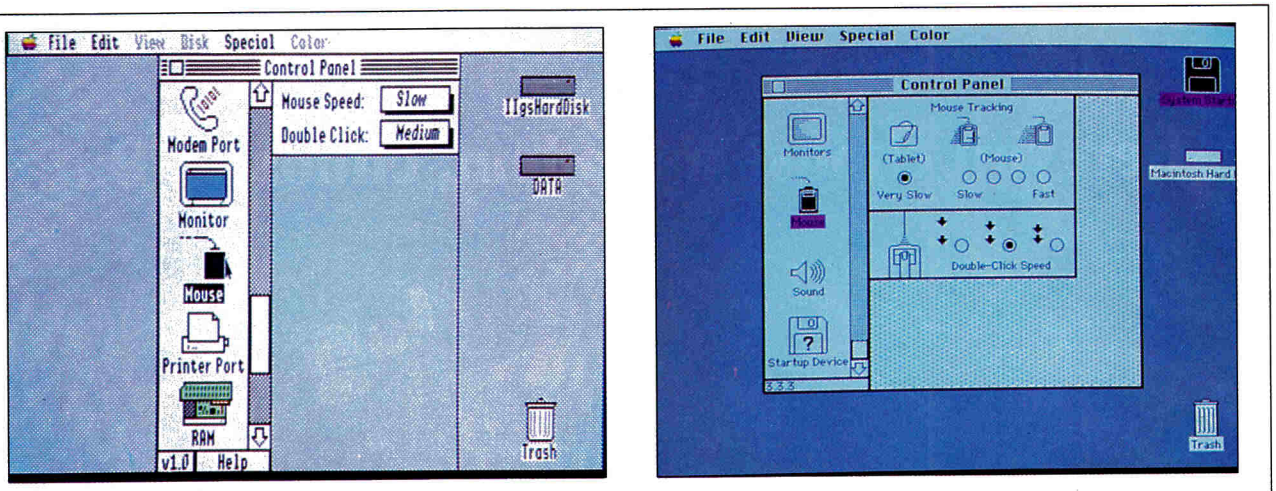


Whether you're using GS/OS or the Mac operating system, the Control Panel is where you customize your system. The examples above (GS, left; Mac, right) show settings for adjusting your mouse.

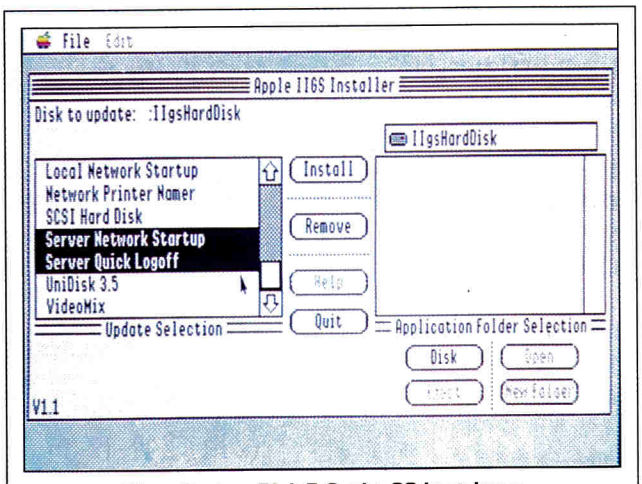
Printing is one of the most popular uses of a network, and Apple's system software makes that a snap. On the Macintosh, you select the printer (there may be several connected to the network) with the *Chooser*, a desk accessory. From the GS, you head to the Control Panel and choose the appropriate printer icon. Either method takes only a moment.

With the introduction of System 5.0, Apple made the GS workstation-ready. In other words, you don't need any additional software to connect a GS to an AppleTalk network. (See the **Figure** below.) This integration of client workstation software with system software began with 5.0, and according to Tim Golden, Apple's product manager for classroom networking, will continue. "The goal of system software for the GS will be to make connectivity easier between different operating systems," says Golden. System software that shares traits, whether in networking ease of use or printer setup, is a welcome sight when you're moving from GS to Mac and back.

MOVE ALONG, LITTLE DOGIES

It's obvious that Apple is devoted to its Macintosh. The debut of the new, lower-priced Macintosh Classic, LC, and IIsi computers makes that clear. Less clear is Apple's dedication to the Apple IIGS. The GS of today is probably the GS of tomorrow.

Similar system software across the Mac/Apple chasm makes that hardware dead end easier to face. That's because the time you spend becoming a power GS user won't be wasted when you bring a Macintosh into your computer fold. When you decide to add a Macintosh, you'll be able to turn the corner from all Apple II to Apple II/Macintosh user in a matter of moments. (Both the Classic and the LC are excellent candidates; for a closeup and an anlaysis of their impact on Apple II computing, see "Meet the Mac LC" and "New Wine in an Old Bottle," December 1990, pp. 40 and 43, respectively.) Compare that to the months you'd spend learning a new operating system — say, MS-DOS.



Since System Disk 5.0, the GS is at home on an AppleTalk network.

HOW EASY IS IT TO MAKE THE SWITCH — REALLY?

I've been a Macintosh user since 1984 and an Apple IIGS user since 1986. It took System Software 5.0 to convince me that they were from the same company. Moving back and forth between my Mac and the GS, whether stand-alone or connected, is a breeze — not the nightmare of change I'm forced into each time I leave an Apple com-puter and touch the keyboard of an IBM PC compatible. Nearly identical Finders, similar Control Panels (both graphics-based), fonts and desk accessories, network configurations, and shared printer resources all soften the impact of turning off one computer and turning on another.

System software paves the way for the transition from Apple IIGS to Mac, and back, too. The care Apple's taken to make the GS and its Macintosh siblings act alike and look alike pays off when you bridge the gap and bring in Macs to share your desktop. ❑

GREGG KEIZER IS A FREE-LANCE JOURNALIST SPECIALIZING IN COMPUTER-RELATED TOPICS. WRITE TO HIM AT 614 LINDEN STREET, SHREVEPORT, LA 71104. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

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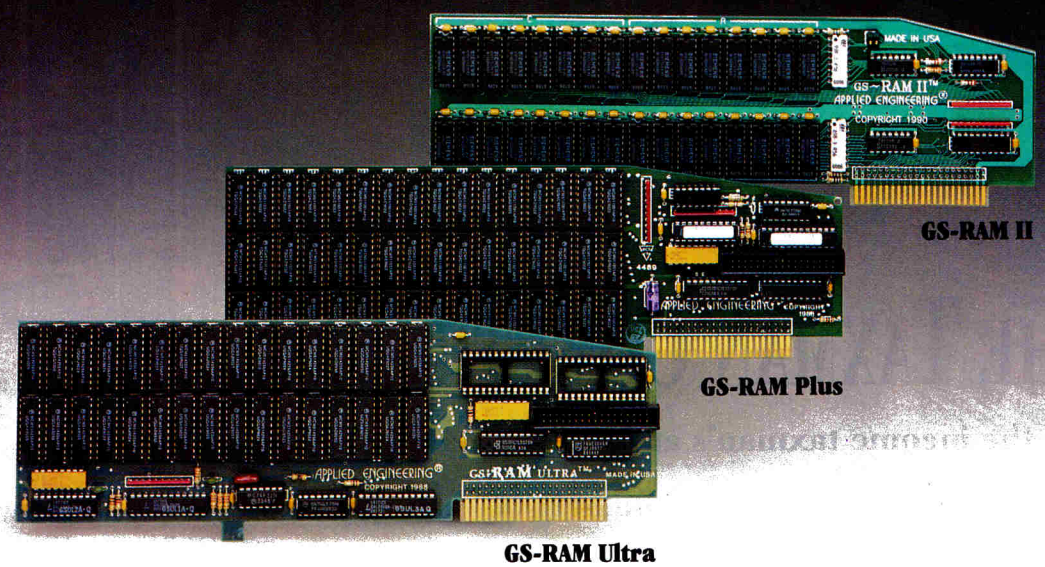

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GS-RAM Ultra.(front) Designed for a more incremental growth path, the GS-RAM Ultra incorporates the 256K x 4 chip, which has four times the density of 256K x 1 chips. That permits incremental expansion in 256K jumps so you can start small and still grow to a massive 4 MEGs.

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THE TAXMAN COMETH

When the income taxman's at the door, have your return ready with the help of this AppleWorks spreadsheet.

By RUTH K. WITKIN

"I BELIEVE WE SHOULD ALL PAY our tax bills with a smile. I tried — but they wanted cash." That delightful old saw may bring a chuckle or two, but paying taxes is no laughing matter.

Figures 1 and **2** show this year's version of the income-tax spreadsheet, loaded with new features, formulas, and a streamlined tax schedule. Many thanks to Jim Harper of Dallas, Texas, George Nicoll of Green Valley, Arizona, and Bill Conlon of Bethpage, New York, for helping to refine this spreadsheet. Jim adapted tax formulas first presented in *NAUG Forum* (September 1989, published by the National AppleWorks Users Group), which I modified further for this column. Special thanks to my favorite tax consultant, George Stein, C.P.A., for his comments and advice.

Tax rules change right up to filing time (or so it seems). Be sure to check that everything you find in this column (written four months ago) is still valid.

Load AppleWorks and create a new spreadsheet file named TAXES90. Referring to **Figures 1** and **2**, set up the spreadsheet as follows:

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

Long vertical lines. Type the vertical character twice in D1, center the characters, copy down column D, 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 the default of 9 characters.

Entries. Enter all labels and numbers, except the numbers in formula cells; the program will calculate them. In **Figures 1** and **2**, each formula cell is highlighted, with or without a formula number beside it. Here are some more detailed instructions for making entries:

- ***Indented labels.*** In columns A and E, indent with spaces. (For example, indent one space in A4 and E9, two spaces in A21, and three spaces in A34.) Type quotation marks and press the spacebar the proper number of times before before typing the entry. In J53, indent three spaces, and in F1, indent eight spaces.
- ***"Outdented" labels.*** Type a space after typing the labels in H6, I47, and J47.
- ***Percentages.*** In G49, type .075; in G50, .1; and in G51, .02. Use OA-L to format these cells for *Percent* with one decimal place.

Short lines in column B. Type quotation marks, press the spacebar, then type 10 minus 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-align the labels in H6, I6, G47 through K47, and F59. When you finish, press OA-S to store the spreadsheet on disk.

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

FORMULA 1: Social Security Benefits (Taxable). Formula 1 takes the lesser of two amounts (E59 or G59) calculated in the Social Security work area, and enters it in B17.

Cell location: B17
Formula: @MIN(E59,G59)

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

FORMULA 2: Total Income. Formula 2 adds income amounts (B4 through B18) to produce total income in B20. This formula includes B3 (an empty cell) and B19 (a line).

Cell location: B20
Formula: @SUM(B19.B3)

FORMULA 3: Total Adjustments. Formula 3 adds adjustments to income (B23 through B30) to produce total adjustments in B32.

Cell location: B32
Formula: @SUM(B31.B22)

FORMULA 4: AGI. Formula 4 subtracts total income (B20) from total adjustments (B32) to produce adjusted gross income in B34.

Cell location: B34
Formula: +B20–B32

FORMULAS 5 – 7: Deductions in Excess These formulas copy from the work area:

Cell location: B37
Formula 5: +K49

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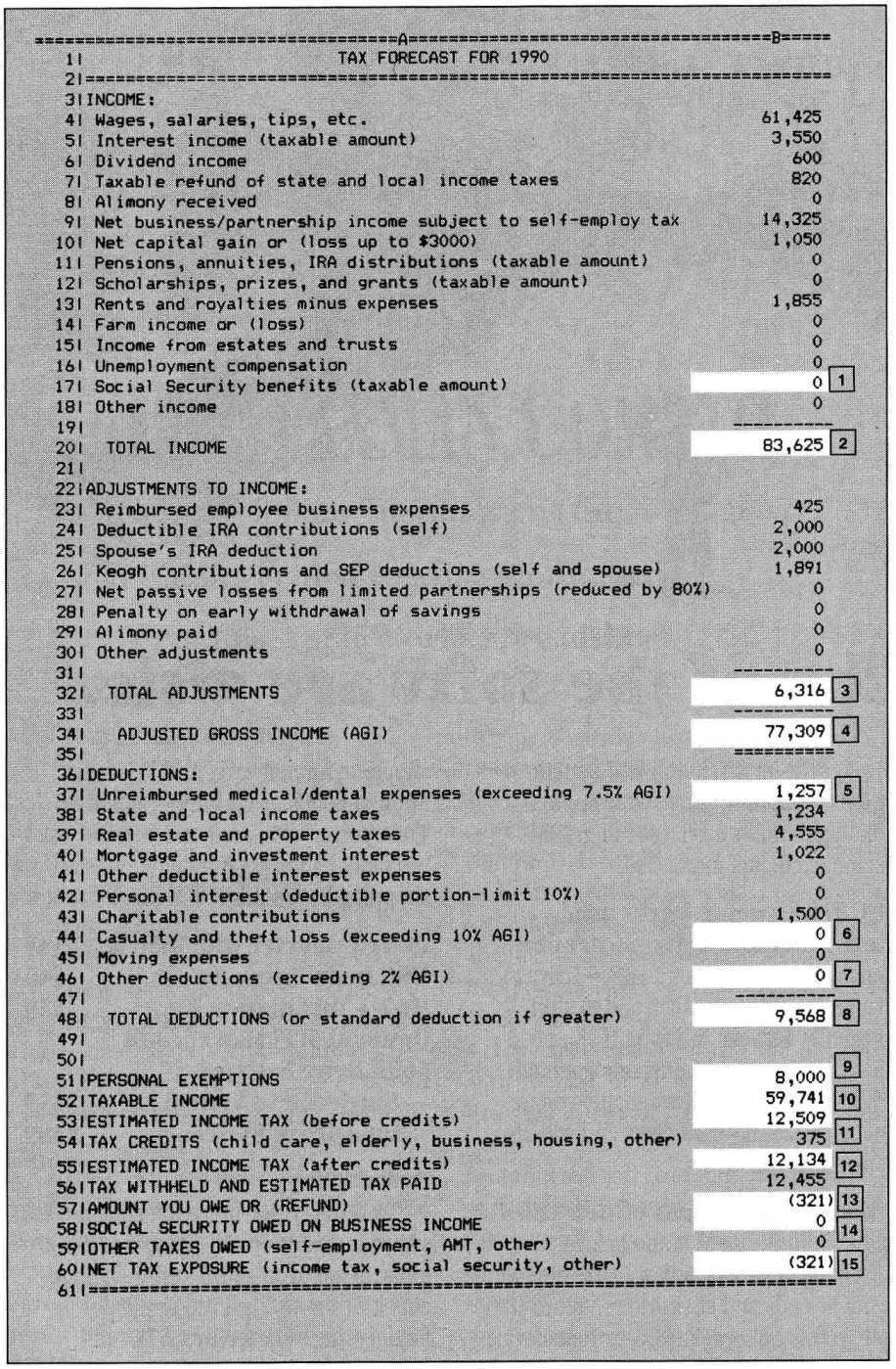

	A	B	
1	TAX FORECAST FOR 1990		
2			
3	INCOME:		
4	Wages, salaries, tips, etc.	61,425	
5	Interest income (taxable amount)	3,550	
6	Dividend income	600	
7	Taxable refund of state and local income taxes	820	
8	Alimony received	0	
9	Net business/partnership income subject to self-employ tax	14,325	
10	Net capital gain or (loss up to $3000)	1,050	
11	Pensions, annuities, IRA distributions (taxable amount)	0	
12	Scholarships, prizes, and grants (taxable amount)	0	
13	Rents and royalties minus expenses	1,855	
14	Farm income or (loss)	0	
15	Income from estates and trusts	0	
16	Unemployment compensation	0	
17	Social Security benefits (taxable amount)	0	1
18	Other income	0	
19			
20	TOTAL INCOME	83,625	2
21			
22	ADJUSTMENTS TO INCOME:		
23	Reimbursed employee business expenses	425	
24	Deductible IRA contributions (self)	2,000	
25	Spouse's IRA deduction	2,000	
26	Keogh contributions and SEP deductions (self and spouse)	1,891	
27	Net passive losses from limited partnerships (reduced by 80%)	0	
28	Penalty on early withdrawal of savings	0	
29	Alimony paid	0	
30	Other adjustments	0	
31			
32	TOTAL ADJUSTMENTS	6,316	3
33			
34	ADJUSTED GROSS INCOME (AGI)	77,309	4
35			
36	DEDUCTIONS:		
37	Unreimbursed medical/dental expenses (exceeding 7.5% AGI)	1,257	5
38	State and local income taxes	1,234	
39	Real estate and property taxes	4,555	
40	Mortgage and investment interest	1,022	
41	Other deductible interest expenses	0	
42	Personal interest (deductible portion-limit 10%)	0	
43	Charitable contributions	1,500	
44	Casualty and theft loss (exceeding 10% AGI)	0	6
45	Moving expenses	0	
46	Other deductions (exceeding 2% AGI)	0	7
47			
48	TOTAL DEDUCTIONS (or standard deduction if greater)	9,568	8
49			
50			
51	PERSONAL EXEMPTIONS	8,000	9
52	TAXABLE INCOME	59,741	10
53	ESTIMATED INCOME TAX (before credits)	12,509	11
54	TAX CREDITS (child care, elderly, business, housing, other)	375	12
55	ESTIMATED INCOME TAX (after credits)	12,134	12
56	TAX WITHHELD AND ESTIMATED TAX PAID	12,455	13
57	AMOUNT YOU OWE OR (REFUND)	(321)	14
58	SOCIAL SECURITY OWED ON BUSINESS INCOME	0	15
59	OTHER TAXES OWED (self-employment, AMT, other)	0	
60	NET TAX EXPOSURE (income tax, social security, other)	(321)	
61			

Figure 1. Completed tax-forecast spreadsheet.

Cell location: B44
Formula 6: +K50
Cell location: B46
Formula 7: +K51

Cells K49 through K51 are empty, so the formulas produce a zero in each cell, not the amounts shown in **Figure 1**. From this point, most of your results will differ from **Figure 1**.

FORMULA 8: Total Deductions. Formula 8 enters the larger of two numbers — the sum of deductions in B36 through B46 or the standard deduction in H8 through H22, which it finds by using the LOOKUP function based on the filing status in F4.

Cell location: B48
Formula: @MAX(@SUM(B47.B36), @LOOKUP(F4,H8.H22))
Your result should be *8311*.

FORMULA 9: Personal Exemptions. Formula 9 multiplies the number of exemptions in F3 by $2000 (the amount you can claim for each exemption) and enters the result in B51.

Cell location: B51
Formula: +F3*2000

FORMULA 10: Taxable Income. Formula 10 is an IF formula that calculates taxable income. The *Test* statement subtracts total deductions (B48) and personal exemptions (B51) 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 B52. If the result is greater than zero, *Else* enters the result of the calculation.

Cell location: B52
Formula: @IF(B34–(B48+B51)<=0, 0,B34–(B48+B51))
Your result should be *60,998*.

FORMULA 11: Regular Tax Calculation (Before Credits). Formula 11 copies the largest amount calculated (that is, any amount greater than zero) in the estimated-tax cells (K8 through K22) to B53.

Cell location: B53
Formula: @MAX(K8.K22)
Your result should be *0* (zero).

FORMULA 12: Regular Tax Calculation (After Credits). The *Test* statement in Formula 12 subtracts tax credits (B54) from estimated tax before credits (B53). If the result is greater than zero, the *Then* statement does the same subtraction, entering the result in B55 as the regular tax calculation after credits. Otherwise, the *Else* statement enters a zero.

Cell location: B55
Formula: @IF(B53–B54>0,B53–B54,0)
Your result should be *0* (zero).

FORMULA 13: Amount You Owe. Formula 13 subtracts the amount of tax withheld and estimated tax paid (B56) from the regular tax calculation after credits (B55) to produce the amount you owe or the refund you can expect in B57.

Cell location: B57
Formula: +B55–B56
Your result should be *(12,930)*.

FORMULA 14: Social Security Owed on Business Income. Formula 14 is an IF/OR formula that tests for two possibilities. If net business/partnership income in B9 is less than $400 or if wages in B4 are greater than $51,300, the *Then* statement enters a zero. Otherwise, the *Else* statement enters the lesser of 15.3 percent of $51,300 or 92.35 percent (reciprocal of 7.65 percent) of business income.

Cell location: B58
Formula: @IF(@OR(B9<400,B4>
51300),0,.153*@MIN
(51300,.9235*B9))

Formula 14 is accurate if you have business income only (that is, no wages). If you have both business income and wages, new tax provisions prevail. Be sure to check.

FORMULA 15: Net Tax Exposure. Formula 15 adds the amount you owe or your refund (B57), Social Security owed on business income (B58), and other taxes (B59) to produce your net tax exposure.

Cell location: B60
Formula: @SUM(B59.B57)
Your result should be *(11,065)*.

This completes the formulas shown in **Figure 1**, so press OA-S to store everything on disk. Now start the work-area formulas in the locations shown in **Figure 2**.

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 F30) and enters the result in K8. If they don't agree, the *Else* statement enters invisible double quotation marks (" "), which make the field appear empty.

Cell location: K8
Formula: @IF(F4=H8,@MAX
(F27.F30)," ")

The formula is in the cell, but the cell shows nothing. Copy Formula 16 into the two cells below it: With the cursor on K8, press OA-C to start the *Copy* command. Press Return twice to confirm *Within worksheet* and the *Source*. Now 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. Each formula cell now looks empty. OA-Return tells the spreadsheet that the rest of the cell references are *No change*. If they were *Relative*, you'd hit OA-R instead.

FORMULA 17: Estimated Tax — Married Filing Jointly or Surviving Spouse. The next formula, number 17, enters either the estimated tax for married couples filing jointly or a surviving spouse (F32 through F35) or makes K11 look empty.

Cell location: K11
Formula: @IF(F4=H11,
@MAX(F32.F35)," ")

```
=====D==========E=============F========G======H=======I=========J=====K=====L=
 1| ||                          *** WORK AREA ***                              ||
 2| || ========================================================================= ||
 3| || EXEMPTIONS -------->      4          SOC SECURITY BENEFITS -->      0  ||
 4| || FILING CODE ------->      4          TAX-EXEMPT INTEREST ---->      0  ||
 5| || ========================================================================= ||
 6| || FILING STATUS                                CODE  DEDUCTION      EST TAX ||
 7| || ------------------------------------------------------------------------- ||
 8| || Single Filer                                   1     3,250                ||16
 9| ||  Same-over 65 OR blind                        2     4,050                ||
10| ||  Same-over 65 AND blind                       3     4,850                ||
11| || Married-Filing Jointly/Surv Spouse            4     5,450       12,509   ||17
12| ||  Same-one over 65 OR blind                    5     6,100                ||
13| ||  Same-one over 65 AND blind                   6     6,750                ||
14| ||  Same-both over 65 OR blind                   7     6,750                ||
15| ||  Same-both over 65 AND one blind/revse        8     7,400                ||
16| ||  Same-both over 65 AND both blind             9     7,050                ||
17| || Married-Filing Separately                     10    2,725                ||18
18| ||  Same-over 65 OR blind                        11    3,375                ||
19| ||  Same-over 65 AND blind                       12    4,025                ||
20| || Head of Household                             13    4,750                ||19
21| ||  Same-over 65 OR blind                        14    5,550                ||
22| ||  Same-over 65 AND blind                       15    6,350                ||
23| || ========================================================================= ||
24| || TAX SCHEDULES       ESTIMATED TAX                                        ||
25| || ------------------------------------------------------------------------- ||
26| || Table 1 - SINGLE FILER (SCHEDULE X)                                      ||
27| ||                  0          0 20a                                        ||
28| ||             19,450          0 20b                                        ||
29| ||             47,050     14,834 20c                                        ||
30| ||             97,620          0 20d                                        ||
31| || Table 2 - MARRIED FILING JOINTLY/SURVIVING SPOUSE (SCHEDULE Y1)          ||
32| ||                  0          0 21a                                        ||
33| ||             32,450     12,509 21b                                        ||
34| ||             78,400          0 21c                                        ||
35| ||            162,770          0 21d                                        ||
36| || Table 3 - MARRIED FILING SEPARATELY (SCHEDULE Y2)                        ||
37| ||                  0          0 22a                                        ||
38| ||             16,225          0 22b                                        ||
39| ||             39,200     15,645 22c                                        ||
40| ||            123,570          0 22d                                        ||
41| || Table 4 - HEAD OF HOUSEHOLD (SCHEDULE Z)                                 ||
42| ||                  0          0 23a                                        ||
43| ||             26,050     13,341 23b                                        ||
44| ||             67,200          0 23c                                        ||
45| ||            134,930          0 23d                                        ||
46| || ========================================================================= ||
47| || DEDUCTIONS                    PERCENT      % OF AGI    AMOUNT   EXCESS  ||
48| || ------------------------------------------------------------------------- ||
49| || Unreimbursed medical/dental      7.5%          5,798 24  7,055   1,257 26||
50| || Casualty or theft loss          10.0%          7,631 25      0       0  ||
51| || Other deductions                 2.0%          1,546       980       0  ||
52| || ========================================================================= ||
53| || SOCIAL SECURITY TAXABLE (USE ONLY IF COLLECTING):          SOC SEC EXEMPT ||
54| || ------------------------------------------------------------------------- ||
55| || Enter amount of benefits in K3 and interest in K4.          1  25,000     ||
56| || APPLEWORKS CALCULATIONS:                                    4  32,000     ||
57| ||  Total before exemptions ------------------->  77,309 27   10       0     ||
58| ||  AppleWorks enters lesser of following in B17:              13  25,000     ||
59| ||          22,654 28      or          0 29                                 ||
60| ||                                                                          ||
61|==========================================================================
```

Figure 2. Work area of tax-forecast spreadsheet.

Your result should be an empty-looking cell. Copy Formula 17 into the five cells below: With the cursor on K11, press OA-C and hit Return twice. Move the cursor to K12, type a period, move to K16, and hit Return again. Press Return, type **R**, and hit OA-Return. You now have more empty-looking cells.

FORMULA 18: Estimated Tax — Married Filing Separately. Formula 18 enters either the estimated tax for married couples filing separately (F37 through F40) or makes K17 look empty.

Cell location: K17
Formula: @IF(F4=H17,@MAX
(F37.F40)," ")

The formula produces a zero. Copy Formula 18 into the two cells below it: 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 empty-looking cells.

FORMULA 19: Estimated Tax — Head of Household. Formula 19 also works the same way Formula 16 does. It enters either ➪

estimated tax for filers who are heads of households (F42 through F45) or makes K20 look empty.

Cell location: K20
Formula: @IF(F4=H20,@MIN (F42.F45)," ")

Again, the cell looks empty. Now copy Formula 19 into the two cells below.

FORMULA 20A/B/C/D: Single Filer (Schedule X). Figure 2 shows four tax schedules, each containing four formulas (*a*, *b*, *c*, and *d*), one of which calculates the estimated tax based on taxable income. The formulas contain both the base tax and the bracket percentage.

Formula 20 (F27 through F30) produces the estimated tax for the single filer.

Formula 20a uses the AND function to establish the income level at which it works. If taxable income (B52) is greater than or equal to the amount in E27 (*0*) and less than the amount in E28 (*19,450*), the *Then* statement calculates 15 percent of the taxable income. If taxable income is outside these limits (either below or above), the *Else* statement enters a zero. This prevents both a negative estimated tax when taxable income is less than zero and an improper calculation when taxable income is greater than the first level.

Cell location: F27
Formula 20a: @IF(@AND(B52>=E27,B52<E28),B52*.15,0)

Formula 20b calculates the estimated tax when taxable income is greater than or equal to 19,450 (E28) and less than 47,050 (E29). If taxable income is within these limits, the *Then* statement subtracts 19,450 from the taxable income, multiplies the result by 28 percent, and adds a base tax of 2917.50. If taxable income is outside these limits, the *Else* statement enters a zero.

Cell location: F28
Formula 20b: @IF(@AND(B52>=E28,B52<E29),(B52–E28)*.28+2917.5,0)

Formula 20c calculates the estimated tax when taxable income is greater than or equal to 47,050 (E29) and less than 97,620 (E30). If taxable income is within these limits, the *Then* statement subtracts 47,050 from the taxable income, multiplies the result by 33 percent, and adds a base tax of 10,645.50. If taxable income is outside these limits, the *Else* statement enters a zero.

Cell location: F29
Formula 20c: @IF(@AND(B52>=E29,B52<E30),(B52–E29)*.33+10645.5,0)

Formula 20d calculates the estimated tax when taxable income is greater than or equal to 97,620 (E30). It first adds the base tax of 27,333.60 to the result of taking 28 percent of 97,620 subtracted from taxable income. It then adds this amount to the lesser of 5 percent of taxable income less 97,620 or the sum of personal or dependency exemptions, thus satisfying the surcharge provision eliminating 28 percent of personal exemptions if taxable income exceeds the top amount in the schedule. If taxable income is below this limit, *Else* enters a zero.

Cell location: F30
Formula 20d: @IF(B52>=E30,27333.6+(.28*(B52–E30))+@MIN(.05*(B52–E30),574* F3),0)

FORMULA 21A/B/C/D: Married Filing Jointly or Surviving Spouse (Schedule Y1).

Cell location: F32
Formula 21a: @IF(@AND(B52>=E32,B52<E33),B52*.15,0)

Cell location: F33
Formula 21b: @IF(@AND(B52>=E33,B52<E34),(B52–E33)*.28+4867.5,0)

Cell location: F34
Formula 21c: @IF(@AND(B52>=E34,B52<E35),(B52–E34)*.33+17733.5,0)

Cell location: F35
Formula 21d: @IF(B52>=E35,45575.6+(.28*(B52–E35))+@MIN(.05*(B52–E35),574* F3),0)

FORMULA 22A/B/C/D: Married Filing Separately (Schedule Y2).

Cell location: F37
Formula 22a: @IF(@AND(B52>=E37,B52<E38),B52*.15,0)

Cell location: F38
Formula 22b: @IF(@AND(B52>=E38,B52<E39),(B52–E38)*.28+2433.75,0)

Cell location: F39
Formula 22c: @IF(@AND(B52>=E39,B52<E40),(B52–E39)*.33+8866.75,0)

Cell location: F40
Formula 22d: @IF(B52>=E40,36708.85+(.28*(B52–E40))+@MIN(.05*(B52–E40),574 *F3),0)

FORMULA 23A/B/C/D: Head of Household (Schedule Z).

Cell location: F42
Formula 23a: @IF(@AND(B52>=E42,B52<E43),B52*.15,0)

Cell location: F43
Formula 23b: @IF(@AND(B52>=E43,B52<E44),(B52–E43)*.28+3907.5,0)

Cell location: F44
Formula 23c: @IF(@AND(B52>=E44,B52<E45),(B52–E55)*.33+15429.5,0)

Cell location: F45
Formula 23d: @IF(B52>=E45,37780.4+(.28*(B52–E45))+@MIN(.05*(B52–E45),574*F3),0)

FORMULA 24: Deductions as Percentage of AGI. Formula 24 produces a percentage of AGI (adjusted gross income), so you can see if certain expenses or losses qualify as deductions. In I49, Formula 24 calculates 7.5 percent of AGI, the amount you can deduct for unreimbursed medical and dental expenses.

Cell location: I49
Formula: +B34*G49

Copy Formula 24 into I51: Leave the cursor on I49 and press OA-C. Hit Return twice. Press Down Arrow twice, and hit Return. Now press Return, and type **R**.

FORMULA 25: Casualty or Theft Loss. Formula 25 calculates 10 percent of AGI less $100 (the deductible for casualty or theft loss) and enters the result in I50.

Cell location: I50
Formula: +B34*G50–100

FORMULA 26: Excess. The *Test* statement in Formula 26 looks at I49. If I49 is greater than zero (meaning you've entered a number in I49), the *Then* statement en-

ters either the amount generated in J49 less I49 or zero, whichever is greater. If I49 is equal to or less than zero (I49 contains zero or is empty), the *Else* statement enters a zero instead of the negative number you'd get by subtracting the percent of AGI amount from nothing.

Cell location: K49

Formula: @IF(I49>0,
@MAX(J49–I49,0),0)

Copy Formula 26 into K50 and K51: Leave the cursor on K49, press OA-C, and hit Return twice. Press Down Arrow, type a period, and press Down Arrow again. Hit Return and OA-R.

FORMULA 27: Total Before Exemptions. Formula 27 adds income items (B4 through B16) and tax-exempt interest (K4), subtracts total adjustments in B32, adds half the Social Security benefits received (K3), and enters the total before exemptions in I57 in the Social Security work area.

Cell location: I57

Formula: @SUM(B4.B16,
B18,K4)–B32+(K3*.5)

FORMULA 28: SS Taxable — Alternate 1. Formula 28 enters either the Social Security taxable amount or zero. The *Test* statement checks the total before exemptions (I57) to see if it's greater than the Social Security exemption (K55 through K58) it finds by looking up your file code (F4) in the Social Security exemption table (J55 through J58). If it is greater, the *Then* statement reduces the total (I57) by the Social Security exemption in the corresponding cell (K55 through K58), divides the result by two, and enters it in E59. Otherwise, the *Else* statement enters a zero.

Cell location: E59

Formula: @IF(I57>@LOOKUP
(F4,J55.J58),
(I57–@LOOKUP
(F4,J55.J58))/2,0)

FORMULA 29: SS Taxable — Alternate 2. Formula 29 enters either 50 percent of Social Security income or zero. The *Test* statement checks the total in I57. If this amount is greater than the Social Security exemption (K55 through K58), the *Then* statement enters one-half of the Social Security income in G59. Otherwise, *Else* enters a zero.

Cell location: G59

Formula: @IF(I57>@LOOKUP
(F4,J55.J58),K3*.5,0)

Your spreadsheet should now look like **Figures 1** and **2**. Press OA-S to store it. Turn on your printer. Press OA-O to bring up the *Printer Options* screen. Change the following settings: **CI** (*Chars per Inch*) to **12**, **LM** (*Left Margin*) to **.7**, and **RM** (*Right Margin*) to **.7**. Press OA-S to store the spreadsheet on disk and return the spreadsheet to the screen. 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 this year's powerful income-tax spreadsheet. ❑

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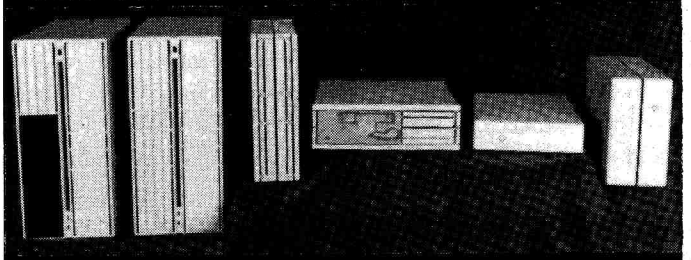

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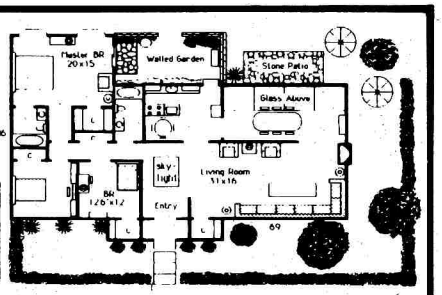

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BRIDGING THE GAP

MACINTOSH ODYSSEY

The lure of the Mac doesn't mean you have to give up your II. In our new Bridging the Gap column, we'll show you how the two machines can achieve a peaceful coexistence, sharing files and peripherals in a powerful, productive partnership.

By GREGG KEIZER

GIVE IT UP. GIVE UP THE GO-NOWHERE life of an Apple II owner and join the hot, happenin' Macintosh world.

That's the siren song Apple plays today. Its newest computers, the less-expensive Macintosh Classic, LC, and IIsi, are perfect sound bites. The Mac LC, with its Apple II emulation card, goes the furthest in calling Apple II users to the technological high ground.

But to many Apple II owners, that high ground is nothing but a stony shoal, one that's luring them to smash their trusty Apple IIs to bits against the rocks. Let's turn that siren song into a call that calms the waters. We'll have to face facts — the Apple II's glory days are long gone, and to experience the best that Apple personal computing can provide, you've got to keep the Mac in mind — but that's not to say you should drop everything, including your Apple II and a bundle of cash, and dash out for the nearest Macintosh.

What you should do is consider the Mac when you add a computer to your home, office, or school. Pairing the Macintosh with the Apple II is a smart move, and makes a lot more sense than delving into the mysteries of PC hardware and the arcane commands of DOS software.

Bridging the Gap will show you how the Apple II and the Macintosh can co-exist and even prosper when they work together, not on opposite sides. Apple II and Macintosh computers can cooperate, can even connect, to make each platform more powerful in combination than it was alone. You need to know what works with both machines, so that you can save money by sharing peripherals and save time by trimming costly learning curves.

This column will tackle anything that shows how the Apple II and the Macintosh bridge the gap between different operating systems, different philosophies, and different applications. Look here for everything from printer sharing to software links that let you import AppleWorks files directly into Macintosh programs, from Apple II/Macintosh strategies in the home to applications in the classroom and small business.

ROOM FOR II

It's no secret that schools have the most experience getting Macs and Apple IIs to work together. Educators have hundreds of thousands of Apple IIs in their inventories. Replacing them is usually impossible. Macs trickle in, usually first through the back door as machines for the school office and the journalism class, then as file servers for AppleShare networks. Sometimes the trickle turns to a flood and the choice becomes one of integrating the two computers. Many schools have met the challenge, keeping the best of the Apple II while moving forward with the Mac.

One such system is Haverford Township, Pennsylvania, a suburb of Philadelphia. Even as the school district goes more Mac, there's room for Apple IIs. Elementary schools have at least one Apple II Plus, IIe, or IIGS in each classroom. According to Morrell Etner, educational media specialist, "[The district's kindergartens and first and second grades are] using 48K machines and software that still run fine." The middle school also depends on the Apple IIe and II Plus, though GSes have made a difference. Linked with AppleShare and supported by a Macintosh as the file server, the GS lab runs creative software such as Scholastic's SuperPaint.

At the moment, Macs make an appearance only in the high school. "We start out with MacWrite," says Etner, "then Microsoft Works, Microsoft Word, and Excel, then finally PageMaker. We see the computer as a tool to help us in the learning process. We're using it in a variety of different ways — for the power of the computer in simulations and science, and for the repetitive drill-and-practice."

Like a lot of other schools, Haverford is moving more toward the Macintosh. "Our order [for new computers] this year will consist of Macintosh LCs and Classics," confides Etner. "With the LC and the Apple II emulation card, you're getting two machines for the cost of one." And echoing some Apple watchers, Etner

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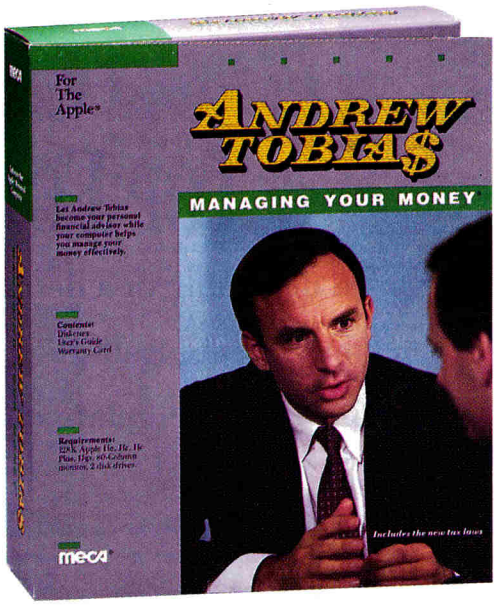

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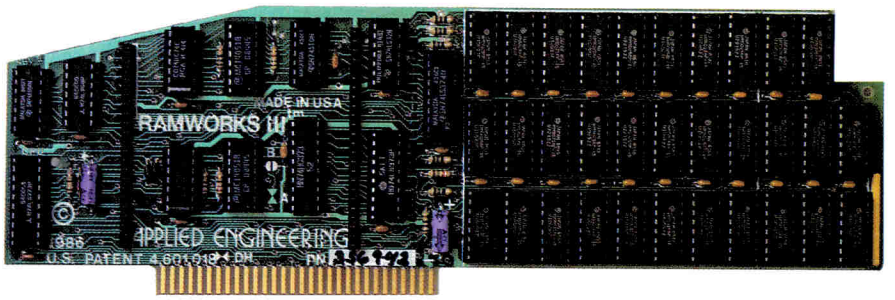

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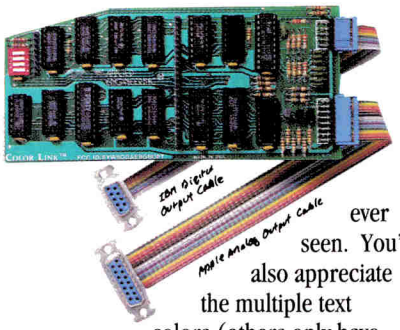

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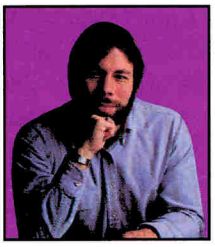

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predicts a dramatic change in the educational computing scene: "I see [the LC] replacing the GS, migrating down from the senior high to the middle school to the elementary schools. In fact, we may have an LC lab in an elementary school as early as this year." But the II still has a place in Haverford's plans. Haverford schools use GSes to teach music, where they serve as controllers for synthesizers and other MIDI-equipped devices. "We have such a heavy investment in GSes," Etner explains, "that I see us staying with the GS in music. It's a great machine for music."

With more than 400 Apple II computers, it's not a tough decision to keep using older technology. "The future of our Apple II Plus and IIe computers is as standalones," says Etner, "where a teacher sends a kid to the computer to work." Of the IIs in Haverford, only GSes will be networked, he added, considering the computer's built-in AppleTalk support. Haverford's Macs and Apple IIs may not work together directly, but they're being used in the same schools, and each is put to its best use, according to Etner: "Our philosphy is we take the machine that does the job and we put it where it will do that job."

II CREATIVITY

In Charleston, South Carolina, the aftermath of Hurricane Hugo may still show on the outside of Ashley River Creative Arts Elementary School, but inside, Macs and Apple IIs are cooking up a storm of creativity. Though there are never enough computers, says Media Specialist Renda Taylor, the school's 30-odd Apple IIe, IIGS, and Macintosh machines are used in an impressive array of activities.

This creative-arts magnet school emphasizes the computers' word-processing power to nearly every one of its 480 students. With an Apple IIe in each class and a lab of 14 IIes and GSes in a lab, most children spend about 30 minutes a week working with AppleWorks, writing everything from original plays to histories of Spanish-speaking countries. When the writing's polished, the kids often hit the GS to create illustrations with Activision's PaintWorks Plus. "We do a lot of computer-assisted instruction, too," says Taylor, noting that writing and drill-and-practice are the two main applications of any Ashley River computer, whether Apple II or Macintosh. "I don't know if we're using them in an integrated way," says Taylor. "We just use them [Macintoshes and Apple IIs] for different things, depending on the software."

Students may "stand in line" to use a Macintosh at Ashley River, says Taylor, but "they love the color on the GS" when they're drawing PaintWorks Plus illustrations to complement their reports. And children are much more likely to work alone when they use the Apple II. "On the Mac we tend to boot up the program for them, especially if it's on the hard disk," says Taylor, while Apple II use is unrestricted. Kids handle everything themselves — even first-graders know how to use AppleWorks.

Taylor plans to link some or all of the Apple IIs and Macs in Ashley River with an AppleShare network. She even has a Mac II reserved as the file server, though Hugo's devastation put the network on hold. Until then, the school will continue to use Apple IIs and Macs to bring out the creativity in its children. "The computers are an accepted thing to the kids now," Taylor adds. "But when they learn something new, they still get excited."

HIGH-TECH MIXER

Jim Giles' technology classroom at Ingleside Middle School, Phoenix, Arizona, mixes Macs and Apple IIGS computers successfully. A small AppleShare network, driven by a Macintosh SE/30, connects four more Macs, four GSes, and a LaserWriter printer. Giles has set up four technology islands in his classroom, each with a specific theme: power, energy, and transportation; visual communication; manufacturing; and construction. Each island includes three workstations, each with a different activity. Pairs of seventh- and eighth-graders rotate through the stations, working through the activities.

The Macs and GSes are an integral part of the course, running the Lab 2000 program from Creative Systems. Students can work at a GS station that lets them design and build cars on screen, or at a Macintosh station where they try their hand at desktop publishing as they create forms for Ingleside's faculty.

"The kids see the computers as simulators and controllers," says Giles. "The GSes run scientific tools and even a simulator of the physics of flight. They drive robot construction sets, programming land vehicles and stepper motors. We even use a GS as a control and trajectory device to launch model rockets. It's a good machine." Students also use PaintWorks to design letterhead stationery and business cards on the GS, he adds.

Giles' students move from Mac to GS and back constantly. One Mac-driven station, for instance, displays a parts list from a FischerTechnik robotic component package, then lets the kids build a device on screen with a CAD (computer-aided design) program. "They print a blueprint of their design, then go over to the modeling center to build it," says Giles.

Like many educators, Giles is eager to see what the Macintosh LC can do for his program and his students. "I'd like to get into interactive video," he muses, wishing for a paperless classroom where even the instructions at each workstation are called up from a computer-controlled videodisc. But Giles' GSes aren't going anywhere. "We're locked into the GS," he says, proving that Macs and Apple IIs can coexist and cooperate in the classroom.

If you're a teacher, administrator student, or parent working with both the Apple II and the Macintosh, we'd like to hear about your victories (and defeats) in integrating the two systems; just write to me at the address listed below. But Bridging the Gap won't dwell on schoolroom concerns every month. In the issues to come, we'll show you how Mac software reads Apple II files, what affordable printers work best with the Mac and the Apple II, and much more.

Apples and Macs have gotten along beautifully on my desktop for years, and they will on yours — all it takes is a little encouragement. That's what Bridging the Gap is all about — ingenuity in building links between two powerful computers. ❑

GREGG KEIZER HAS BEEN USING APPLE IIS SINCE 1983 AND WAS THE FOUNDER AND EDITOR OF *COMPUTE!'S APPLE APPLICATIONS*, A BIMONTHLY PUBLICATION. WRITE TO HIM AT 614 LINDEN STREET, SHREVEPORT, LA 71104. ENCLOSE AN SASE IF YOU'D LIKE A PERSONAL REPLY.

TOP FORM

If you're drowning in a deluge of bureaucratic paperwork, our all-purpose, adaptable Publish It! 3 template can bail you out.

By CYNTHIA E. FIELD, Ph.D.

NEARLY 20 YEARS AGO I DISCOVered that forms are a fact of business life. At a large Rhode Island hospital where I was doing medical research, we even had a form for requisitioning forms — a masterpiece of ingenuity I mockingly referred to as the "forms form."

Things haven't changed much, or so it would seem for Jim Meece, an administrator for the United Food & Commercial Workers Union, Local 464A, in Little Falls, New Jersey. The group boasts some 20,000 members, mostly meat cutters and retail clerks employed by major supermarkets in northern New Jersey and southern New York state.

On any given day Meece can just choose a job title — or two or three, for that matter. He's coordinator of dental and vision benefits, blood-bank chairman, assistant to the executive administrator, and COBRA (Consolidated Omnibus Budget Reconciliation Act of 1985) administrator. With little arm twisting, he'd happily add the moniker "Publish It! expert" to that list.

Meece says he sometimes fails to realize the extent to which he's used his Apple IIc, **AppleWorks 3.0**, and **Publish It! 3** to generate "the volume of forms" he's designed, including his recent project: a series of COBRA enrollment forms like the one shown in **Figure 1**.

Why is COBRA enrollment important to workers? "Simply put," Meece says, "the federal government passed a law that requires any employer or union that provides group health insurance to allow their employees or their families who are losing coverage the opportunity to continue it by making payments directly to the insurance company. This is a major event in the insurance industry. Most people who left employment [in the past] found that their coverage stopped upon separation. Those who could [afford to do so] would buy an individual policy with an outside insurance company. This law allows people to continue their group coverage through self-payment until they can get a new job and pick up new [group] coverage."

FOOD FOR THOUGHT

Meece's COBRA enrollment form, an attractive, functional document, can easily serve as a model for any type of fill-in form you need to create for your school or business. Think of the possibilities: parental permission forms, extracurricular club or team membership forms, employee application forms, personnel forms, payroll deduction forms. Even forms forms!

Replicating part or all of the COBRA form is easy. Start up Publish It! 3, begin working in *Size to Fit* mode (press Open apple-4 or pull down the *Special* menu), and select the tools required to create the objects listed in the accompanying **Table**.

For text frames use the text tool; for shaded rectangles, use the box tool, then select the first gray pattern in the *Set Fill Pattern* palette (*Objects* menu). For hollow rectangles (check boxes) use the box tool, but select the white color swatch instead. As you might guess, Meece created horizontal and vertical rules with Publish It!'s line tool.

If you're using an earlier version of Publish It! you can still create forms like Meece's, though you won't be able to print selected sections in red as he did with his ImageWriter II printer.

Versions prior to Publish It! 3 don't support color printing. If you prefer a GS-specific desktop-publishing (DTP) package, select analogous tools and features, including your program's color text-printing capability.

After you create each object with Publish It!, press Open apple-M or pull down the *Objects* menu and choose *ShowSpecifications*. Edit the dimensional values to conform to those listed in the **Table**. In other DTP programs, use on-screen rulers or set guides to help you size and align the objects that comprise your form.

RECIPE FOR SUCCESS

Notice how, in laying out his COBRA enrollment form, Meece divided a large, seemingly complicated project into a series of smaller, manageable parts. For one thing, each area between shaded bars is an individual text frame.

Each section heading is simply a shaded rectangle with a text-frame "label" on top of it. If, during the design process, a text label becomes "hidden" behind a shaded

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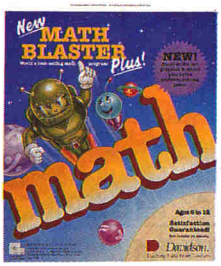

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SOFTWARE SELECTION GUIDE

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- Ages 7-10
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Name_____

Address_____

City_____ State_____ Zip_____

Telephone ( )_____

1. Please send me item number _____ to preview. (Please fill in identification number of program shown above.)
2. AGE of child (check one):
   ☐ 3-7 ☐ 7-10 ☐ 10-13+
3. Computer you own and size of disk required (check one):
   ☐ IBM/Tandy & Compatibles with 5 1/4" disk drive
   ☐ IBM/Tandy & Compatibles with 3 1/2" disk drive
   ☐ Apple II Family & Compatibles with 5 1/4" disk drive
4. Child's name_____
   Child's birthdate: Month_____ Day_____ Year_____
5. Please check below if you have a:
   ☐ Printer ☐ Modem ☐ Color Monitor
6. Parent's Signature_____

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bar, select the bar and then choose *Move to Back* from the *Objects* menu to reorient items correctly.

Each check box on Meece's form is nothing more than a hollow rectangle. Create one according to the specifications found in the **Table** and then select, *Copy* (Open Apple-C), and *Paste* (Open Apple-V) duplicate boxes wherever you need them.

Making check boxes this way is an uncomplicated alternative to using a check-box "dingbat." A *dingbat* is a typographic symbol, one series of which is included in the public-domain font known as *Zapf Dingbats*.

Public-domain fonts compatible with Publish It! 3 and GS desktop-publishing programs are available from user groups, on-line services, and commercial freeware libraries.

For date and signature lines Meece used a series of shift-underline key presses instead of drawing rules with the line tool. Using the line tool would require tedious and frustrating alignment shifts if text were edited later on.

Meece's choice of typeface (*Font* menu) is simple: He used 24-point plain Deerfield for the heading (*COBRA ENROLLMENT FORM*), 12-point plain Deerfield for the subhead (*CONTINUATION OF HEALTH CARE COVERAGE . . .*), and 9-point plain Deerfield for the body text. He emphasized section titles (*MEMBER INFORMATION, ELECTION OF COVERAGE*, and so on) with boldface type. All text is printed in uppercase.

THE RIGHT INGREDIENTS

Thanks to his extensive experience, Meece has put together a few other tricks that can help novice form crafters get started. "One good rule of thumb is to establish the text areas first," he notes.

Meece types text and checks spelling with the AppleWorks 3.0 word processor. Trying to do that on the screen version of the form itself can cause eyestrain, so Meece imports the already edited text into its appropriate text frame on his Publish It! template.

For extensive typeface, style, or size changes, Meece inserts the I-beam tool at the beginning of the targeted text and then presses Open apple-E (or pulls down the *Edit* menu). Finally, he chooses the attributes he wants from the *Font* menu.

Before starting a new form, Meece sets his document size (*Page* menu) to *Legal* (8.5 by 14 inches) so that he can have access to 3 inches of work area below the standard form. In the bottom text frame, he types text in *Show Full Size* mode (Open apple-1 or *Special* menu) and later resizes the text frame, if necessary, with the pointer or the *Show Specifications* feature.

JUST DESSERTS

Jim Meece enjoys one significant "perk" most of us don't: His union has its own print shop. As he points out, "My computer and a photocopier couldn't produce ➪

COBRA ENROLLMENT FORM

CONTINUATION OF HEALTH CARE COVERAGE
WITH SELF PAYMENT OF PREMIUMS

IF YOU ARE SELECTING SINGLE OR FAMILY HEALTH CARE CONTINUATION COVERAGE (PART-TIME MEMBERS ARE NOT ENTITLED TO FAMILY COVERAGE), YOU MUST COMPLETE ALL INFORMATION REQUESTED ON THIS FORM. ANY FORM INCOMPLETE OR UNSIGNED WILL BE RETURNED. FULL-TIME MEMBERS MUST HAVE SPOUSE SIGN ALSO.

MEMBER INFORMATION

MEMBER NAME _____ SOCIAL SECURITY # _____

ADDRESS _____ EMPLOYER _____

CITY _____ ST ____ ZIP _____ LAST COVERED DATE _____

ELECTION OF COVERAGE

I HEREBY ELECT TO CONTINUE THE BENEFITS INDICATED IN THIS FORM FOR MYSELF, AND IF APPLICABLE, FOR THE ELIGIBLE QUALIFIED DEPENDENTS LISTED ON THIS FORM, AND I AGREE TO PAY THE PREMIUM LISTED ON THE PREMIUM CHART ENCLOSED. I HAVE READ THE NOTICE ACCOMPANYING THIS FORM AND UNDERSTAND MY RIGHTS TO ELECT CONTINUATION COVERAGE. I ALSO UNDERSTAND THE FOLLOWING:

1) THIS CONTINUATION COVERAGE PROVIDES BASIC HOSPITAL , MEDICAL & PRESCRIPTION COVERAGE, (MAJOR MEDICAL FOR FULL TIME MEMBERS ONLY) AND DENTAL/VISION COVERAGE IF ALSO SELECTED. THIS COVERAGE DOES NOT PROVIDE DEATH OR DISMEMBERMENT BENEFITS.
2) HEALTH BENEFITS WILL BE CONTINUED FOR A MAXIMUM PERIOD OF 18 MONTHS AFTER MY TERMINATION OF EMPLOYMENT OR REDUCTION OF HOURS , PROVIDED PREMIUMS ARE PAID ON TIME FOR THAT PERIOD.
3) IF THIS FORM IS NOT RETURNED TO THE FUND BY THE DATE INDICATED ON THE ACCOMPANYING NOTICE, I WILL NOT BE ELIGIBLE FOR CONTINUATION COVERAGE.
4) PREMIUMS ARE SUBJECT TO CHANGE ONCE EACH YEAR.
5) THE INITIAL PAYMENT MUST COVER THE FIRST MONTHLY PREMIUM DUE AND ALL MONTHS UP THRU THE DATE OF PAYMENT. IF I HAVE NOT INCLUDED A CHECK WITH THIS FORM, ONE WILL BE SENT WITHIN 45 DAYS OR I WILL NOT BE ELIGIBLE FOR THIS CONTINUATION COVERAGE.
6) IF MONTHLY PREMIUM PAYMENTS ARE NOT RECEIVED BY THE FUND BY THE 30TH DAY OF EACH MONTH, THE CONTINUATION COVERAGE WILL TERMINATE. I UNDERSTAND THAT PAYMENTS OF TIMELY PREMIUMS IS MY RESPONSIBILITY AND THAT THE FUND WILL NOT SEND ME MONTHLY BILLS FOR THESE PREMIUMS. IF COVERAGE TERMINATES, IT CANNOT BE REINSTATED.
7) MY CONTINUATION COVERAGE WILL TERMINATE IF I AM ELIGIBLE FOR COVERAGE UNDER MEDICARE.
8) IF I (AND/OR MY DEPENDENTS IF ELIGIBLE) BECOME COVERED UNDER ANOTHER GROUP HEALTH PLAN (UNLESS SUCH PLAN HAS LIMITS ON PRE-EXISTING CONDITIONS), COVERAGE UNDER THIS PLAN WILL TERMINATE FOR EACH PERSON COVERED BY THE OTHER PLAN.
9) IT IS MY RESPONSIBILITY TO NOTIFY THE FUND OF ANY CHANGE OF STATUS OR ADDRESS (INCLUDING ANY QUALIFIED DEPENDENT COVERED UNDER THIS PLAN).

I HEREBY ELECT (CHECK ONE BOX): ☐ SINGLE COVERAGE ☐ FAMILY COVERAGE (FULL-TIME ONLY)

I ALSO WANT TO (CHECK ONE BOX): ☐ CONTINUE DENTAL & VISION CARE ☐ REJECT DENTAL & VISION CARE

I AM (CHECK ONE BOX): ☐ COVERED BY ANOTHER MEDICAL PLAN ☐ NOT COVERED BY ANOTHER MEDICAL PLAN

I HAVE READ AND UNDERSTAND THE INFORMATION AS STATED ABOVE AND AFFIX MY SIGNATURE AS ACKNOWLEDGEMENT OF SAME

DATE _____ SIGNATURE _____

REJECTION OF COVERAGE

☐ I DECLINE TO CONTINUE HEALTH CARE COVERAGE FOR MYSELF (AND DEPENDENTS, IF ELIGIBLE).

☐ I DECLINE TO CONTINUE HEALTH CARE COVERAGE MY SPOUSE AND DEPENDENTS. I HAVE ELECTED SINGLE COVERAGE.

DATE _____ SIGNATURE _____

TO BE COMPLETED BY MEMBERS SPOUSE (FULL-TIME ONLY)

☐ I AGREE WITH THE SELECTION AS MADE BY MY SPOUSE.

☐ I CHOOSE TO SELECT COVERAGE FOR MYSELF (AND DEPENDENTS). PLEASE SEND ME AN ENROLLMENT FORM.

DATE _____ SIGNATURE _____

COVERED ENROLLEES (FAMILY COVERAGE ONLY)

SPOUSE NAME _____ SOCIAL SECURITY # ___-___-___ BIRTH DATE _____

CHILD #1 _____ SOCIAL SECURITY # ___-___-___ BIRTH DATE _____

CHILD #2 _____ SOCIAL SECURITY # ___-___-___ BIRTH DATE _____

Figure 1. Publish It! 3 COBRA form.

UNITED FOOD & COMMERCIAL WORKERS UNION LOCAL 464A • 245 PATERSON AVENUE • LITTLE FALLS, N.J. 07424

WELFARE FUND
COBRA ENROLLMENT FORM
CONTINUATION OF HEALTH CARE COVERAGE
WITH SELF PAYMENT OF PREMIUMS

IF YOU ARE SELECTING SINGLE OR FAMILY HEALTH CARE CONTINUATION COVERAGE (PART-TIME MEMBERS ARE NOT ENTITLED TO FAMILY COVERAGE), YOU MUST COMPLETE ALL INFORMATION REQUESTED ON THIS FORM. ANY FORM INCOMPLETE OR UNSIGNED WILL BE RETURNED. FULL-TIME MEMBERS MUST HAVE SPOUSE SIGN ALSO.

MEMBER INFORMATION

MEMBER NAME _____ SOCIAL SECURITY # _____
ADDRESS _____ EMPLOYER _____
CITY _____ ST _____ ZIP _____ LAST COVERED DATE _____

ELECTION OF COVERAGE

I HEREBY ELECT TO CONTINUE THE BENEFITS INDICATED IN THIS FORM FOR MYSELF, AND IF APPLICABLE, FOR THE ELIGIBLE QUALIFIED DEPENDENTS LISTED ON THIS FORM, AND I AGREE TO PAY THE PREMIUM LISTED ON THE PREMIUM CHART ENCLOSED. I HAVE READ THE NOTICE ACCOMPANYING THIS FORM AND UNDERSTAND MY RIGHTS TO ELECT CONTINUATION COVERAGE. I ALSO UNDERSTAND THE FOLLOWING:

1) THIS CONTINUATION COVERAGE PROVIDES BASIC HOSPITAL MEDICAL & PRESCRIPTION COVERAGE, (MAJOR MEDICAL FOR FULL-TIME MEMBERS ONLY) AND DENTAL/VISION COVERAGE IF ALSO SELECTED. THIS COVERAGE DOES NOT PROVIDE DEATH OR DISMEMBERMENT BENEFITS.
2) HEALTH BENEFITS WILL BE CONTINUED FOR A MAXIMUM PERIOD OF 18 MONTHS AFTER MY TERMINATION OF EMPLOYMENT OR REDUCTION OF HOURS, PROVIDED PREMIUMS ARE PAID ON TIME FOR THAT PERIOD.
3) IF THIS FORM IS NOT RETURNED TO THE FUND BY THE DATE INDICATED IN THE ACCOMPANYING NOTICE, I WILL NOT BE ELIGIBLE FOR CONTINUATION COVERAGE.
4) PREMIUMS ARE SUBJECT TO CHANGE ONCE EACH YEAR.
5) THE INITIAL PAYMENT MUST COVER THE FIRST MONTHLY PREMIUM DUE AND ALL MONTHS UP THRU THE DATE OF PAYMENT. IF I HAVE NOT INCLUDED A CHECK WITH THIS FORM, ONE WILL BE SENT WITHIN 45 DAYS OR I WILL NOT BE ELIGIBLE FOR THIS CONTINUATION COVERAGE.
6) IF MONTHLY PREMIUM PAYMENTS ARE NOT RECEIVED BY THE FUND BY THE 30TH DAY OF EACH MONTH, THE CONTINUATION COVERAGE WILL TERMINATE. I UNDERSTAND THAT PAYMENTS OF TIMELY PREMIUMS ARE MY RESPONSIBILITY AND THAT THE FUND WILL NOT SEND ME MONTHLY BILLS FOR THESE PREMIUMS. IF COVERAGE TERMINATES, IT CANNOT BE REINSTATED.
7) MY CONTINUATION COVERAGE WILL TERMINATE IF I AM ELIGIBLE FOR COVERAGE UNDER MEDICARE.
8) IF I (AND/OR MY DEPENDENTS IF ELIGIBLE) BECOME COVERED UNDER ANOTHER GROUP HEALTH PLAN (UNLESS SUCH PLAN HAS LIMITS ON PRE-EXISTING CONDITIONS), COVERAGE UNDER THIS PLAN WILL TERMINATE FOR EACH PERSON COVERED BY THE OTHER PLAN.
9) IT IS MY RESPONSIBILITY TO NOTIFY THE FUND OF ANY CHANGE OF STATUS OR ADDRESS (INCLUDING ANY QUALIFIED DEPENDENT COVERED UNDER THIS PLAN).

I HEREBY ELECT	(CHECK ONE BOX): ☐ SINGLE COVERAGE	OR ☐ FAMILY COVERAGE (FULL-TIME MEMBERS ONLY)
I ALSO WANT TO	(CHECK ONE BOX): ☐ CONTINUE DENTAL & VISION CARE	OR ☐ REJECT DENTAL & VISION CARE
I AM	(CHECK ONE BOX): ☐ COVERED BY ANOTHER MEDICAL PLAN	OR ☐ NOT COVERED BY ANOTHER MEDICAL PLAN

I HAVE READ AND UNDERSTAND THE INFORMATION AS STATED ABOVE AND AFFIX MY SIGNATURE AS ACKNOWLEDGEMENT OF SAME.

DATE _____ SIGNATURE _____

REJECTION OF COVERAGE

☐ I DECLINE TO CONTINUE HEALTH CARE COVERAGE FOR MYSELF (AND DEPENDENTS, IF ELIGIBLE).

☐ I DECLINE TO CONTINUE HEALTH CARE COVERAGE FOR MY SPOUSE AND DEPENDENTS. I HAVE ELECTED SINGLE COVERAGE.

DATE _____ SIGNATURE _____

TO BE COMPLETED BY MEMBERS SPOUSE (FULL-TIME ONLY)

I, THE SPOUSE OF THE COVERED MEMBER STATED ABOVE HEREBY STATE:
☐ I AGREE WITH THE SELECTION AS MADE BY MY SPOUSE.
☐ I CHOOSE TO SELECT COVERAGE FOR MYSELF (AND DEPENDENTS). PLEASE SEND ME AN ENROLLMENT FORM.

DATE _____ SPOUSE SIGNATURE _____

COVERED ENROLLEES (FAMILY COVERAGE ONLY)

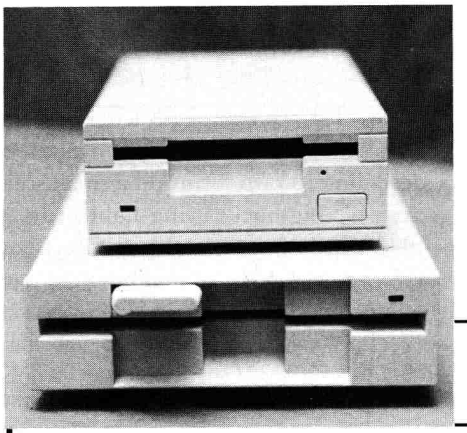
SPOUSE NAME: _____ SOCIAL #___-___-___ BIRTH DATE _____
CHILD #1: _____ SOCIAL #___-___-___ BIRTH DATE _____
CHILD #2: _____ SOCIAL #___-___-___ BIRTH DATE _____
CHILD #3: _____ SOCIAL #___-___-___ BIRTH DATE _____

FOR ADDITIONAL CHILDREN, PLEASE USE A SEPARATE SHEET OF PAPER.

WHITE COPY - FUND OFFICE PINK COPY - MEMBER

FORM #55 - MEMBER APPLICATION

Figure 2. Professionally printed COBRA form.



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Parallel A/B/C/D	$34.95

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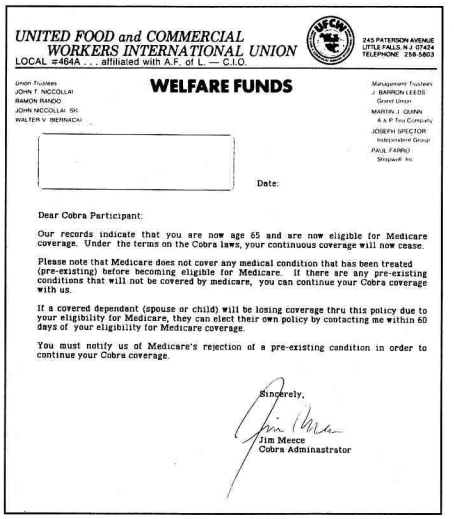

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Jim Meece
Cobra Adminastrator

Figure 3. Publish It! letter with address area sized to fit window envelope.

the number of forms necessary [for my department] to function on a daily basis."

For a run of 5000 COBRA enrollment forms on two-part carbonless paper, the union's print shop charges $715. The professionally printed version is shown in **Figure 2**.

AND OTHER GOODIES

Nevertheless, thanks to Publish It! 3, Meece estimates he saved at least $150 in layout and proofing charges for this project alone. Add up the myriad forms, rate cards, and letters he produces for the United Food & Commercial Workers Union local, and the savings prove substantial indeed.

Meece's Publish It! 3 projects save a lot of time, too: For example, he outlines an address area on letters such as the *Notice of Medicare Eligibility* shown in **Figure 3**. All he has to do is fold the completed letter and insert it into a window envelope, eliminating the need to address the envelope separately.

APPETITE FOR SAVINGS

After designing the COBRA enrollment form, Meece was curious to know what the finished forms would cost if he hadn't used the union print shop's presses, two-part carbonless paper, or two-color printing. A local quick-printer in the Little Falls area quoted a price of $129 for 5000 photocopies of any camera-ready letter or form.

Says Meece, "Any company involved in designing its own forms on a small scale can save big bucks using Publish It! 3. Just think — with the money you save, you could go out and buy your own photocopier!" ❑

CONTRIBUTING EDITOR CYNTHIA E. FIELD IS A FREE-LANCE JOURNALIST SPECIALIZING IN COMPUTER-RELATED TOPICS. WRITE TO HER AT 60 BORDER DRIVE, WAKEFIELD, RI 02879. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

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Object	Left Start	Top Start	Width	Height	Color
TEXT FRAMES					
Heading	0.500	0.000	7.500	1.160	black
Member Text	0.500	1.440	7.500	0.840	black
Coverage Text	0.500	2.500	7.500	4.900	black/red
Option Text 1	3.015	6.120	2.262	0.740	red
OptionText 2	5.427	6.120	2.534	0.720	red
Rejection Text	0.645	7.701	7.250	0.450	red
Signature Text1	0.500	8.143	7.500	0.290	red
Spouse Text	0.645	8.729	7.250	0.419	red
Signature Text 2	0.500	9.250	7.500	0.293	red
Enrollees Text	0.500	9.779	7.500	1.125	black
Bar 1 Label	0.550	1.230	1.575	0.140	black
Bar 2 Label	0.550	2.313	1.700	0.140	black
Bar 3 Label	0.550	7.454	1.750	0.140	black
Bar 4 Label	0.550	8.520	3.850	0.140	black
Bar 5 Label	0.550	9.577	3.200	0.140	black
SHADED RECTANGLES					
Bar 1	0.500	1.184	7.500	0.227	black
Bar 2	0.500	2.259	7.500	0.227	black
Bar 3	0.500	7.433	7.500	0.227	black
Bar 4	0.500	8.463	7.500	0.227	black
Bar 5	0.500	9.538	7.500	0.227	black
HORIZONTAL LINES					
H. Line 1	0.500	6.063	7.500	n/a	red
H. Line 2	0.500	6.305	7.500	n/a	red
H. Line 3	0.500	6.604	7.500	n/a	red
H. Line 4	0.500	6.870	7.500	n/a	red
VERTICAL LINES					
V. Line 1	0.500	6.076	n/a	0.833	red
V. Line 2	7.962	6.076	n/a	0.833	red
HOLLOW RECTANGLES	(left to right, top to bottom)				
Check Box 1	2.885	6.118	0.120	0.120	red
Check Box 2	5.305	6.118	0.120	0.120	red
Check Box 3	2.885	6.404	0.120	0.120	red
Check Box 4	5.305	6.404	0.120	0.120	red
Check Box 5	2.885	6.680	0.120	0.120	red
Check Box 6	5.305	6.681	0.120	0.120	red
Check Box 7	0.500	7.700	0.120	0.120	red
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Table. Specifications for COBRA form (all dimensions in inches).

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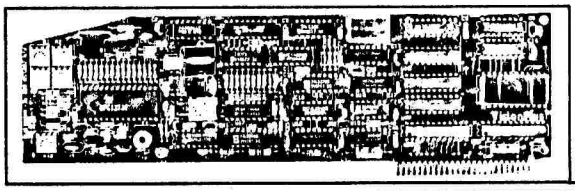

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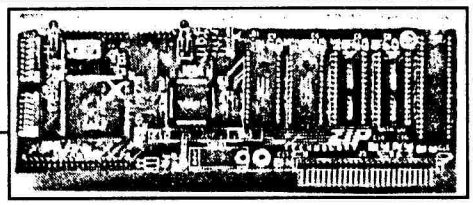

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By JOE ABERNATHY

SO YOU WANNA BE A GRAPHICS cowboy. You may be an experienced programmer, or you may be taking your first shaky steps. But no matter who you are, your brain is filled with thoughts of exploding sunbursts, delicately colored panoramas, and starships giving their pilots whiplash. You've seen what your GS can do and you hunger for the means to do it, but you think it'll take a degree in advanced hyperbolic programming. Not so! Thanks to the Toolbox — a thoughtfully designed programmer's interface and an integral part of GS/OS — you can make your Apple do some amazing things.

The Toolbox is a collection of prewritten routines, or programming tools you can call from within your program. In both GS/OS and Macintosh programs, everything you see on the screen, including text and graphics, is drawn using a group of tools known collectively as QuickDraw II in GS/OS and QuickDraw in the Macintosh. With these tools, you can produce pull-down menus, dialog boxes, text, and graphics quickly and easily.

QuickDraw II offers two resolution modes: 640 and 320. These numbers correspond to the number of pixels in each of the 200 horizontal screen lines. Most GS programs use 320 mode, which gives them a choice of 16 colors; 640 mode offers greater resolution, but you can choose from only four colors. During the execution of a program, you can change modes, but you can't preserve the contents of a screen. Text appears as 40 columns in 320 mode and as 80 columns in 640 mode. Regardless of the mode, QuickDraw II offers the same set of drawing tools.

You can follow along with this discussion on introductory graphics programming even if you're a novice programmer. If you haven't chosen a language yet, or if you think this month's column presumes too much about your level of knowledge, read the two-part feature "Breaking the Programming Code" (June 1990, p. 50, and July 1990, p. 56).

All languages available for the IIGS let you use built-in QuickDraw II graphics, each with varying levels of performance. Assembly language is preferred for doing heavy animation, and it's required for the most sophisticated animation.

Micol Advanced BASIC ($145) is one of the most interesting languages for free-form graphics programming. This language lets you use more screen resolutions than any other language, and it includes routines that simplify on-screen drawing. Combined with its ability to compile straight Applesoft code, this language becomes a simple way to enliven any of the thousands of old BASIC programs that may catch your attention. For details contact Micol Systems Inc. at 9 Lynch Road, Willowdale, Ontario, Canada M2J 2V6, (416) 495-6864.

Although more difficult to write than Pascal, C retains the flexibility of assembly language — an important aspect when you start employing the most sophisticated screen-drawing and animation techniques. Three good versions are Complete Technology Inc.'s **Complete Pascal 1.1** ($29.95), formerly TML Pascal, and The Byte Works' **ORCA/Pascal** ($150) and **ORCA/C**. ($150). For details contact Complete Technology at 5411 Ortega Boulevard, Suite 7, Jacksonville, FL 32210, (904) 389-7174, and The Byte Works at 4700 Irving Boulevard NW, Suite 207, Albuquerque, NM 87114, (505) 898-8183. For lighter graphics tasks, any of the other compilers will provide adequate performance.

Note that the tools available in QuickDraw II are similar to the ones in QuickDraw, the Macintosh drawing toolset — so you're learning to program on two machines instead of one.

READY, SET, DRAW

There are five basic shapes in the QuickDraw II collection — lines, arcs, ovals, rectangles, and rounded rectangles. You can create points by plotting lines one pixel long. The machine can perform five operations on the four shapes — erase, fill, frame, invert, and paint. By using the operations in combination with the shapes, you can call routines such as *PaintRect*, *FrameRect*, and *EraseRect*. Once you've drawn a shape or small picture you want to ➪

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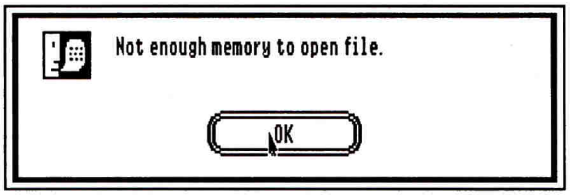

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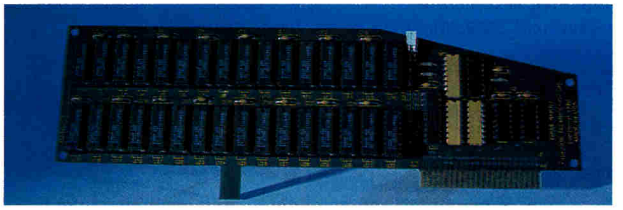

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move, you can define it as a *region* for easy handling (an area your Apple treats as a single shape). Specifying coordinates measured in pixels is usually all that's necessary to draw on screen. Here's an example:

```
SetMode(320);          { Set Graphics Mode }
ClearScreen(4);        { clear screen to black }
SetPenSize(4,2);       { width, height, in pixels }
SetSolidPenPat(white);{ set drawing color }
MoveTo(110,100);       { horizontal, vertical }
LineTo(210,100);       {.. middle of 320screen }
```

We didn't intend this pseudo-code to represent any individual language — you'll have to translate it into syntax your compiler will recognize. This routine clears the screen to the color black, sets the color of the pen to white, and draws a horizontal line in the middle third of the screen (from 110 to 210). Now you're ready for the basic algorithm of all animation: Draw something on screen, erase it, move to a nearby location and redraw, then repeat. A number of advanced techniques can enhance speed and quality, but this simple process is your foundation.

Although the accompanying **Program listing** demonstrates basic drawing and animation techniques and can serve as a template to get you started using graphics, it doesn't run perfectly. In fact, the object flickers while it's undergoing animation. Also, you can't use a background because when you move your object you'll leave a hole. The solution depends on how much time you have, and how deeply you want to immerse yourself in programming. We'll keep it simple for now, and discuss the sophisticated techniques later.

Using standard QuickDraw II techniques there's no way to cure the flicker completely. Instead, keep the animated object's size small and its incremental movement limited, so that you'll diminish or eliminate the flicker. Most games use a background such as a picture, over which your machine draws the animated object. With a special QuickDraw II pen mode known as *transfer mode*, you can keep your background from getting destroyed by the drawing taking place in the foreground. Here's an example:

```
ClearScreen(4);        { Set Background Color to Blue }
modeXOR = 2;           { define XOR mode }
SetPenMode(modeXOR); { set pen mode }
MoveTo (110,100);      { Now, drawing this line }
LineTo (210,100);      { won't destroy background }
```

You can use this method to draw shapes over backgrounds or other shapes, without marring the background. As you move the objects, setting the pen mode to *modeXOR* restores the underlying images. One problem remains: Images caught in an overlap look gauzy. It's a minor tradeoff for access to a sophisticated tool.

If you're a beginning graphics programmer, you're set to go to work. Take a look at the accompanying **Program listing** (which is written in Pascal to make it easy to understand) to see how we used QuickDraw tools, and to get a feel for the required program infrastructure. The crucial part of learning how to create graphics images, as with all computer programming, is experimentation.

ADVANCED ANIMATION

In general, the "advanced" in "advanced animation" translates as "faster and smoother." Without getting into complex

Program listing. A basic drawing and animation routine.

```
{$keep 'drawtools', optimize 0}

program DrawingTools;
{************************************************************
*
* Program: DrawingTools
* Language: ORCA/Pascal
* By Joe Abernathy
* Copyright 1990, Joe Abernathy. All Rights Reserved.
*
* This program demonstrates how to set up and use the
* QuickDraw II graphics tools.
*
************************************************************}
uses
   Common, QuickDrawII, ORCAShell;      { Internal tool sets  }

const
   screenMode  =  320;        { 320 is best for graphics }
   screenHeight =  200;
   modeCopy    =  0;          { overwrite background drawing mode }
   modeXOR =  2;               { do not overwrite background }
   maxcolors   =  16;         { num colors }

var
   curColor, curSize : integer;
   r : rect;
   maxX, maxY, minX, minY: float;

{************************************************************
*
* Set up your program here
*
************************************************************}

procedure Initialize;

begin

    curColor := white;                  { pen color }

end; { Initialize }

{************************************************************
*
*  procedure Plot:  Plot a point.
*  By Mike Westerfield
*  Copyright 1989, The Byte Works. Used with permission.
*
************************************************************}

procedure Plot (h, v: integer);

const
    disp  = 60;                  { correct for oblong screen }

begin { Plot }
    MoveTo (h, v - disp);
    LineTo (h, v - disp);
end; { Plot }

{************************************************************
*
*  NextPenColor - Changes the pen color
*  By Phil Montoya.
*  Copyright 1989, The Byte Works. Used with permission.
*
************************************************************}

procedure NextPenColor;
```

Program listing continued.

```
begin
    curColor := curColor + 1;      { get next color }
    if curColor > white then       { if out of colors cycle }
          curColor := black;
    SetSolidPenPat(curColor);  { set pen to this color }
end; { NextPenColor }

{************************************************************
*
*  Pause - (number of ticks)
*
************************************************************}

procedure Pause (howlong: integer);

var time : integer;

begin
  time = TickCount();
  while (TickCount() < time + howlong) do
     begin
    end;
end; { Pause }

{************************************************************
*
*  Main program - demo QuickDraw capabilities
*
************************************************************}

begin

    StartGraph(screenMode);          { Toolbox startup for QDII }
    Initialize;                      { initialize our variables }
    SetPenMode(modeCopy);            { drawing overwrite mode }

    Plot (50, 50);                         { plot a point }
    NextPenColor;                    { change drawing color }
    Plot (52, 52);                   { plot again }
    MoveTo (10,10);
    DrawCString ("A painted box:");  { QDII does text }

    SetRect (r, 10, 22, 50, 40);     { define rectangle }
    SetSolidPenPat (curcolor + 1);   { define pen color }
    PaintRect (r);                   { paint rectangle }
    Pause (10);

    ClearScreen(0);

    MoveTo (10,10);                        { Animate }
    DrawCString ("Basic animation:");
    for i := 1 to 280 do
          begin
          SetRect (r, i+10, i+22, i+20, i+35);  { define rect }
               NextPenColor;                    { increment color }
               SetSolidPenPat (curcolor);  { set pen color }
               PaintOval (r);              { paint an oval }
               EraseOval (r);                       { Erase it }
               end;
    Pause (10);
    EndGraph;                        { shut down tools }
end.
```

commercial processes that would require support from a team of software engineers, there are three basic techniques — buffering, shadowing, and selective updating — that'll speed up and smooth out your animations.

These techniques are really memory-management systems rather than different drawing methods. This space is too limited for an extensive tutorial, so we'll present them as concepts, with only some of the real-world data you need to implement them. You'll have to rely on research and hard work for the rest. All three of these alternate methods take advantage of the Apple II's ability to operate at 2.8 megahertz (its natural speed), then transfer the image to the screen. (When your Apple draws to the screen directly, it operates at only 1 megahertz, ensuring compatibility with older software.)

Buffering involves creating your image as a data table in your program, writing the table into a prepared data buffer, then copying it directly into screen memory. When you move your data to screen memory (think of it as a "shadow screen"), all you need to know is that it starts at location $2000 in bank $E1. Each screen line is $A0 bytes long, so that you can find any location on the screen with the formula $E1/2000 + (LineNumber * $A0) – $A0 + (HorizPosition * 2) Keeping a virgin copy of your background screen on hand is one neat thing you can do with a buffer. This lets you quickly use a memory-to-screen copy as your erase function.

Shadowing is another technique that writes graphics to memory at a speed of 2.8 megahertz. You can access this faster "screen" by drawing to the screen in bank $01 instead of bank $E1. For even higher performance, you can use a buffer to write to the shadow screen. A final way to add speed is to update portions of the screen selectively. To employ selective screen updating, you'll need a way of determining when a particular part of the screen needs refreshing. The solution to this often turns out to be a simple array with cells correlating to those portions/citizens of the screen that you want to monitor. Will you write the next hit game with these newly found techniques? That's hard to predict, but with a couple of weekends' exploration, we guarantee you'll get results to be proud of. ❑

Just before press time we received word of a new animation toolkit under development at Apple. These tools will be aimed at average programmers seeking to add animation. Programmers will define the background as a "stage," objects as "characters," then write "scripts" or "parts" for their characters to follow. Both foreground and background scenery will be supported, allowing a character to move in front of or behind stationary objects. We'll keep you posted on release dates and availability. — *eds.*

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Continued from p. 35

Eight double-sided disks cover the 150-plus scenes through which Jerrod may pass during the course of his travels. The accompanying manual, 88 pages long, gives an excellent overview of the history of the Gold Rush and includesa number of photographs and maps presenting information you can't get during game play. A parchment map shows the western United States with the route you'll follow on two of your journeys, plus a depiction of the United States, Mexico, and South America with the sea route around Cape Horn.

The game's most outstanding feature is the quality of the graphics images. Animation is as realistic as an Apple II can make it; images are detailed; colors are varied and bright. The best thing though, is that there's a three-dimensional quality to the scenes.

The program's parser (the part of the program that interprets the commands you issue) is also advanced: It accepts whole sentences and responds properly as long as you spell key words correctly. For example, you can type either LOOK TREE or LOOK AT THE TREES and get a response. Use either a joystick or the keyboard direction keys to move Jerrod Wilson around his world and through his adventure.

You can save your game at any point in play. If anything happens that you haven't planned, just restore the game and begin play at the point you last saved. Don't save the game if Jerrod has died, however; you restore it and it asks you again if you want to restore the game — an endless loop worse than the Devil's Triangle. You must restore the game while Jerrod is still with us if you're to have any chance of making it.

For the impatient player, screen changes in the program can be maddeningly slow as you travel from one area to another — it doesn't recognize expanded memory, so scenes are loaded into RAM as needed.

The manual can be a little confusing to the novice user. It covers both the MS-DOS and Apple versions. References to the enter and function keys, for instance, may confuse the first-time Apple II user. It's not a fatal flaw.

Gold Rush! is fun. Because it's accurate geographically and historically in its portrayal of the conditions of life in the mid-1800s, it's also a superb educational game, suitable for both school and home use.

The story line is believable, and with ships sailing by in the distance, birds flying across the sky, and people walking about, there's plenty of action on screen, too. Children from about age 12 on up should have no problem with the game. Gold Rush! and other simulations like it can even help children who don't respond to more routine methods of teaching, and that's worth everything.

Jerry D. Greer
Bedford, IN

EUROWORKS 3.0

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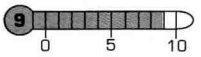
Foreign-language modification for AppleWorks; 128K Apple II, AppleWorks 3.0, 5.25-inch disk drive; printer recommended; no copy protection; $24 French-only or Spanish-only; $39 5-language edition



Writing in a foreign language isn't just a matter of knowing your grammar and vocabulary inside and out — to do a thoroughly professional job, you have to pay attention to accents and special characters, too. That's why a program such as EuroWorks is such a valuable utility. It patches AppleWorks 3.0 so that you can print French, German, Italian, Portuguese, and Spanish characters without touching your printer's DIP switches. In addition, EuroWorks offers eight common symbols every keyboard should provide, including a "cents" sign and symbolic notation for plus/minus, greater than or equal to, less than or equal to, not equal to, degrees, and the British pound sterling. With EuroWorks installed, these special symbols are accessible from USA and foreign character files.

If you're running AppleWorks 3.0 on a GS, it's true that you can access that machine's foreign-language character sets via the Control Panel, but there a couple of disadvantages: First, it's hard to remember which key is where unless you map the characters yourself; and, second, certain characters become inaccessible, having been replaced by those of the foreign character set you switched to. But with EuroWorks installed, you won't need

READER SERVICE INDEX

Reader Service		Page
52	5th of July Productions	90
40	Abracadata	65
103	Alltech Electronics Co.Inc	30
*	AppliedEngineering	9, 51, 57, 59, 61, 67,
87	Bible Research Systems	92
8	CDA Computer Sales	10,11
115	Chinook Technology	77
*	Choice Computer Products	91
56	CMS Peripherals, Inc.	92
154	Compu-Teach	36
252	Computer Enhancers	92
288	Computer Friends	89
134	Dayton Computer Supply	90
220	Educational Resources	15
85	Fas-Track Computer Prods	46
67	FYI Publishing	90
84	Golem Computers	31
27	Gosselin Computer Services	92
88	Howardsoft	17
	Howardsoft	17A
23	International Software	93
*	inCider	
	AppleWorks Gs Library	87
	AppleWorks 3.0 Pak	80
	Publish It! Yourself	95
43	Island Computer Services	92
175	Laser Computer Inc.	CV2
222	Learning Service	83
44	LRO Computer Sales	75
186	Meca Ventures	69
248	Memory Plus Distribution	73
*	Nat'l Education/Learning Comp	71
55	National AW User Group	93
173	New Science Prospects	90

Reader Service		Page
71	Nite Owl Productions	90
*	NRI Schools	32A
59	Perfect Solutions Software	91
*	Preferred Computing	45
105	Price Busters	35
128	Programs Plus	22,23
128	Programs Plus	24,25
128	Programs Plus	26,27
269	Public Domain Exchange	82
136	Quality Computers	2,3
165	Quality Computers	5
155	Quality Computers	4
7	Ramco Computer Supplies	91
90	Roger Coats	21
240	Sensible Software	20
29	Shreve Systems	106
292	Softdisk	1
127	Softspoken, Inc.	93
47	Software Discount Int	86
18	Sports Software Assoc.	91
3	Springbranch Software, Inc.	92
60	Springbranch Software, Inc	92
140	Timeworks	CV3
140	Timeworks	6
231	Tulin Corp	65
297	USA Micro	14
*	Utilico	90
17	VMC Marketing Technologies	92
189	Zip Technology	CV4

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confusing keyboard reassignments, and you won't have to relinquish any other characters to access foreign accents or special EuroWorks symbols.

Setup is easy. Start by printing the electronic manual (64 pages in 20 AppleWorks word-processing documents). With no index or table of contents, its current format makes for a lot of page flipping, and finding particular topics in a hurry is difficult, but the documentation is thorough.

```
=====<=====<=====<=====<=====<=====<=====<=====<=====<=====<=====<=====<=====<=====<===
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                                for
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          FRENCH TEST


04cpi: c* e' a' e' u' e* i* u*

       a^ e^ i^ o^ u^


05cpi: c* e' a' e' u' e* i* u*

       a^ e^ i^ o^ u^


-------------------------------------------------------------------------------
Type entry or use @ commands            Line 6  Column  1       @-? for Help
```

EuroWorks: Print in another language.

The publisher recommends installing the utility on a clean copy of AppleWorks — a copy you make directly from the original, unmodified program. I had no trouble installing it on a disk already configured with TimeOut Thesaurus and SuperFonts, however. EuroWorks 3.0 requires AppleWorks 3.0; if you use AppleWorks 2.0 or 2.1, get EuroWorks 2.0. EuroWorks 3.0 has special features that work with Beagle Bros' TimeOut UltraMacros, but you don't need the program to run EuroWorks.

You must have at least 14K free on disk. (If your AppleWorks disk is filled to the last sector with TimeOut applications, for instance, be prepared to delete some files.) Be sure to configure EuroWorks' *Default Printer Type Code* to match your hardware setup.

ImageWriter II and LQ users won't be able to print special EuroWorks symbols or lowercase French, Italian, Portuguese, and Spanish characters in four, five, six, seven, or eight characters per inch. At present, EuroWorks prints only on ImageWriters (I, II, and LQ) or compatibles (Mannesmann Tally MT 85/86 or Seikosha SP-1000AP, for instance).

When installation's complete, the fun begins! Entering an accented letter or typing a foreign-language character (such as an N-tilde or an upside-down question mark in Spanish) is a breeze — you use existing keys or type in special combinations. In many cases, you simply type an asterisk (*) and the program figures out your intent. EuroWorks even includes several data-entry macros to save keystrokes on special character insertions. You won't be able to see special symbols or foreign characters on screen — AppleWorks displays them as American English characters. Nevertheless, text prints as intended when you generate hardcopy.

EuroWorks is an inexpensive package that offers a lot of value for the money, despite its lack of a printed manual. Note that the disk also includes a copy of AW 3.0 Patcher, version 1.4, a freeware utility pack with a number of patches designed to fix a variety of minor but irksome AppleWorks 3.0 bugs. You'll find a fix for the problem that occurs when you delete your default printer after installing a new one, plus a utility that lets you print multiple copies of a database file.

The next time you need to access foreign-language character sets for recipes, vocabulary sheets, exams, newsletters, or correspondence, check out EuroWorks. It's the next best thing to having a dedicated foreign-language computer. ❑

Carol S. Holzberg, Ph.D.
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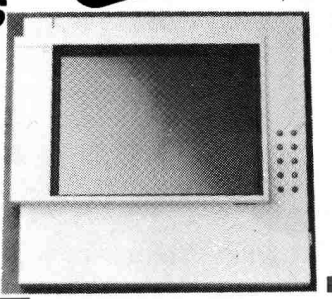

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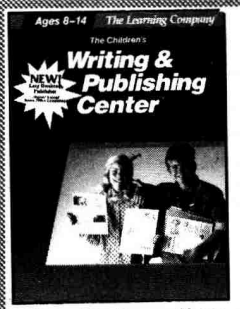

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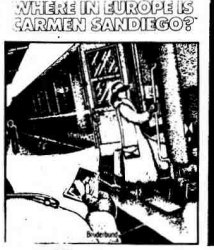

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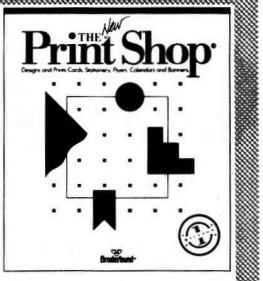

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LEARNING CURVE

PURSUIT OF KNOWLEDGE

By DAVID D. THORNBURG, Ph.D.

We need more hackers — in all areas of scholarship. We need to find ways to keep kids' intrinsic love of learning alive.

JUST WHAT IS A "HACKER" THESE DAYS? The popular image shows someone bathed in the glow of a video-display screen. Going without sleep or a shower, subsisting on Jolt cola and Twinkies, the hacker spends his or her entire life fathoming the depths of the latest computer game or breaking into yet another electronic network.

FOR LEARNING'S SAKE

That picture's a little behind the times now, though. Although the term "hacker" used to be synonymous with "nerd," today's computerphiles should be known more for single-mindedness than for unkempt appearance and lack of social graces.

Hackers have begun to acquire a better reputation as a group: After all, some of them started taking baths and wearing shoes — and became multimillionaires. In addition, their dedication to the pursuit of knowledge, even if only in the limited realm of computers, stands in stark contrast to the lives of many other young people who have chosen to drop out and fill their emptiness with drugs.

As we look at the challenges facing education today, it seems to me that we need more hackers — not just computer hackers, but hackers in all areas of scholarship. We need to find ways to keep kids' intrinsic love of learning alive well into high school, so that it never gets lost.

The child who's absorbed in a good book has much in common with the youngster who plays Tetris for hours on end: They're both engaged in activities filled with the opportunity to learn and to develop skills.

The poet who stays up all night searching for the perfect word, the songwriter crafting a melody, and the anthropologist piecing together the threads of an ancient civilization are all hackers, too.

Delving into the vast universe of ideas and creating your own map of this uncharted territory is one of the most powerful capabilities of the human intellect. How can we use computers to ignite children's love of exploration?

FALLING IN LOVE

Let's start with an understanding of the common ground hackers in all areas share.

First, hackers are self-motivated — they spend significant parts of their lives engaged in an activity for no other reason than the pleasure it provides. If the hacker is rewarded with grades or money, so much the better — but it's a true love of the subject that captures the hacker's spirit and keeps him or her entranced.

Second, many hackers were introduced to the thing they love by others — they didn't find it on their own. This suggests that educators can play a significant role by helping students understand why the subjects they teach have the potential for excitement — enticing them to see pleasure in a field they may have associated previously with drudgery.

Third, the hacker is likely to chart his or her own course through a subject. He or she may start at too high a level and then have to backtrack, for instance. If you're teaching a youngster who's learning this way, he or she will expect you to be a resource for solutions, not a critic of the path he or she has chosen.

The hacker may develop proficiencies far greater than your expectations — after all, the subject he or she is studying has become an overriding passion. The problem with all this is that it depends almost entirely on the youngster's own motivation.

What do you do with the student whose passion is math, to the total exclusion of writing, for instance? Or, worse yet, the student who's so turned off to school that he or she finds nothing of interest? With students operating at their own pace in a variety of subjects, how can you ensure that you cover the required curriculum in the prescribed period of time?

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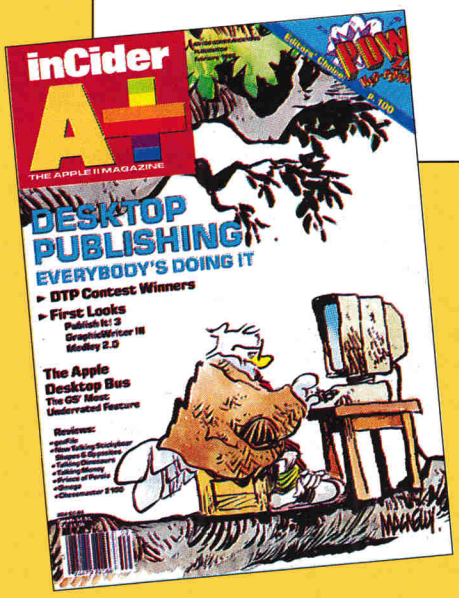

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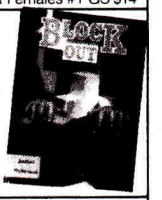

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Update: Notebook Computers

Last year Laser Computer (800 North Church Street, Lake Zurich, IL 60047, 708-540-8086) introduced a portable called the PC-3 (see October 1990, p. 82) — shipped with MS-DOS software, but capable of transferring document files to an Apple II or a Mac. Here are a few tips for smooth operation:

- Get a terminal program for your desktop II or Mac.
- Make sure your serial port is connected properly. If you have Apple's Super Serial Card, turn the patch plug upside down. (Check your manual for details.) If you're using a IIc or a Mac, get a null-modem adapter from your local Radio Shack.
- Try your connection out with a small text file you've backed up or don't mind losing, in case the system hangs up.

Laser has now released an updated model, the **PC-4**, with a larger display (four lines of 40 columns), a quieter keyboard, and more built-in software (a spreadsheet and BASIC plus the word processor). The big bonus is that file-transfer software is also included. The PC-4 carries a higher price tag, but if you shop around, you should be able to find one for less than $300. **— D.T.**

model in which the human mind is seen more as a vessel to be filled than as a fire to be kindled. (See "Paradigm Paralysis," last month's Learning Curve, p. 92.) That approach is manageable, measurable, and teacher-controlled. The only problem with it is that it doesn't give students much that's useful in their lives.

It's true that math fundamentals, vocabulary development, and certain other topics require a base of factual knowledge that will always be important — but unless we present these subjects in context and integrate them with others that ignite passion in our students, we risk failing our future. Some of our brightest students tune out because deep down they know that their subjects deserve far better treatment than they receive in many classrooms.

One of the earliest justifications for educational computing was that it let kids learn at their own pace. Now, with the increased availability of multimedia in the classroom, technology lets students work according to their own learning styles, as well. But for all the lip service we've paid to this area since the late 1970s, we have yet to provide meaningful access to computers.

Even computer-intensive schools may fail if all they offer is a number of rooms equipped with so-called "integrated learning systems," which promise improved test results by force-feeding information. Better to use computers less "efficiently" — to create measurement apparatus with Broderbund's Science Toolkit, for example, or plot complicated math functions with a program students have written themselves in Applesoft BASIC.

Rather than predigest a curriculum and remove all risk and uncertainty from it, we should present students with open-ended challenges they must solve themselves. Not only does that build their self-esteem, it helps light the fire we see burning in the eyes of intrepid hackers everywhere — a fire that illuminates the love of learning that's the hallmark of every truly educated person. ❑

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ColorWorks

Apple users know there's always an easier way to get the job done. A shortcut here, an elegant twist there — that's what Hints & Techniques is all about. It's an information swap for readers who want to share their programming pointers, hardware secrets, AppleWorks applications, and all kinds of other insights.

Bright Ideas

By Bill Thompson

MOST DESKTOP PUBLISHERS GO through professional ad houses to get four-color separations, but if you own an ImageWriter, a copy of AppleWorks, and a color ribbon, you can create brightly colored text at home or in school (**Figure 1**). AppleWorks GS users can create colored text with the flick of a pull-down menu, but with the AppleWorks 1.0 and 2.0 series, you must first set up your color driver by creating a custom printer from the *Other Activities* menu, then send the proper codes to the printer by hand. With AppleWorks 3.0, you won't need to set up a custom printer, but you do need to enter codes in the *Printer Information* menu.

If you use a version of AppleWorks other than 3.0, select item 7, *Specify Information About Your Printer(s)*. If you've defined three printers already, you'll have to remove one. Also, earlier versions of AppleWorks let you define only one custom printer at a time. Now choose item 2, *Add a Printer*, then add a custom printer. **Figure 2** shows what your printer setup should look like.

If you're using a Super Serial Card or the ports on an Apple IIc or IIGS, leave item 5 alone. If you have a non-Apple serial interface card, check your card's manual for the correct initialization codes if you encounter problems such as *80N* printed on your documents.

Now for the control codes. There are two important things to remember:

- First, close your entries with a caret (Shift-6); if you press Return, AppleWorks will think you're adding another code.
- Second, remember that uppercase and lowercase letters aren't the same to your system. Your ImageWriter interprets *Esc N* and *Esc n* differently.

Now tell AppleWorks how to translate character-per-inch and line-per-inch formatting commands:

1. Select item 6 for the *Printer Codes* menu (**Figure 3**).
2. Select item 1, *Characters per inch*.
3. Type *5* and press Return.
4. Now type *<Control>-N* ^ (caret). Don't press Return here.
5. Repeat steps 2–4 to enter the following codes for character sizes. When you see *Escape*, just press the escape key (no spaces). Note upper- and lowercase letters.

10 cpi Esc N
12 cpi Esc E
13 cpi Esc e
15 cpi Esc q
17 cpi Esc Q

After you've entered the characters-per-inch codes, press Escape to go back to the *Printer Codes* menu and select item 2, *lines per inch*. Enter these codes the same way you entered the ones above, and with the same rules:

6 lpi Esc A
8 lpi Esc B

```
A sample color document
***********************

  Once you have set up your custom printer driver for your
ImageWriter II, your AppleWorks word processor printouts can
have many colors; yellow, red, blue, orange, green,
purple or plain old black. Set up your custom printer
driver and brighten up your printouts with color.

              Colors
              ------

Yellow ************************************
Red    ************************************
Blue   ************************************
Orange ************************************
Green  ************************************
Purple ************************************
Black  ************************************
```

Figure 1. A sample color document fresh off the printer.

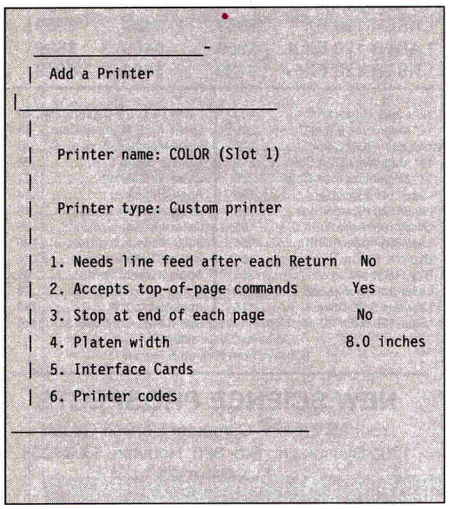

Figure 2. Printer-setup display.

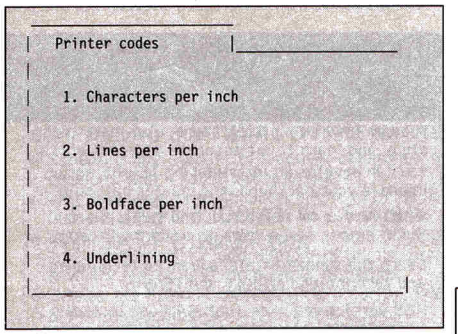

Figure 3. Printer-code menu.

Next, press Escape again to go back to the *Printer Codes* menu. Then select item 3, *Boldface*, *Subscript*, and *Superscript*. Enter these codes the same way:

Boldface Begin Esc K
Boldface End Esc KØ

Boldface Begin turns on the color printing and lets you choose the colors within the document. *Boldface End* turns off color printing. When you want to change the color of a word (or go back to black), press Control-B with the cursor in front of that word. A caret (^) will appear on screen, indicating the point where a color change starts. Decide what color you want, and type the corresponding number, following the caret. Your on-screen document will display these numbers, but your printout won't.

1 = yellow
2 = red
3 = blue
4 = orange
5 = green
6 = purple

Figure 4 is a sample AppleWorks word-processing document with several color changes coded in. **Figure 1** represents a printed version of it. To print a color document, make sure your color ribbon is in, press the Open apple-P key combination (OA-P), and select your new custom printer driver.

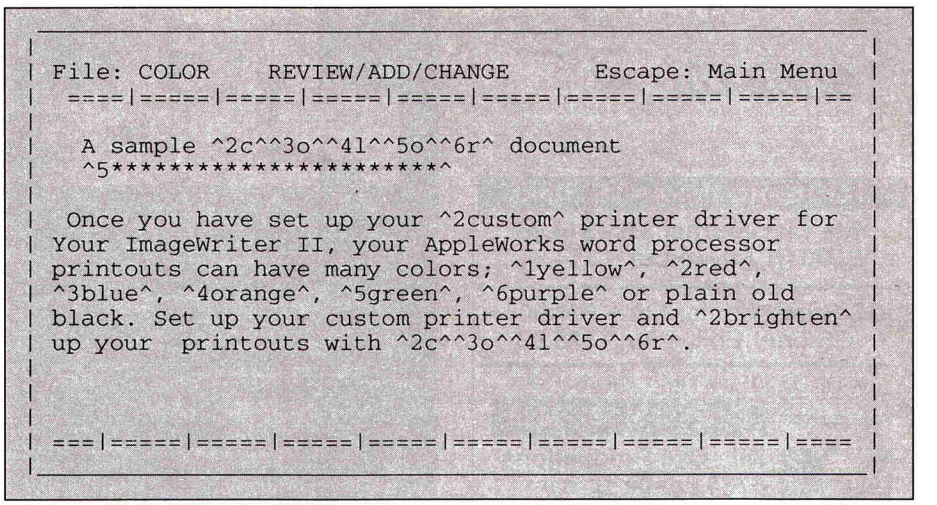

Figure 4. Sample color document on screen.

If you use AppleWorks 3.0, just use the *Special Codes* option in the program's *Printer Information* menu:

1 Esc K
2 Esc KØ

When you type, follow the instructions for color, but instead of Control-B, choose the appropriate *Special Code* from *Printer Options* (OA-O). Remember — a patch of blue or some purple prose livens up any plain-vanilla document. ❑

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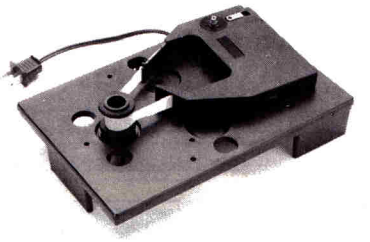

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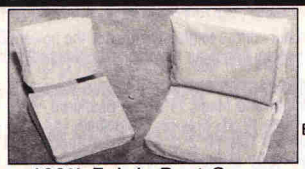

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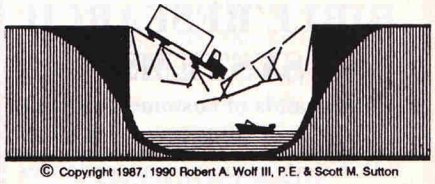

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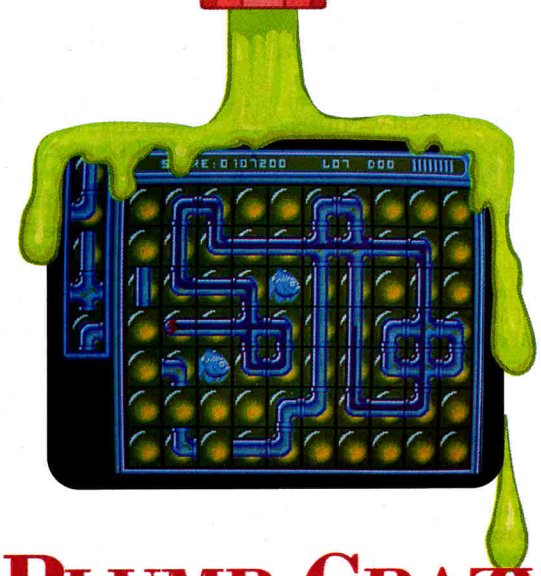
EDITORS' CHOICE



PLUMB CRAZY

If you aren't quick with that monkey wrench, the question will be "How long can you tread flooze?"

In keeping with the *inCider* tradition of introducing you to addictive games that cut office productivity, we proudly present **Pipe Dreams** by LucasFilm. The premise is simple: Connect sections of pipe to create a continuous pathway, so that an overflow of flooze doesn't swamp the city. As in Tetris, the computer feeds you the pipe pieces randomly, so you have to plan ahead.

There are seven different types of pipe pieces — two straight lines, one horizontal, the other vertical; four lines that bend to form corners; and one that consists of two lines intersecting to form a cross. You score points for every piece of pipe the flooze flows through, and lose points for every extra piece you leave scattered around. You also earn points for crossing your own path at one of the intersection pieces.

As you move up through the levels, you'll find reservoirs that fill up slowly and give you more time to lay pipe; obstacles such as fire hydrants you have to work around; bonus sections of pipe that give you extra points for redirecting the flow; one-way pipes that let the flooze flow in only one direction; and "end-pipes" you have to use as the last section of your path. The game includes a practice mode that slows down the flow rate — an essential step when you first learn the game. There's also a password option that lets you start a game on a higher level.

Why did we make Pipe Dream Editors' Choice? Because it represents a refreshing change from the sports/war/shoot-'em-up arcade genre? Because of its original concept? Because of the great graphics? Nah. It's just more fun than one person should be allowed to have. Even the off-disk copy-protection code wheel is relatively painless. After having his fingers surgically removed from the GS keyboard, Technical Editor Cameron Crotty explained the addictive challenge: "It's really tough to concentrate on where you're laying pipe — you keep shooting panicky glances at the advancing flooze. When can I take these bandages off? I just *know* I can make it past the 20th level."

Pipe Dreams is available for both the Mac and the GS, but for colorful graphics, the GS version wins hands down. (The only difficulty we ran into arose when the brightness of the color on some levels proved a little hard on the eyes and almost prevented us from seeing clearly what we were doing.) Pipe Dreams is distributed by Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404, 415-571-7171); it's priced at $29.95 for the GS edition and $34.95 for the Mac. ❑

EDITORS' CHOICE SINGLES OUT ONE PRODUCT EACH MONTH THAT THE *INCIDER* EDITORS FEEL IS A SIGNIFICANT ADDITION TO THE APPLE FAMILY. PRODUCTS EVALUATED ARE AMONG THE MOST RECENT RELEASES AND MAY NOT BE AVAILABLE YET FOR RETAIL DISTRIBUTION.

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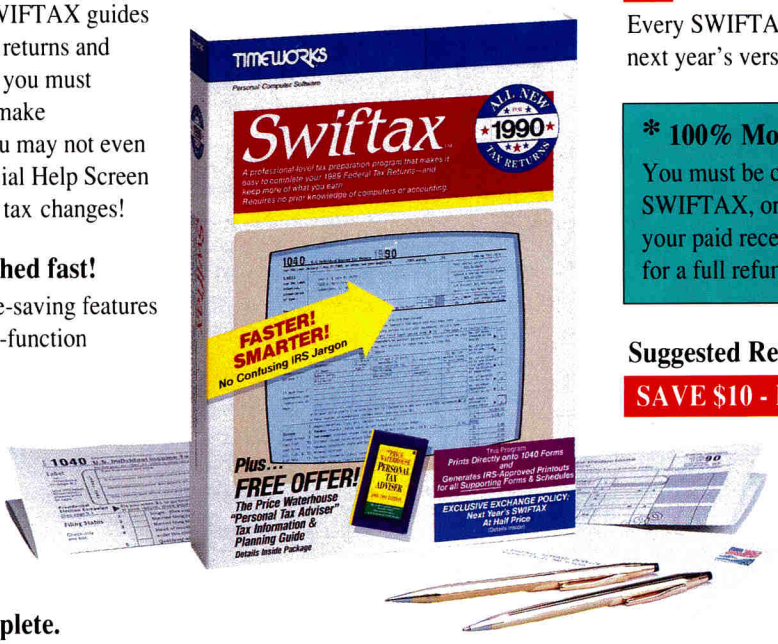

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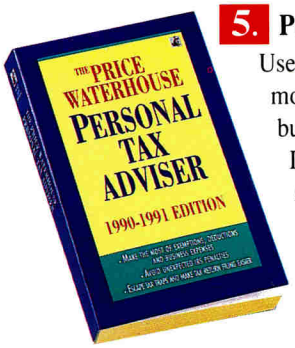

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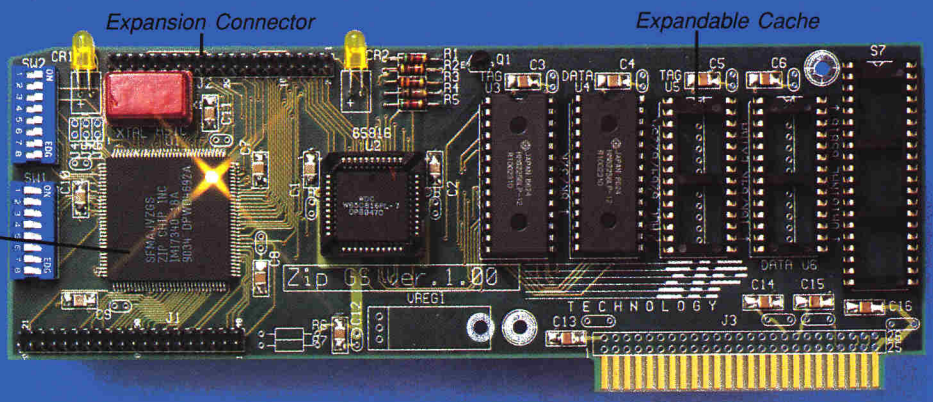

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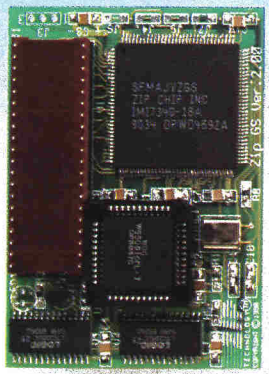

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