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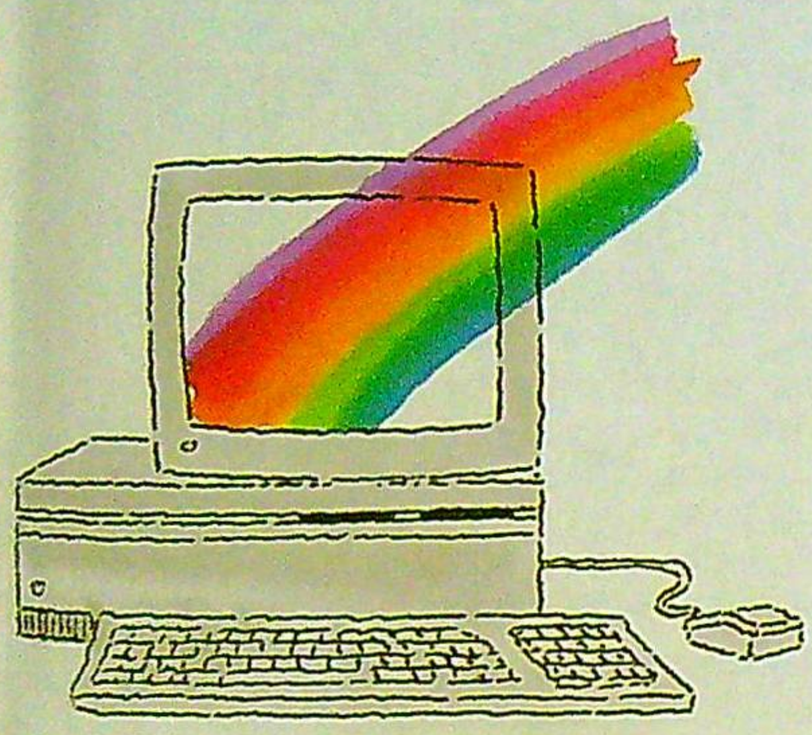

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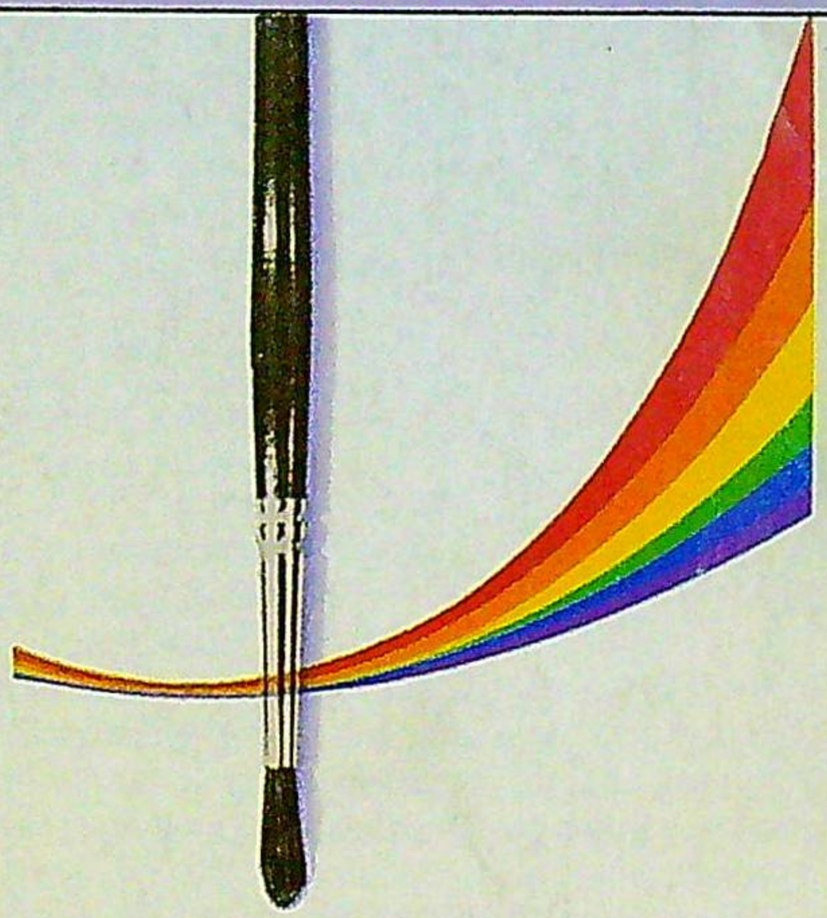
18 Intriguing Bulletin Boards



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Impressive Graphics Software Makes It Easy

Educational Software Buyer's Guide

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Ready To Type In And Run Programs:

Biker Dave
A Fast-Action, Arcade-Style Game

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Learn To Tell Time And Improve Memory

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Create Beautiful Hi-Res Screens The Easy Way

APPLE II DISK
Available.
See page 29

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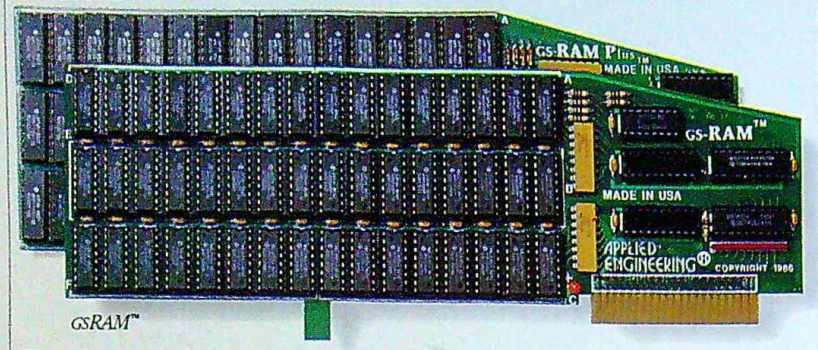
Insist on GSRAM™ When You Buy Your IIGS™

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

GSRAM Plus™



GSRAM™

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

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

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

GSRAM for More AppleWorks Power

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

Turn Your IIGS into a Giant

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

Grow by Bytes or Megabytes

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

GSRAM—for Normal Memory Requirements

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

"I recommend Applied Engineering products wholeheartedly."

Steve Wozniak, the creator of Apple Computer

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

GSRAM Plus—for Growing by Leaps and Bounds

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

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

Easy Expansion

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

Quality and Support of the Industry Leader

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

GSRAM with 256K	$169
GSRAM with 512K	$219
GSRAM with 1 MEG	$299
GSRAM with 1.5 MEG	$379
GSRAM with 2-8 MEG	CALL
GSRAM Plus with 1-8 MEG	CALL

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See your dealer or call Applied Engineering today, 9 a.m. to 11 p.m. 7 days. Or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

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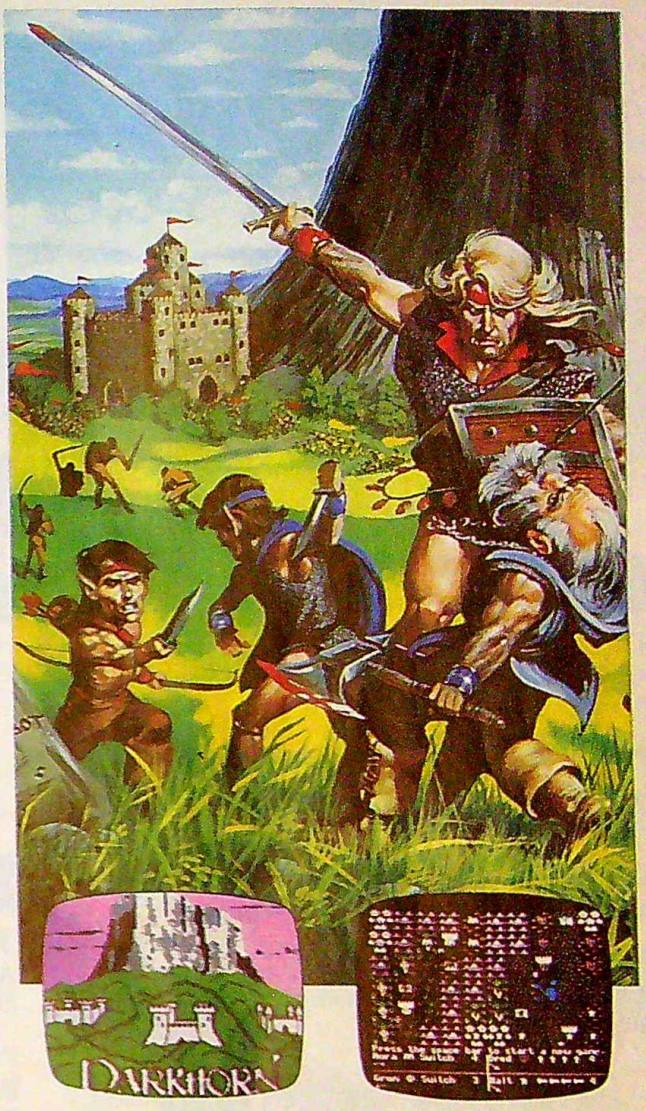
thunder over DARKHORN

The gathering of the armies is accompanied by the gathering of storm clouds. The spinning wheels of history have brought the four major powers into the final conflict for supremacy over the fertile land under the shadow of the towering mountain, Darkhorn.
From the four armies, men, elves and dwarves fan out and occupy strategic strongpoints and search for the elusive enemy. Some enter villages, foothills and woods, recruiting new members to the cause, while others remain behind and fortify the castles against siege. But watching over them all from his hidden fortress, the Darklord watches and waits . . . to confront the leader who dares to challenge his supremacy.

Up to Four Players—Simultaneously!
DARKHORN is the newest fantastic strategy game from The Microcomputer Games division of The Avalon Hill Game Company. Up to four players compete *at the same time*: raising their armies, organizing their forces and leading them into battle.

Look at these unique features!
★NO WAITING! Everybody plays in Darkhorn! A unique real-time system allows all players to give orders to their armies at the same times. No one has to wait while one person decides what to do. The keyboard, joystick and paddles can be used in any combination.
★MULTI-PLAYER OR SOLITAIRE! Darkhorn can be played by up to four players, with the computer sitting in when needed. And, if you want a solitaire game, Darkhorn offers that too. A unique handicapping system makes even a one-player game a true tactical and strategic challenge.
★PLAY A SHORT GAME . . . OR AN ENTIRE CAMPAIGN! Want to play a game lasting thirty minutes? The Quick Scenario takes place on one of sixteen different maps. For an afternoon of fun, the Campaign Game rages over the nine maps of Darkhorn, with the winning army facing the Final Trial against the evil Darklord! And what does it take to triumph there? An unknown power that you can learn only by succeeding in previous campaigns.
★BUT THERE'S MORE! Darkhorn can be changed to suit your taste. Randomly generated maps make each game a different strategic challenge. A tactical combat option tests your arcade skills. And, of course, the computer can take any side!



Darkhorn Calls!
The battle horns are sounding and the companies of men, elves and dwarves are assembling under the shadow of the mountain. By the night-banishing torches, the commanders are plotting their strategies for the coming campaign, and you are invited to join them. Darkhorn is calling for you!

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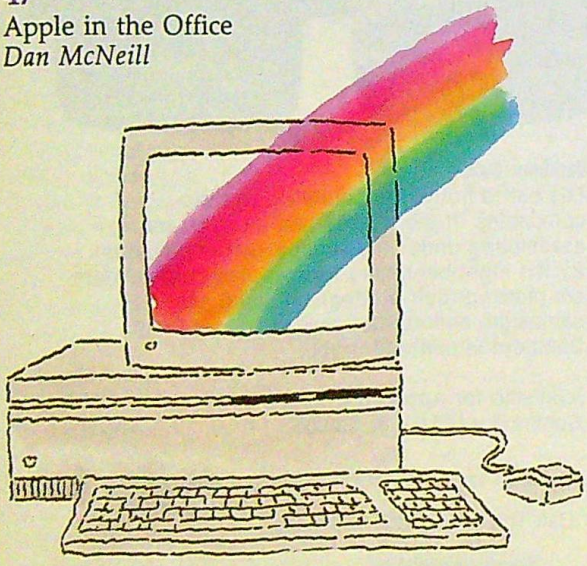

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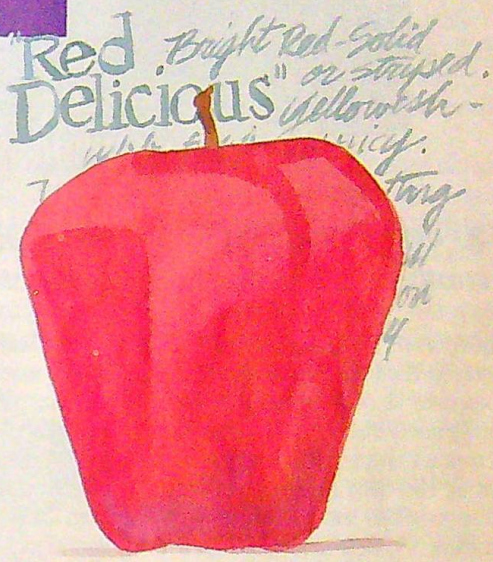

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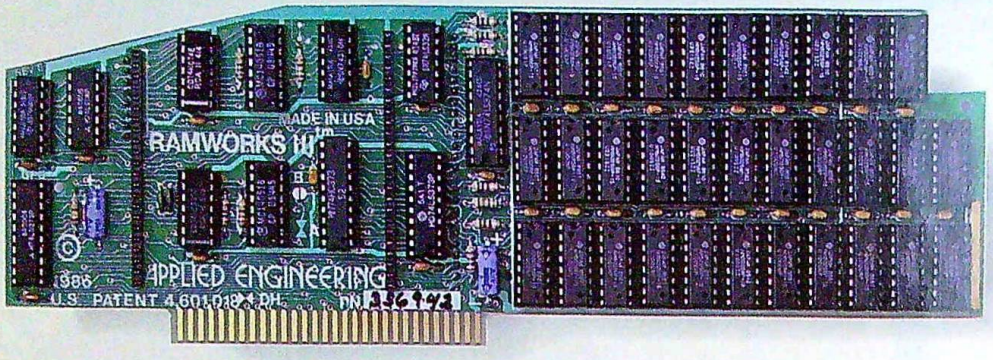
RamWorks® III

Patented Performance from the Recognized Leader



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

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

The AppleWorks Amplifier.

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

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

RamWorks, nothing comes close to enhancing AppleWorks so much.

The Most Friendly, Most Compatible Card Available.

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

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

Highest Memory Expansion.

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

It Even Corrects Mistakes.

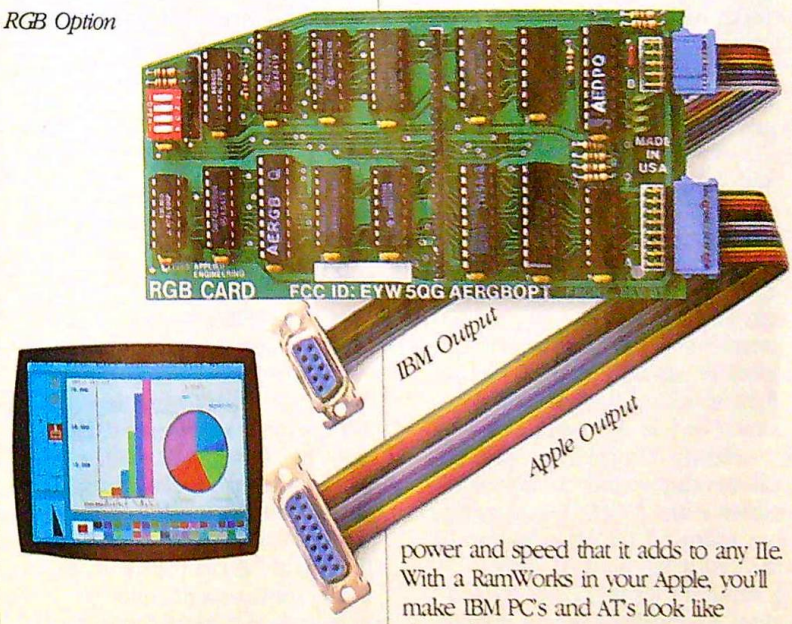
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

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

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

RGB Option



True 65C816 16 Bit Power.

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

Endorsed by the Experts.

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

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

Steve Wozniak, the creator of Apple Computer

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

Quality and Support of the Industry Leader

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

It's Got It All

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

RamWorks III with 64K	**$179**
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RamWorks III with 512K	**$269**
RamWorks III with 1 MEG	**$369**
RamWorks III with 1.5 MEG	**$539**
RamWorks III with 2 to 16 MEG	**CALL**
65C816 16 Bit Card	**$159**
RGB Option	**$129**
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Pinpoint with RAM Enhancement Software	**$79**
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RamWorks III. The industry standard for memory expansion of the Apple IIe.

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Editor's Notes

COMPUTE!'s Apple Applications Special is a bi-annual magazine—it's published in the spring and again in the fall. Because of those six-month intervals, and because of its deadlines (I'm writing this in late February), this magazine coincides with Apple's important hardware announcements.

The last three issues of Apple Applications have traced the new generation of Apple's personal computers, from the Macintosh Plus a year ago to the Apple IIGS last fall to the Macintosh SE and Macintosh II today. It's been an interesting path, this maturing of Apple computers, and Apple Applications has been there to guide you down it.

No doubt about it, the IIGS and the new Macintoshes are the future of computing with Apple, and a significant part of computing in general. These machines, characterized by more memory, more features, more intuitive user interfaces—and most importantly—more expandability, will make their mark on the industry as surely as has the Apple II.

David Thornburg, noted Apple developer and an associate editor with COMPUTE! magazine, has followed the introduction of the last three lines of Apple computers. In this issue he provides an insider's report on the newest Macintoshes—the SE and II. As both a developer and user, David is excited about the new machines. Why? Because "the new computers...build on the strength of the original... products."

That's the key. Apple has become known for building on its strengths, not its weaknesses. The Macintosh Plus, though criticized for being what the original Mac should have been, beefed up an innovative computer and made it attractive to American business. (See "Apple in the Office.") The Apple IIGS brought impressive power, sound, and graphics to the home and school, yet maintained links to the vast library of Apple II-series software. Now, with the introduction of the Mac SE and Mac II, that building-on-success philosophy will be tested even more.

The SE is a better and faster Macintosh Plus, one that allows one add-on card. Nothing dramatic, but with the excellent software now available for the Macintosh line, it's another step up. The Macintosh II, though, is a different beast. As Thornburg says, "The Macintosh II is clearly the first step in a new direction for Apple." A completely open architecture, optional color display, and up to eight *gigabytes* of

All the Apple II programs in this issue are available on our companion *Apple Applications Special Disk*. This 5¼-inch disk, formatted for both DOS 3.3 and ProDOS, runs on any Apple II+, IIe, or IIc. You can order this disk ($12.95 plus $2.00 shipping and handling) only through COMPUTE! Publications, either by using the card bound in this issue, or by calling toll-free **1-800-346-6767** (in New York, **1-212-887-8525**).

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RAM are just some of what makes this computer more a workstation than a personal computer. Yet even with its departure from the traditional closed-box approach of the Macintosh, the Macintosh II will still run a majority of Mac software—right now.

Introducing new computers which use new and different technology is risky enough without having to worry about what will run on them. Hardware alone just doesn't sell computers anymore. The early struggle that both Atari (with its ST) and Commodore (with its Amiga line) went through before attaining something even close to widespread acceptance is a good indication of that.

One can see a logical and thought-out progression of the Apple computer line. The trends are fairly clear—Mac-like graphics interface, more memory, faster microprocessors, state-of-the-art sound, color, and an open architecture.

That last aspect is going to be vital in the ways we use Apple computers. The Apple IIe and IIGS offer slots for add-on cards and boards. This open approach has let us customize our computers to best fit how *we* use them, not how an engineer *believed* we'd use them. It has also added years—perhaps decades—to the longevity of the Apple II line.

Now that the Macintosh has its open models, the same thing that happened with the Apple II will undoubtedly happen with it. We'll be able to personalize how we compute.

Though the new Macintoshes' effect on home computing won't be apparent for some time (think of the 2½ years between the introduction of the Macintosh and the IIGS), it *will* arrive. Low-cost Macintosh computers (or computers like the Mac in everything but name) with massive memory, high-speed processors, color, and large displays are in Apple's future, and in ours.

Until next issue, enjoy what you find in COMPUTE!'s Apple Applications Special.

Gregg Keizer
Editor

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David D. Thornburg, Associate Editor

Apple To The Macs

Ten years after its founding, Apple Computer's vitality is unquestioned. The introduction of two new computers—the Macintosh SE and the Macintosh II—along with a number of peripherals, open up new possibilities, both for the company and for the users of its computers.

In The Chips

Apple's Macintosh line is built around the Motorola 68000 microprocessor family. This trend continues with the newest computers. Given the recent attention paid to the Intel 286 and 386 microprocessors making their way into the IBM world, it's interesting to see that Apple has strengthened its resolve to use the Motorola technology. Apple's reason has nothing to do with a fondness for Motorola—it's based on benchmark tests that show the 68000 family as the clear winner in handling the Macintosh's highly visual programming environment. And from the standpoint of hardware development, Apple feels that the transition from the 68000 to the 68090 will be far smoother than the transition from the 8086 to the 80286 and 80386.

Why Build New Computers?

With the Macintosh 515e and Macintosh Plus, Apple has done a good job of penetrating the Fortune 500 markets, as well as maintaining a strong position in smaller businesses and higher education. (See the article "Apple In The Office" elsewhere in this issue—Ed.) In fact, as of January, 1987, sales of Macintosh computers exceeded 50,000 units per month. By the time you read this, the one-millionth Macintosh has probably already been shipped. This puts the Macintosh in the number 1 monthly-sales position in the personal computer marketplace.

Why Tamper With Success?

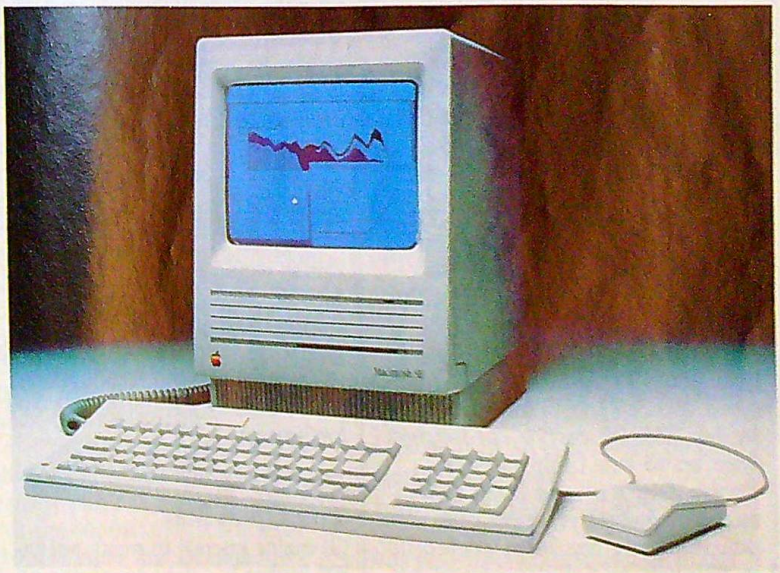
Adding two new computers won't make the older machines obsolete, but it *will* allow Apple's market to grow into new areas. The Macintosh 512e and Macintosh Plus remain in Apple's line, and will continue to meet the needs of students, small businesses, and small desktop publishing applications.

The new computers—the Macintosh SE (which stands for System Expansion) and the Macintosh II—build on the strength of the original Macintosh products. The Macintosh SE can be thought of as an expandable (one slot) Macintosh Plus which has other enhancements to make it faster in certain applications. The SE is a mainstream business product which Apple feels will compete handily with the 80286 PC AT.

The Macintosh II is a high performance computer designed to meet the needs of those advanced users who would otherwise be using computers ranging from the Compaq 386 to DEC VAX systems.

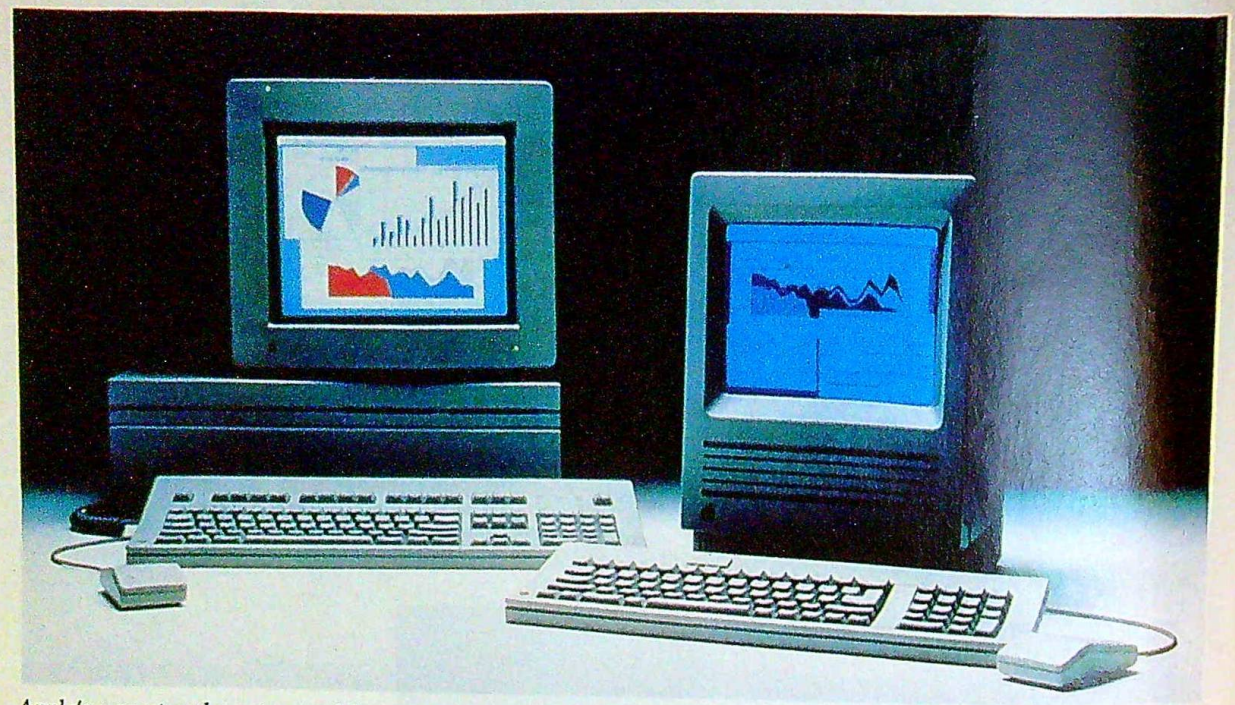
What's amazing is that, with all its power, the Macintosh II will still run existing Macintosh applications.

On March 2, 1987, Apple added two new computers to its Macintosh line, computers that pave the way for Apple's growth well into the 1990s. The Macintosh SE and Macintosh II—more powerful, expandable variations on the classic Macintosh—offer faster speed, more memory, and a flexibility undreamed of just three years ago, when the first Macintosh was introduced. Apple expert David Thornburg takes an early look at these exciting new computers.



The Macintosh SE—a faster version of the Macintosh Plus—offers limited expandability, an optional internal hard drive, and choices in keyboards. Note the 81-key keyboard pictured here.

The Macintosh II looks nothing like a Macintosh. Its separate system unit and display make it appear similar to the Apple IIGS. This Mac II is equipped with the optional color display.



Apple's newest and most powerful computers—the Macintosh SE (right) and Macintosh II. The 105-key keyboard, which includes 15 function keys, is shown connected to the Mac II.

Lifting The Hood On The SE

On the surface, the Macintosh SE looks like the traditional Macintosh, complete with the 9-inch black and white display. A closer look reveals that the traditional Macintosh keyboard has been replaced by the keyboard interface used on the Apple IIGS—the Apple Desktop Bus. The Apple Desktop Bus daisy-chains multiple keyboards together for special applications, making it easier for custom keyboards to be designed for this computer.

In the case of the Macintosh SE, the Desktop Bus makes it possible for Apple to unbundle the keyboard from the computer. Apple has announced two keyboards for their new Macintoshes. The first is an 81-key device with numeric keypad, similar to that used on the Apple IIGS. The second keyboard has 105 keys and includes 15 function keys, a T-shaped cursor keypad, and the numeric keypad. Users of this keyboard can assign keyboard macros to the function keys to speed up information for various applications.

Inside the cabinet, however, the Macintosh SE looks quite different from the Macintosh Plus. The venerable 68000 is still there and RAM size is one megabyte (expandable to four megabytes), but the main circuit board isn't the same. For example, 19 of the original Macintosh Plus chips have been replaced by a single gate array. ROM is now 256K (instead of 128K), of which 160K is in use. The SE can be configured with up to two built-in 800K floppy drives or one 800K drive and a 20-megabyte hard disk. The power supply has been beefed up to 80 watts and the computer has a built-in fan to keep it cool. The internal clock even has a seven-year battery, an improvement over the older Macintoshes.

The Macintosh SE outperforms the Macintosh Plus in two areas. First, even though it uses the same processor and clock rate, enhancements in the firmware (internal ROM routines) and system design provide a 15 to 20 percent improvement in overall performance. Second (and this is important for disk-based applications), a new controller circuit has doubled the effective throughput of the SCSI port, allowing hard disk data to be transferred to and from the computer at a tremendous clip.

The price for all this? Although firm prices had not been set at press time, Apple said that a Macintosh SE with two floppy drives would cost approximately $2,800. Taking away one of the floppies and adding a 20-megabyte hard disk would change the price to around $3,500. (Both prices include the smaller, 81-key keyboard.)

The Open Mac

Of major interest to many potential buyers is a new connector on the Macintosh SE's circuit board which takes an external plug-in card. This connector accommodates third-party expansion cards, which will run the spectrum from a 3270 emulator (for IBM fans) to Ethernet controllers, IEEE-488 interfaces, internal modems, a 68020 co-processor, and other products too numerous to mention.

It's as though the pressure for add-ons to the Macintosh built to such a level that, as soon as the architecture was opened even a crack, developers rushed to fill the slot.

Because there's only one expansion slot in the Macintosh SE, expect a number of multi-function cards to appear on the market over the next few months.

When Is A Mac Not A Mac?

The Macintosh II is the first product in the Macintosh line to deviate from the familiar all-in-one display/computer/disk drive design. Instead, the Macintosh II is a large flat box like the cabinet on the IBM PC.

But the excitement of this computer is not in its packaging. The reason for the larger box is because this computer has a lot more inside, and has a lot more expandability.

In addition to the Macintosh SE standard ports (two serial ports, one SCSI port, and two Apple Desktop Bus ports), this computer has six internal expansion slots that support full 32-bit address and data lines. This means that the computer can address more than four *gigabytes* of memory. The II's RAM, however, can be expanded to *just* half that—2 gigabytes.

To get an idea of just how much memory this is, consider the amount of RAM found in many early microcomputers. Most people were happy with slightly more than 8,000 bytes (8K is 8192 bytes). Multiply that 8192 bytes by 1024 for *only* 8+ million bytes (that's 8 megabytes). Multiply that another 256 times for the RAM capacity of the Macintosh II—2 gigabytes, or *more than 2 billion bytes.*

Of course, the computer isn't shipped with that much memory; it comes with one megabyte of RAM, but the expansion capabilities of this computer are astounding.

Memory isn't important unless you can use it quickly. The Macintosh II is built around Motorola's 68020 microprocessor—a full 32-bit processor which operates at a speed of almost 16 MHz—double the speed of the Macintosh Plus's 68000. The chip effectively quadruples the processing speed of the Macintosh II when compared to the Plus.

There's more. *Floating point* mathematics operations are usually quite time-consuming. That's why most programmers interested in speed use integer arithmetic. Even so, floating point numbers are often handy (when rotating a picture of a three-dimensional object on the screen, for instance). To meet the needs of people who work with "real" numbers, Apple has included some help for the 68020. The 68881 math co-processor chip provides anywhere from 4 to 40 times the improvement in floating point processing speed for existing Macintosh programs. When programmed directly, it can increase the speed of floating point operations by as much as 200 times.

The SCSI data transfer rate on the Macintosh II is also increased—to greater than one million bytes per second, close to the SCSI limit of one and a half megabytes per second.

Graphics And Sound

There's more?

When the Macintosh first came out, many pundits said, *But it doesn't have color.*

Others (those who liked the Macintosh as it was) said, *Yes, but it has high resolution.*

This argument is now part of history. The Macintosh II has both color *and* high resolution—enough to meet the needs of anyone but the major graphics studios.

The display for the Macintosh II is handled through a plug-in card which comes in two models. The low-end card supports a 640 × 480 pixel display at up to four-bits of color or gray scale data per pixel. Up to 16 colors can be displayed simultaneously.

The other Apple graphics card supports the same resolution but provides eight-bits per pixel; any of 256 colors or gray scales can be assigned to each pixel on the screen with this card in place.

Simple multiplication shows that this capability requires a screen buffer of over 300,000 bytes—almost three times the total memory of the first Macintosh. Fortunately, the screen buffer RAM is included on the graphics cards so that the display doesn't eat into the main memory space.

Colors for this computer are selected from a palette of 16.8 *million* colors. As a result, near-photographic quality images can be displayed on the color monitor that Apple also announced for the Macintosh II.

In a move that surprised many, Apple chose to use a horizontal (TV-like) monitor rather than support a vertical (page-like)

Silicon Decisions

Most Apple watchers know the story of the creation of the first Apple computer in Steve Jobs' garage—a venture financed in the beginning by the sale of his Volkswagen. The diligent efforts of Jobs and Steve Wozniak have become legends, and like many legends, the folklore is hard to separate from fact.

The reality is that Apple's first popular computer (the Apple II) has survived these many years for two reasons. First, Apple made a good guess in choosing the 6502 as the processor. The 6502 (and its follow-up microprocessors like the 65C02) have shown tremendous strength. The second technological feat that kept the Apple II alive was Apple's willingness to continue to develop and enhance its original offering, without compromising compatibility.

Years after the original Commodore PET and Radio Shack Model I vanished, Apple continued to support and enhance its original technology to provide as smooth an upgrade path as possible to newer technologies. Just compare the features of the Apple IIGS with the original Apple II.

History repeats itself. With the introduction of two new Macintosh computers, Apple is showing that it's willing to provide the same growth pattern and support in the Macintosh family that it did with the Apple II. To do this, Apple once again had to make a good choice for the microprocessor. They also had to realize the importance of compatibility. As owners upgraded from the original Macintosh, it was important that their software would still work on the new technology.

monitor. Given the popularity of desktop publishing, some people expected the vertical format would be preferred. Apple's response to this observation is that vertical monitors at these resolutions are very expensive, and that third parties will be providing offerings in this area anyway.

While the Apple IIGS drew a lot of attention because of its graphics, the latest entry to the Apple II line also showed what could be accomplished with a good sound circuit. The Macintosh hasn't been considered a "sound" computer, but the Macintosh II may change that. Apple designed a new sound circuit for the Macintosh II which includes four-voice wave-table synthesis and a stereo sampling generator. While not based on the Ensoniq chip used in the Apple IIGS (for hardware reasons), the new sound chip provides exceptional performance.

In order to keep developers sane, Apple will probably provide a sound toolbox which will provide a uniform programming interface that can be used with the Ensoniq chip on the IIGS or with the Apple chip on the Macintosh II.

Who Needs It?

The Macintosh II is clearly the first step in a new direction for Apple. Rather than look at the personal computer market and move upward, it seems that Apple looked at the serious workstation market (populated by companies like Sun, Symbolics, Apollo, and others) and brought high performance within the price range of small businesses and university research labs.

That's evident by the price of Apple's most powerful computer. A Macintosh II with the 4-bit display card and a monochrome monitor is expected to sell in the neighborhood of $5,500 (at press time, prices had not been established). Exchanging the monochrome monitor for one that displays color (but retaining the low-end 4-bit display card) should increase the cost to approximately $6,500.

The Macintosh II should strengthen Apple's position in its existing markets and at the same time help it move into areas currently dominated by other companies. The artificial intelligence market, for instance, is one that's ripe for Apple's picking. For well under $10,000, one can get the Macintosh II with a 40-megabyte hard disk, lots of RAM, and a splendid version of LISP—all this would compete quite handily with systems costing five times as much.

MS-DOS And UNIX

The "fight" between Apple and the MS-DOS world has been the subject of more press than it ever deserved. There are still those who maintain that it was folly for Apple to go its own way when everyone was falling in step behind Big Blue.

Nonetheless, Apple charted its own course. In time, many computer users realized that a highly visual programming interface had its merits. The PC market is now flooded with desk accessories, mice, windows, and the other features normally associated with the Macintosh. The only problem is that the 8086 microprocessor just doesn't have the steam to do this job well.

Now that Apple has introduced a computer far more powerful than the original IBM PC, one might imagine Apple proclaiming itself the "winner", and making those who followed another path atone for the error of their ways.

This hasn't happened. Because of the expandability of the two new Macintoshes, third parties have created 8086 (and 80286) co-processor cards that bring MS-DOS compatibility to these machines. Apple has even announced 5¼-inch disk drives so PC users can work with their familiar disks.

An MS-DOS application running on a new Macintosh still takes advantage of the usual Mac capabilities—desk accessories, clipboards, and so on. The result is a hybrid environment which provides a smooth and easy transition from one machine to the other. The compatibility software packages available from third parties even map the MS-DOS Epson printer commands

My Wish List

As excited as I am by the new Macintoshes, there are two things these computers are missing.

The first is a vertical (pagelike) display that has Apple's name and support. While this may not be important for the Macintosh SE, I think it was a gross oversight not to include it as an Apple option for the Macintosh II.

The second oversight is one that Apple has ignored since the introduction of the first Macintosh—the inclusion of an external video connector. Why should this matter, since (except for the Macintosh II) the other Macintoshes have built-in displays?

For many applications, the Macintosh screen needs to be seen by a lot of people at once. When I taught a Macintosh-based course at Stanford a few years ago, I used a video projector connected to an "illegal" adapter that allowed the Macintosh video signal to be sent to other monitors and projectors. Unfortunately, this modification violates the warranty of the original Macintoshes. Yet, even with this loss of warranty, many people made similar modifications so the computer could be used in staff meetings, classrooms, and other places where a projected image is required.

Departments within Apple have had to violate the warranty on their own computers to use them with projectors for their own meetings.

Aside from the warranty issue, external video adapters are costly (about $100) and require disconnecting hard-to-reach connectors inside the computer. And yet, for very little additional expense, Apple could have provided this external video capability from the very start.

into Quickdraw commands so they can properly control the LaserWriter.

Of greater importance than MS-DOS (in the long run), is Apple's decision to support UNIX. This operating system, designed at Bell Labs, is quite popular in universities. The Macintosh II supports the optional 68851 PMMU chip for UNIX memory management. The Macintosh version of UNIX corresponds to AT&T's system 5, release 2, with the Berkeley 4.2 extensions that are popular with the educational community.

From the looks of the support being given to the Macintosh II, it appears that Apple is more concerned with being compatible with the DEC computers than with those from IBM.

Open Architectures And Open Minds

John Sculley has said that it was a mistake for Apple to have introduced a closed architecture Macintosh. His reasoning was that a closed machine presented problems to third party developers. He said that the third party developer community—from which so much innovation has come in the past—was stifled by Apple's original decision.

There is room for both types of computers—the original closed Macintosh and the new Macintosh SE and II—in the marketplace. A lot of people who bought the original Macintosh might not have have bought other computers because they felt that setting up a computer was too intimidating. By treating the computer as an appliance and focusing purely on its function rather than what was inside, the original Macintosh was instrumental in bringing computational power to thousands who might never have taken the "computer risk."

Besides, how can it be a mistake to introduce a computer whose sales just reached the one-million point?

Now that the closed Macs have some new "open" relatives in the family, we can truly say the Macintosh is a computer for all seasons.

The New Macs At A Glance

	Macintosh SE	Macintosh II
Memory	1 megabyte RAM (expandable to 4 megabytes) 256K ROM	1 megabyte RAM (expandable to 2 gigabytes)
Disk Drives	2 800K floppies or 1 800K floppy and 1 20-megabyte internal hard disk	1 or 2 800K drives 1 800 K floppy and 1 20-, 40-, or 80-megabyte SCSI internal or external hard disk
Display	Monochrome (512 × 342)	Monochrome or color (640 × 480)
Keyboard	81-key or 105-key with 15 function keys	81-key 105-key with 15 function keys
Colors	———	4 bits/pixel (16 colors simultaneously) 8 bits/pixel (256 colors simultaneously)
Palette	———	16.8 million colors
Sound	Same as Mac Plus	4-voice wave-table synthesis, stereo sampling generator
Microprocessor	68000	68020 (68881 math co-processor)
Ports	2 serial ports 1 SCSI port 2 Apple Desktop Bus ports 1 external plug-in board connector	2 serial ports 1 SCSI port 2 Apple Desktop Bus ports 6 internal expansion slots (32-bit address/data lines)

aa

The IIGS:
A Rainbow Brush, A Fresh Canvas

Lee Noel, Jr., Assistant Editor, Art & Design

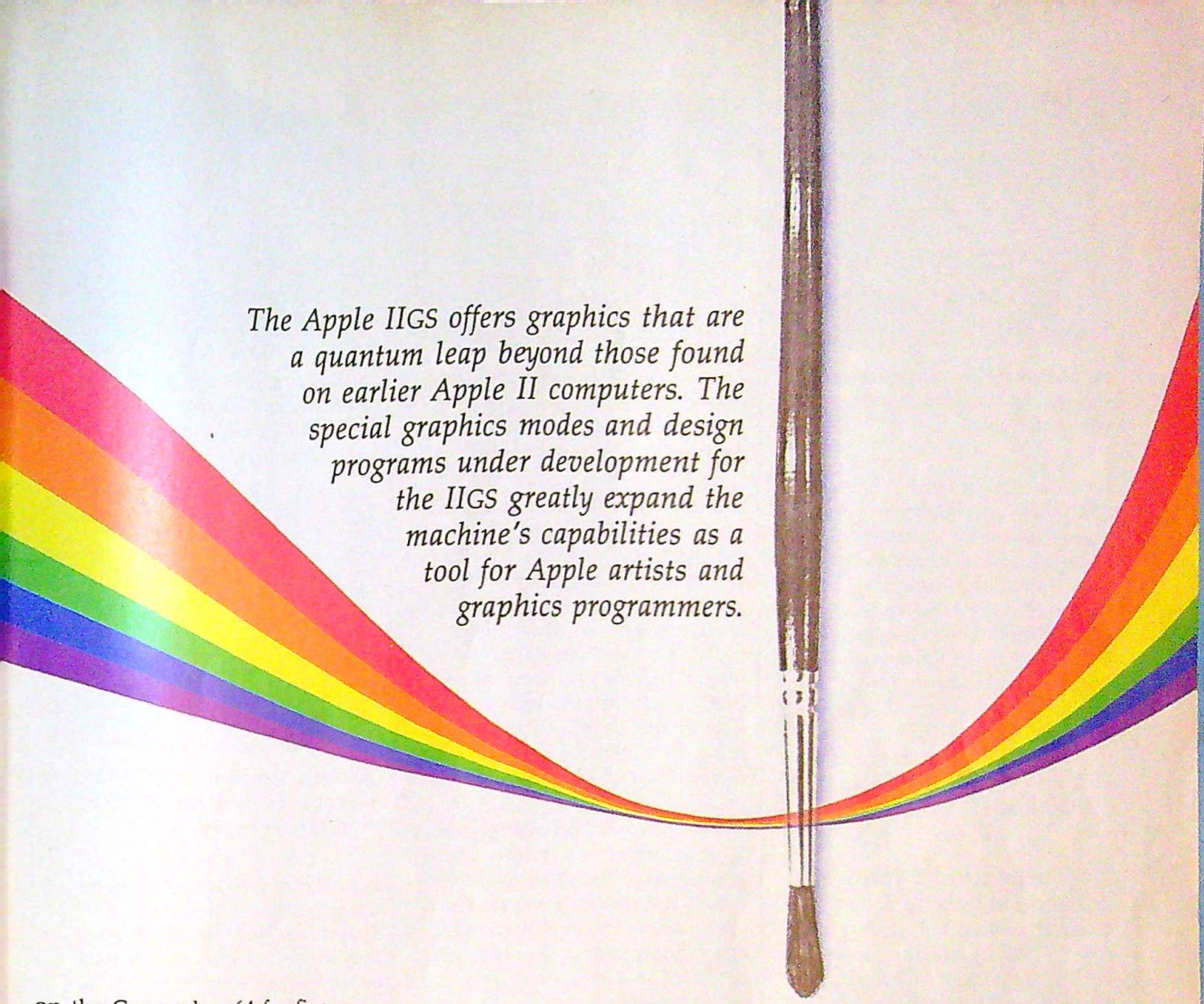
When the Apple II made its debut in 1977, it was the first personal computer with color graphics. But recently, Apple II enthusiasts have been watching—probably in dismay—as a whole parade of graphically superior computers has come marching by. In addition to higher screen resolution and more colors, these other computers offer vast increases in speed, power, and memory—three factors which can greatly affect the sophistication of screen graphics. Perhaps the premier example of this new generation is the Commodore Amiga, with its 4096 colors, high-resolution screen, and fast-running Motorola 68000 microprocessor.

With the arrival of the IIGS, Apple II artists and graphics programmers can step into the parade. When the IIGS is not emulating traditional Apple II displays, its graphics capabilities stack up relatively well against the Amiga and the Atari ST. (Comparing the IIGS to Apple's own Macintosh is a little more difficult, since the Mac is strictly a black-and-white computer. But the IIGS nevertheless owes a debt to the Macintosh for the appearance and operation of its software.)

Like the Amiga, the IIGS offers 4096 colors. These are constructed by mixing the three color components of a video screen: red, green, and blue (hence the term *RGB monitor*.) Each component has 16 luminances, or levels of brightness. Sixteen luminances of red, green, and blue yield 4096 unique colors (16 * 16 * 16 = 4096). On the AppleColor RGB monitor, the IIGS display is very clear and distinct, and it appears to be much purer than the display of the Amiga RGB monitor. The Atari ST's display is comparable to the AppleColor screen, but the ST allows only 8 luminances each of red, green, and blue, for a total of 512 possible colors. Although this is sufficient for most purposes, the eight-times-larger range of the IIGS encompasses some delicately subtle shades that cannot be displayed by the Atari.

The entire 4096-color spectrum is available in both of the IIGS's special high-resolution modes, but not all of those colors can be displayed on the screen at once. You can display up to four colors simultaneously on a screen with 640 horizontal and 200 vertical pixels, or up to 16 colors on a screen with 320 horizontal and 200 vertical pixels. (*Pixels*—picture elements—are the individual dots of light that make up an image on a video screen.) Most artists prefer to trade resolution for more colors, so they tend to work with the slightly coarser 320 × 200 mode. (All of the graphics programs we tested, and all of the screen photos accompanying this article, use this mode.)

Although this isn't an exceptionally high resolution—the 320 × 200 screen has been available



The Apple IIGS offers graphics that are a quantum leap beyond those found on earlier Apple II computers. The special graphics modes and design programs under development for the IIGS greatly expand the machine's capabilities as a tool for Apple artists and graphics programmers.

on the Commodore 64 for five years—it is capable of producing stunning displays when coupled with the immense IIGS palette. In fact, since smooth blended-oil and watercolor-wash effects can be easily simulated on the IIGS, pixels can be made to almost disappear, and the resolution can seem almost infinite. Most graphics screens created on the Amiga and ST also use this flexible and effective resolution.

Graphics Software

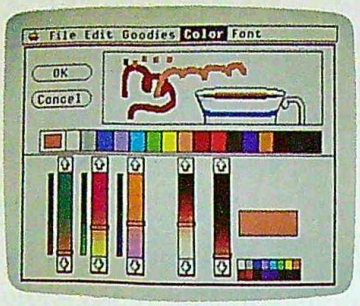
To take advantage of the IIGS and its magic canvas, the artist—as opposed to the technically skilled programmer—needs some kind of software to make things easier.

One of the first graphics-design programs to appear for the IIGS was *Paintworks Plus*, published by Activision and developed by Version Soft, creators of the IIGS desktop. *Paintworks Plus* resembles a full-color version of the popular *MacPaint* program on the Macintosh. Like many other icon-based, mouse-driven programs on the Macintosh, *MacPaint* became an almost instant standard. It inspired several similar programs for the Apple II, but earlier members of the Apple II family were limited by the relatively slow 6502 microprocessor. The 65816 chip used in the IIGS is significantly faster than the 6502, so programs like *Paintworks Plus* operate fairly rapidly.

Like the other graphics-design programs we'll discuss, *Paintworks Plus* offers a full complement of computer art tools. To avoid a lengthy litany of standard features, it's safe to assume that all of these programs—unless otherwise noted—include the usual tools for drawing lines, boxes, ellipses, and circles; for filling shapes with colors and patterns; for magnifying and editing small sections of the artwork; for copying and moving portions of the image; and for saving and printing the screens at various stages of completion.

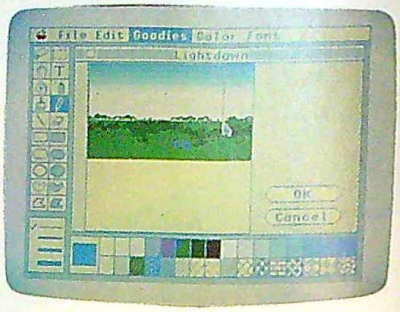
The icons for tools in *Paintworks Plus* resemble those found in *MacPaint*. Tools are selected from the vertical array of icons at the left edge of the screen. To create a filled box, for instance, all that's necessary is to move the mouse pointer to the solid rectangle near the middle of the icons, click the mouse button once, and move back to the drawing window. From there, another button press fixes one corner of

Paintworks Plus *reproduces almost exactly the* MacPaint *environment, but in full color.*



Paintworks Plus *makes it easy to choose your colors from the 4096 available hues. Note the test window and five slider controls.*

In this simple landscape, the Paintworks Plus *tool palettes have been withdrawn, allowing an unobstructed view of the full screen.*



Here, the same full-screen landscape is seen to be just a portion of the miniaturized picture.

the box. An elastic-sided "rubberband" box then follows every movement of the mouse pointer, allowing you to adjust the box to any desired size. Releasing the button sets the finished box in place. The box is automatically filled with the color or pattern that you previously selected from the color/pattern array at the bottom of the screen.

All of the tools in *Paintworks Plus* work in this smooth and simple fashion.

No Turpentine Fumes

At the top of the screen, further program options are made available by pulling down menus from the command bar. In *Paintworks Plus* (as in *MacPaint*), one of the most useful options is called FatBits. This is like a powerful magnifying glass that lets you zoom in and work with the picture pixel by pixel. One excellent feature of *Paintworks Plus* is that all the tools work in FatBits mode—not just one or a few tools as is sometimes the case with other programs.

Another option available from the command bar lets you select from the gigantic IIGS color palette. As you can imagine, picking the desired 16 colors from the 4096 possible hues could be a considerable chore (although not as difficult, say, as mixing and modifying paints with linseed oil and turpentine). Fortunately, the palette options in *Paintworks Plus* make the job relatively easy.

Colors are adjusted with the five slider controls shown in the photo of the palette window. Moving the indicator bar for any of the sliders results in an instantaneous change in the color being mixed in the large box at the right of the sliders. The three sliders on the left control the proportions of the computer's primary colors—red, green, and blue. The two right-hand sliders allow changes in the intensity, or density, of a color. Once a satisfactory color has been mixed, it can be transferred into the 16 midwindow blocks of the palette itself.

Paintworks Plus also provides a fairly large test window where you can experiment with colors during the mixing process. The test window is actually a chunk of any current picture, so colors can be tested in a realistic setting. (Tests have no effect on the picture itself.)

The program also lets you save useful palettes into a special palette table. They can be recalled for use in later pictures.

The picture window in *Paintworks Plus* represents only a small portion of a much larger "canvas." The entire picture area can be seen only if printed, but the program includes numerous tools for working with any area of the picture, and even for previewing the whole image in a reduced form.

One feature that sets *Paintworks Plus* apart from many other drawing programs is that it allows the budding cartoonist to make fairly complex animated "films" with relative ease. You start by creating a sequence of pictures, called *frames* or *cels*. Elements common to a number of frames can be readily transferred and manipulated with the wide range of editing tools. Each frame is saved on disk with a sequentially numbered filename. *Paintworks Plus* then compresses and converts all the frames into one file containing the complete animation and its timing information. This can be played back as a short movie.

The Brush Supreme

DeluxePaint II from Electronic Arts promises to be another powerful picture-making program for the IIGS. Although at this writing there was only a demonstration version available, the program we tested was at least 50 percent functional, and it already incorporated some unique features.

DeluxePaint first appeared on the Amiga in late 1985. Although it doesn't run as fast on the IIGS, it does retain the Amiga version's orientation to the concept of the *brush* as the central drawing tool in most operations. Any section of the screen may be captured and used as a brush. Not only can you paint with the brush, you can also resize, stretch, rotate, or even cast it into perspective. The brush is also the main editing tool, since it

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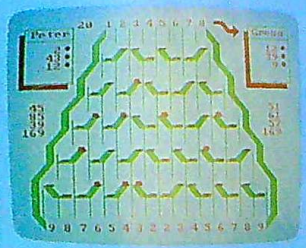

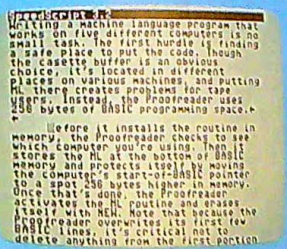

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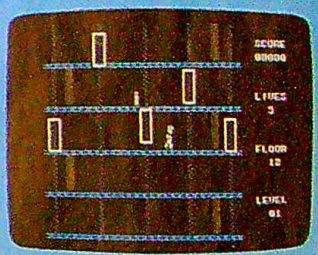

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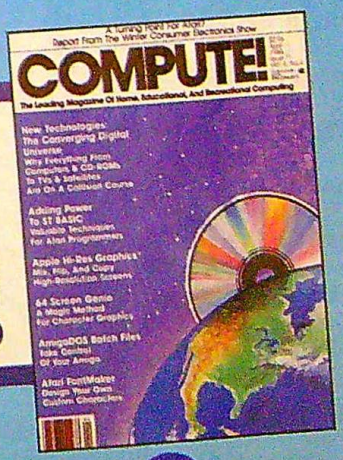

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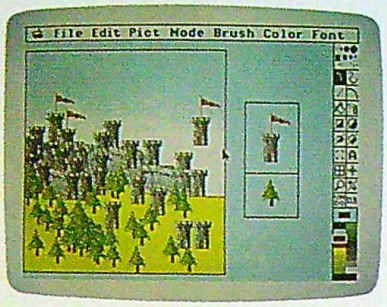
can be copied from one section of the screen to another, or even onto a spare screen.

In some ways, though, *DeluxePaint II* is much like *Paintworks Plus*. Graphics tools are selected from an array of icons (on the right side of the display), augmented by a number of pull-down menus. The range of tools is excellent. Special options include the display of position coordinates for exacting work, several different magnifications for working with individual pixels, and some interesting drawing tools which allow the initial image to be tugged and distorted.



In DeluxePaint II, *the brush is the primary tool. Here, the simple graphics of the pine tree and castle have both been turned into brushes with impressive results.*

The *DeluxePaint II* palette also can be mixed with slide controls, although they don't work exactly the way those in *Paintworks Plus* do. There's no test window, but one particularly useful feature lets you automatically generate a smooth, graduated spread of colors. This process takes the intensity of the hues into account as well as that of the basic colors, and makes it much easier to create the watercolor-wash effects mentioned earlier.

DeluxePaint II also has an animation feature, although it's based on color cycling instead of frame flipping. When using this technique, you specify a range of colors in the palette. Then, in a timed cycle, the program rotates the colors through the selected range. For instance, you could cycle blue, green, and white to simulate foaming waves breaking on a beach. A number of independently operating cycles can be set up.

Dithering Colors

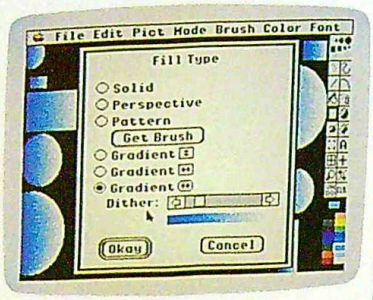
Like most graphics programs, *DeluxePaint II* has a tool for filling closed shapes with color, but it also offers an unusual function that's closely related to the color palette. Ranges established for color cycling can also be used for making gradient fills—that is, fills made up of a range of graduated colors.

Moreover, these fills can be adjusted for the amount of *dithering* in the different colors in the range. In this context, dithering refers to the extent to which pixels of adjoining colors in the defined range are intermixed. For example, if red and yellow were alongside each other, an undithered range would keep the colors completely separate. Dithering would mix together pixels of red and yellow near the common border, creating an orange, border-masking effect.

With dithering, it's possible to create textures ranging from banded metallic to flat, to grainy, or to pebble-like surfaces. These are useful options for an artist, because you're really working only with colored dots of light behind a glass screen.

There are a number of other sophisticated color-related features in *DeluxePaint II*. For instance, you can protect, or mask, certain colors or levels of a picture. In this way, it's possible to draw a complex foreground object and then add an equally complex background without disturbing even a single pixel of the first object. Alternatively, a picture can be built up in several successive layers, each of which is fixed when satisfactory.

Since good work can be protected from damage, you're free to work only with the strongest elements of any given design.



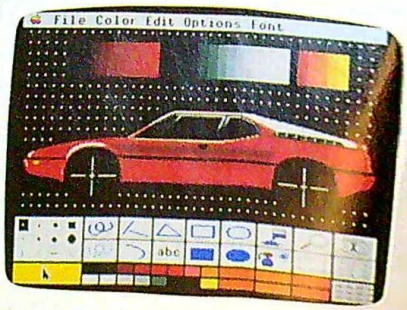
The gradient fill in DeluxePaint II *offers speed and ease of use impossible with traditional art media.*

A Program For All Modes

Another graphics package coming soon for the IIGS is Baudville's *816/Paint*. At the time of this writing, only a nonfunctioning display demo was available. However, the demo and manual do give some hints of what to expect.

For one thing, this program is supposed to work in all of the IIGS screen resolutions, including the normal Apple II modes. It should also be able to access existing graphics files under DOS 3.3. These may prove to be attractive features to artists with a stock of existing material for the Apple II.

Like *Paintworks Plus* and *DeluxePaint II*, *816/Paint* lets you select tools from arrays of icons, but the icons are hidden in pull-down menus instead of being displayed on the screen. Those who find themselves distracted by a host of tiny icons lying atop the artwork may prefer this approach. The menus are clearly related in the Macintosh style, even though their orientation is different.



816/Paint *is expected to include a wide range of brush effects and color cycling.*

More Than Pictures

There is more to graphics than just pictorial material—typography, layout, and page design all fall into this category. And although all the drawing programs described above let you add text to pictures, a program called *GraphicWriter* from DataPak is sharply focused on the text side of graphics.

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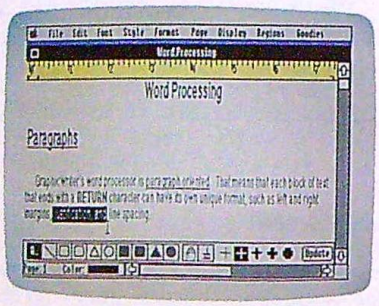
The core of this program is an up-to-date, mouse-driven, WYSIWYG (What You See Is What You Get) word processor. In a sense, *GraphicWriter* is like a paint program for text. You can enter different kinds of typefaces in different styles (bold, italic, and so on), then edit the text with tools much like those in the drawing programs.

The main display of *GraphicWriter* simulates a typewriter. Using the mouse to slide small markers across the ruler at the top of the screen, you can set margins, indentation, and various tab positions. The document will be printed exactly as it appears on the screen.

Each paragraph can have its own ruler settings, and the program automatically keeps track of them. As a consequence, text can be typed into paragraphs of different widths and in different styles, so you can manipulate the text in creative ways. As with many other word processors, pages can be forced to break at certain points or left to break automatically, and headers and footers can be added to each page.

Overall, *GraphicWriter* appears to be an adequate word processor for most purposes, although it isn't particularly fast when dealing with large amounts of text.



GraphicWriter *utilizes the popular icon-based user environment. Note the ruler at the top of the screen.*

Mixing Text And Graphics

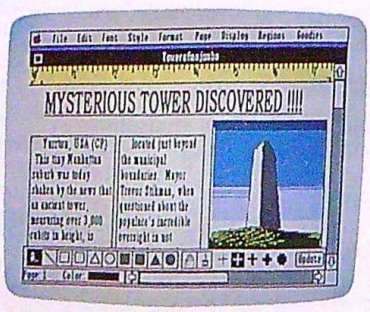
Where *GraphicWriter* really comes into its own is when you want to integrate text and graphics. This is the heart of the new field of desktop publishing, and *GraphicWriter* is clearly intended to play a part here.

Equipped with a fairly good set of drawing tools, *GraphicWriter* lets you easily draw lines, boxes, borders, and so forth, and then color them (if desired). But the artwork thus created is quite different from the images made with a conventional painting program. *GraphicWriter* drawings are *object-based*—that is, every completed item is separate from those created before, and also from those created later. By laying these objects atop one another, you can combine them into complex designs. Because the computer keeps track of each of the objects, they can be peeled apart like the layers of an onion, and even modified or discarded individually.

Objects are restricted to regions, or special screen areas that you define and position as the need arises. Text can be entered into any region. (Actually, the word processing part of *GraphicWriter* establishes a bottomless, screen-wide region when you start the program. Additional regions fall within this larger, overall region.)

By mixing type, art, and regions, it becomes a relatively simple matter to design pages and covers for virtually any kind of publication. You can easily set up columns of text in any width and length; and artwork—ranging from corporate logos to business graphs to elaborate illustrations—can be handled just as deftly.

GraphicWriter also allows freehand artwork in its "canvas" mode. Here, you define a special canvas region that cannot be mixed with or converted into an object region. The graphics created in a canvas region are pixel-based, like those in the paint programs. The drawing tools in this mode are necessarily restricted, since it forms only a minor part of *GraphicWriter*. But the option is valuable because it allows the straightforward drawing of complex illustrations, something that can be difficult when restricted to an object-only mode.



With GraphicWriter, *this rather fanciful illustrated news story was laid out in just a few minutes.*

A Powerful Ally

These programs represent just the first wave of software for the IIGS, but they reveal the computer to be an excellent machine for graphic and artistic expression. In general, the software is of good quality and appears to have benefited from the high standards of Apple and the Macintosh. Like most early programs for a new computer, though, they do have a few problems. For example, the printing options in version 1.0 of *GraphicWriter* were not fully implemented, since they depend on printer drivers that Apple had not delivered by the release date.

One point demonstrated by this software is that the Apple IIGS is graphically comparable to powerful computers like the Amiga and Atari ST, and it may have the best colors of the three. It's even more remarkable that the IIGS maintains compatibility with the old Apple II machines while unleashing some of the best graphics available on a personal computer today.

DeluxePaint II
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$99.95

816/Paint
Baudville
1001 Medical Park Dr. SE
Grand Rapids, MI 49506
$75.00

GraphicWriter
14011 Ventura Blvd., Suite 507
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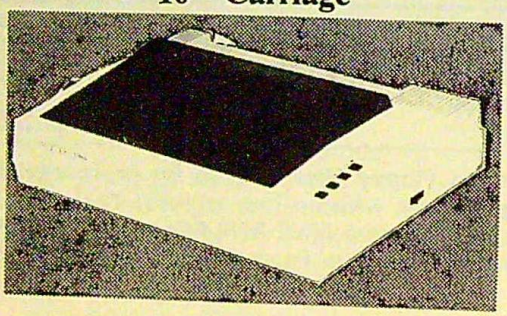

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Apple IIGS
Software Buyer's Guide

The Apple IIGS is a computer of power and promise. The power is evident in the computer's sophisticated graphics and sound capabilities—from the super hi-res resolution to the Ensoniq sound chip. The promise, as with all computers, is in the software that's either available or planned.

The software for the newest Apple II ranges from reworkings of popular programs—like *The Print Shop* or *Managing Your Money*—that take advantage of the IIGS's colors or increased memory, to totally new packages that couldn't have been written for any other machine—programs like *DeluxePaint II* or *Talking Text Writer*.

What with this computer's strengths, it's natural that much of the new IIGS software is graphics oriented. Paint programs, some which emulate the Macintosh's *MacPaint*; drawing programs which let you create and manipulate objects with ease; and even desktop publishing programs are just some of what's now available.

Educational software for the IIGS is also starting to make an appearance. That, too, isn't surprising, knowing the number of the IIe computers in classrooms and the soon-to-be-available upgrade from the IIe to the IIGS. Software which takes advantage of the IIGS's sound and speech abilities has already been released. Talking word processors, talking math programs, and talking spelling software are just the first of many products that will entertain and educate at the same time.

The list here isn't an all-encompassing one—instead it presents a variety of the known IIGS programs now (or soon to be) available. Note that prices and availability are subject to change.

Name	Price	Publisher/ Vendor	Category	Description
Business and Personal Productivity				
AppleWorks 2.0	$250.00	Apple Computer	Intregrated package	The IIGS can only run *AppleWorks 2.0*—the newest version of the popular integrated package of word processor, spreadsheet, and database manager.
Award Maker	$39.95	Baudville	Desktop publishing	Create professional quality certificates with colored, detailed borders, specialized graphics, and personalized messages. Easy-to-follow program for creating certificates or awards for any occasion.
Calliope 128	$59.95	Innovision	Productivity	Idea processor and brainstorming tool which clusters ideas and concepts in a structure of the user's choosing.
CommWorks 16	$49.95	PBI Software	Communications	Communications program which features mouse support, color, fonts, pull-down menus, and more. Tranfer formats include ProDOS/*AppleWorks* file transfer, XMODEM, ASCII, and AppleBinary.
DeluxePaint II	$99.95	Electronic Arts	Graphics	A full-featured paint program with 4096 colors, a variety of brushes, zoom capability, variable resolutions, 3-D imaging, fill commands, and variable page size.
DeskTop	$29.95	Simple Software	Productivity	A collection of desktop tools—enhanced calculator, enhanced control panel, scrap book, note pad, cursor editor, and more.
Drawing Table	$89.95	Brøderbund	Graphics	Hi-res object-oriented drawing program that supports the LaserWriter and color printing on the ImageWriter. Built-in rulers aid in precision drawing of everything from floor plans to architectural renderings.
816 Paint	$75.00	Baudville	Graphics	Paint program designed to work with all graphic modes available in the Apple II family. Works in the super hi-res modes of the IIGS.

Name	Price	Publisher/ Vendor	Category	Description
Fantavision	$59.95	Brøderbund	Graphics	Animation and special effects tool which uses the crisper colors, increased processor speed, and super hi-res graphics capabilities of the IIGS. Also supports the computer's impressive sound abilities.
FutureSound	$149.95	Applied Visions	Sound	A digital sound recording package to record, edit, and save digitized sounds directly on the IIGS. Hardware includes two input sources, input volume control, and a microphone.
GraphicWriter	$149.95	Datapak Software	Word processor	Graphics, text, and paint program with over 40 colors available. All three can be done on the same page at the same time.
Managing Your Money	$199.95	MECA	Financial	Personal financial software integrates nine packages for small business and home financial planning. Features accounts payable, accounts receivable, tax forecasting, and more.
MouseWrite 2.6	$149.95	Roger Wagner Publishing	Word processor	Word processor which is now available for the IIGS, *MouseWrite* features pull-down menus, mouse control, mail merge, communications, and a spelling checker. Downloadable fonts and color printing. Shipped in both 5¼- and 3½-inch disk formats.
MultiScribe GS	$99.95	StyleWare	Word processor	Mouse-based word processor that lets you select fonts, character sizes, and type styles. Print on dot-matrix or laser printers.
Music Construction Set	$49.95	Electronic Arts	Music	Compose music, play it back, and print out sheet music. Eight digitized instruments, longer songs, hi-res graphics, and MIDI output are just some of the new features in the IIGS version.
Newsmaker	$89.95	Brøderbund	Desktop publishing	Personal publishing package for the IIGS, *Newsmaker* offers a variety of tools, borders, graphics, and printing capabilities. Design and lay out newsletters, flyers, reports, and presentations.
PageWorks	$125.00	Megahaus	Desktop publishing	Produce newsletters, price lists, publications, bulletins, and more with this desktop publishing program. What-you-see-is-what-you-get editing. Incorporate *AppleWorks* text files.
Paintworks Plus	$79.95	Activision	Graphics	Produce multicolored graphic designs that can come alive in full, animated sequences.
The Print Shop	$69.95	Brøderbund	Graphics	Takes advantage of the IIGS's super hi-res capabilities to aid in writing, designing, and printing greeting cards, signs, letterheads, and banners.
TopDraw	$99.95	StyleWare	Graphics	Object-oriented graphics program for the IIGS. Manipulate shapes and objects with ease. Draw with up to 12 colors at one time. Supports the LaserWriter and color printing on the ImageWriter II.
VIP Professional	$299.00	VIP Technologies	Spreadsheet	*Lotus* 1-2-3-like spreadsheet with more than 50 functions, a 8,192 × 256 cell worksheet, business graphics, and macro abilities. Full-feature mouse interface, color presentation graphics, and more. Reads and writes 1-2-3 files.
Visualizer	$99.95	PBI Software	Graphics	Present spreadsheet data from *AppleWorks* in graph form, using one of several graphic forms: bars, pies, lines, and scatter.
Writer's Choice Elite	$99.95	Activision	Word processor	Takes advantage of all IIGS features, including color. Integrates with *PaintWorks Plus* and includes the cross text feature as well.
Wordperfect Version 1.1	$179.00	Wordperfect	Word processor	A full-featured professional word processing package. *Wordperfect* will automatically reformat text, number pages, assist with hyphenation, and repaginate allowing for headers, footers, and footnotes.
Education				
CLS Marks	$98.00	Chancery Software	For teachers	Spreadsheet format grading program. Incorporates color and a Macintosh-like interface. View or print students' reports.
First Shapes	$49.95	First Byte	Basic skills	Ted E. Bear helps children ages 3–8 build toys using basic geometric shapes and problem solving.
Homework Helper: Math Word Problems	$49.95	Spinnaker Software	Math	An upgraded package which helps students in grades 7–12 learn step-by-step methods for completing math homework assignments. A built-in calculator solves the equations created by the student.
Homework Helper: Writing	$49.95	Spinnaker Software	Composition	An upgraded package, *Homework Helper: Writing* deals with essays and book reports. Teach students to form and express ideas, then organize the idea into an outline before writing, editing, and printing.
KidsTime II	$39.95	Great Wave Software	Basic skills	Two educational programs—*ABKey* is a letter recognition/keyboard skill program, and *KidsNotes* allows children to play, compose, and experiment with an assortment of simple melodies. Ages 3–10.
KidTalk	$49.95	First Byte	Composition	Children can write, hear, and read their own stories, reports, poems—any form of writing—with this talking notebook. Can correctly pronounce 95 percent of all English words.
MathTalk	$49.95	First Byte	Math	Talking Professor Matt A. Mattics helps children solve addition, subtraction, multiplication, and division problems. Children enter own math problems and receive spoken assistance.
Reader Rabbit	$49.95	The Learning Company	Reading	Four games take advantage of the speech capabilities and enhanced graphics of the IIGS to teach children ages 5–7 the basics of early reading, spelling, and vocabulary.
Speller Bee	$49.95	First Byte	Spelling	Combines speech and enhanced graphics in a spelling mastery program. Ages 5–13.
Talking Text Writer	$249.95	Scholastic Software	Composition	Combines a word processor with a speech synthesizer. Designed to help children in grades K–6 improve their reading and writing skills. Available in both home and school editions.

If you have children, get ready. Sooner or later they'll want a computer of their own. Here's what you'll need to know when that day comes.

What every parent needs to know about computers

Stephen Levy

You walk through the door and your eight-year-old almost knocks you down. She's talking at that speed only children use as she tells you about something new at school. A special class, a computer, her next birthday, how much fun the class is, what she learned on the computer, not very expensive....The last few words sound an alarm in the parental part of your brain.

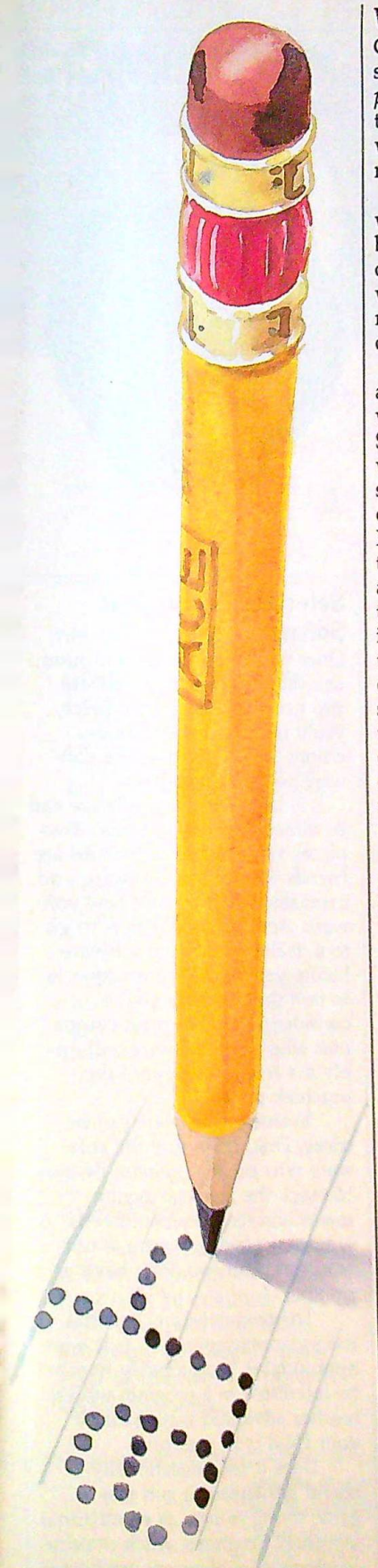
The two of you manage to catch your breath and you ask her to begin again, this time at adult speed. Once everything's sorted out, you realize what's causing the excitement. Today it was her turn to begin a special three-week class on using computers. The bottom line? She loved it, and wants a computer to call her own. That alarm is ringing full tilt now.

You'd heard that the school board had purchased personal computers for the classroom, but have never been quite sure what they were doing with them. Now you've learned, from your daughter's point of view at least, what a marvelous learning and motivating tool computers can be. And she just *has* to have one of her very own.

You're pleased with her reaction, but are you ready to buy a computer? And if so, how will you translate your daughter's initial enthusiasm into durable, sensible purchase, something that will help her throughout her education?

Unlike most appliances—toasters, for example—a computer has no single purpose. Because it can do so many things, an almost bewildering array when you think about it, it's hard to come up with that one obvious application. Like millions of other people, you'll have to ask the famous question: *Just what does a computer do?*

Answering this question will not only give you a reason for spending the money, but will also help you select the right computer.



Write And Write Again

Currently the most popular personal computer application is *word processing*. For those who've written with pen and paper or a typewriter, word processing is a revolutionary experience.

Imagine writing just as you would on a typewriter, and then being able to easily make changes or even move whole paragraphs with just a few keystrokes. No more retyping an entire page because you found an error.

But it's not just businesses and individuals that have seen what a word processor can do. Schools have discovered that word processor software and personal computers make an excellent aid to teaching writing. From kindergarten to college, a teacher can now give a writing assignment, read it, make corrections, and suggest improvements in style; then the student can return to the computer, make the changes, move text around, and so on—all without having to retype the entire paper. The process of writing and rewriting is focused on what's written rather than the manual chore of typing, scratching out, and making margin notes.

Word processing programs are available for all of the popular personal computers. Note, though, that word processor programs vary greatly in features and ease of use.

What's Educational?

A more obvious reason to buy a computer for a child is to run educational programs. If this is your main reason for purchasing a personal computer, you'll need to check the type, number, and quality of the educational programs created for the computer you're considering.

Drill and practice, mundane as it is, is an important teaching method. Writing words down 25 times may be boring, but it teaches spelling. Reviewing a set of facts in a question-and-answer dialogue form has helped students learn information for centuries.

One of the first educational uses of personal computers was just such repetitive drill. For example, a teacher would write a program which presented a student with ten random math problems. The student entered the answer and the computer responded with *CORRECT* or *SORRY, TRY AGAIN*. The computer never got tired, though the student may have. The idea was a good one. A computer was a perfect tool for drill and practice.

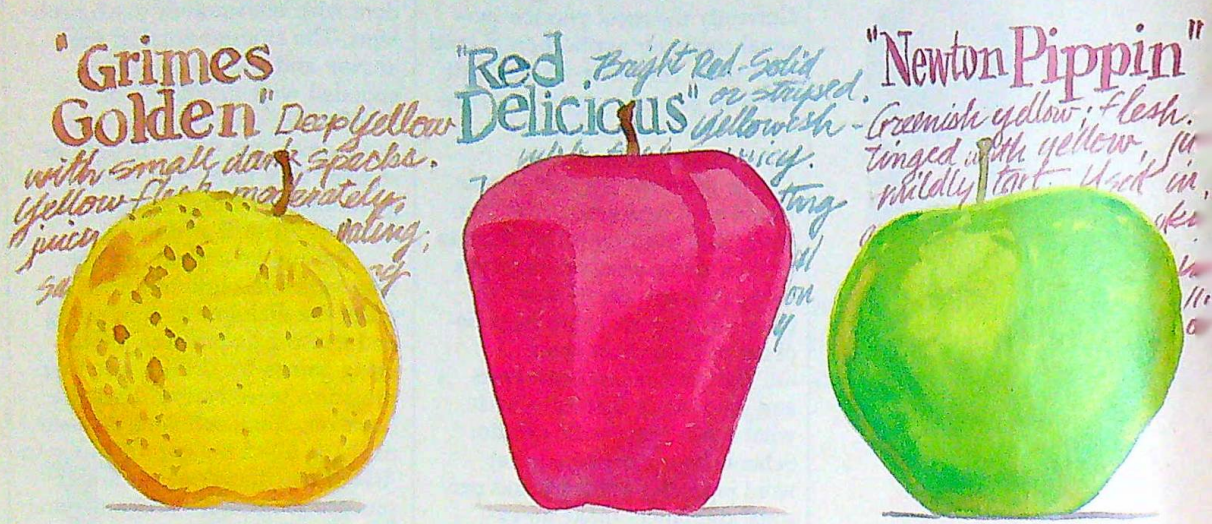
But unlike a good teacher who varies the drill and tries to make the dialogue as interesting and exciting as possible (often using games for drill), these first programs were boring. Recently, however, some software publishers have filled the gap. It's easy to find good educational drill and practice programs—programs that hold a child's interest.

Another type of educational software teaches new concepts, rather than simply reinforcing things already learned. Imagine an application that teaches homonyms (words that sound the same, but are spelled differently and have different meanings). The program might present stories in the form of a series of animated pictures. Each story might illustrate the meaning of each of the words which sound alike. A simple example might be two stories that present the meanings of *hear* and *here*. The next part of the application would require the student to respond to a new picture with the correct word.

A third kind of software used in the schools today helps students develop decision-making skills. This kind of learning is most often presented in game form. Information is provided and the child tries to solve the problem based on that information. Depending on the child's decision, the program *branches*, or moves toward one conclusion or another. Clues are given which a player must evaluate before making the next decision. The many adventure games now available are essentially problem-solving games.

Choosing Your Computer

If you've decided to buy a computer, the next question is, *which one?* The choice can be difficult. Deciding which to buy is a matter of determining what you're going



to do with it, then finding models and software that meet your needs and are in your price range.

Price. You'll need more than just the computer. At the very least, you'll want a disk drive to permanently hold information and programs (but some systems, like the Apple IIc and the Atari 1040 ST, come with disk drives built-in). Of course you'll need a display screen. A television set can be connected to most computers, but you'll probably be happier with a monitor, with its sharper images. If you expect to do word processing, you'll also need a printer. And don't forget cables to connect everything.

Be sure to include everything you want in the total price before comparing costs. Computer marketing varies with the manufacturer and distributor. Some stores will give you a complete system price, while others will charge you extra for each piece, including cables.

Software. A computer is nothing without the right software. Again, before deciding what computer to buy, decide what you want to do with it; *then* search for the software. If the software you need doesn't exist for the computer you're considering, you'd better start looking at other computers.

Many parents opt for the same computer their children use in school. Like adults, children feel more comfortable with the familiar. But do consider whether or not your reasons for buying a computer differ from those of the school.

Hardware. Do you want a monochrome (black and white) Macintosh or a color Apple IIe? Do you need 64 kilobytes of RAM (one kilobyte, or one K, of RAM is equal to 1024 characters), 128K, 512K, or more? This can be a difficult decision because most first-time computer buyers have problems understanding how memory is used. Also, memory is often used differently by different computers. Again, perhaps the best approach is to examine the software you want to use. Check the memory requirements of the programs you plan to buy (they will be printed on the packages). Will they work on the system you want?

Applications such as word processors, databases, accounting packages, and speadsheets usually require more memory than educational software. If you plan to use your computer for business or personal finance, you may want more memory. For many, expandability is the answer. Some computers are hard to expand—adding memory and additional equipment ranges from difficult to impossible. Other computers provide for simple expansion.

Selecting Educational Software

Once you've selected a computer, one that includes the hardware you need and meets your price, you'll need to make more decisions, this time about the software you want to buy.

Finding the right software can be difficult for the beginner. Two places you can look for advice are friends who've used software and magazine reviews about new software. Another good idea is to go to a dealer and try the software before you buy. An alternative is to rent the programs you're considering. In fact, most companies which rent software will apply the rental cost toward the purchase price.

Evaluating software can be tricky. First, make sure the software runs on your system. Be sure to check the memory requirements and its equipment needs. A word processing program is not worth much if you don't have a printer.

The next criterion concerns the program's approach. Is it age-appropriate? You probably won't be interested in a program which teaches advanced math skills if your child is in preschool.

Does it use educationally sound principles, or is it just a game trying to pass as educational software? Programs which require continuous involvement are better

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School And Computers

Since the beginning of the 1980s, personal computer use in the classroom has increased dramatically. And *how* those computers have been used has changed just as rapidly, as teachers and school administrators struggle to find the best approaches to differing curricula, classroom situations, and computer availability.

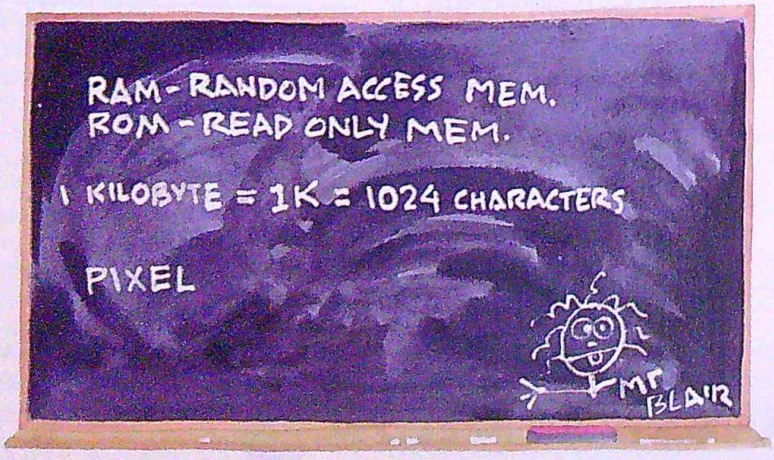
A number of school systems began to experiment with computers in the late 1970s, buying one machine, perhaps two, per school. In elementary schools, only a few students used the computer. Parent volunteers helped, and many taught computer programming (how to write the instructions the computer will carry out). In high schools, personal computers began to be integrated into existing courses in data processing.

Soon thereafter, schools began to talk about computer-aided instruction (CAI). The first CAI programs were often written by teachers to help students practice specific skills, like addition or multiplication. Most programs lacked the things—graphics, sound, a story line—necessary to maintain a child's interest. In fact, most programs were little more than electronic versions of math problem worksheets.

Some software companies, though, began producing applications which did live up to the initial excitement for CAI—programs that were more than mere repetitive practice. And the number of quality educational software programs available continues to increase each year.

The next twist came when some educators decided that America's youth needed to be *computer literate.* The argument was simple: Computer technology is all around us. We're confronted with a computerized world—everything from library card catalogs to automatic tellers. And educators figured that it was the schools' responsibility to help young people cope with this new computerized age. The problem, though, was that it was the *adults,* more than the children, who needed to learn about this new environment.

Although computer literacy is not quite as popular as it once was, CAI and programming curricula continue to mature and improve. The great expectations schools had for their computers during the early 1980s have evolved into more realistic goals. Personal computers are now seen as just another medium, one that educators use along with many other techniques.



than one that only requires an occasional response. Watch out for simple question-and-answer programs. Ask yourself this question about the software—*Could the same thing have been done in a book?* In other words, is the software taking advantage of the power of a computer, or is it simply an electronic text?

What are the program's goals? Do you agree with them? Are they what you want your child to learn or practice at this stage in his or her development? And, just as important, does the program appear to be aimed at those goals?

How easy is the program to use, and how good is the documentation? A program which is frustrating, or takes hours to learn, may never be used. And finally, will the presentation hold the child's attention: Is it both interesting and challenging?

It's Up To You

The ultimate decision is, of course, yours: whether your child (and others in the family) would find a computer in your home as useful as the computers at school.

But by keeping some things in mind—from what you'll use the machine for, to what to look for in software—you're less likely to make an uninformed decision. With some time and thought, you should be able to translate your child's initial enthusiasm into a permanent benefit to his or her education. aa

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Stephen Levy is a parent, a former educator, and COMPUTE!'s Book Division Editor.

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Arts And Crafts Go Digital

Dan Gutman

Print certificates, build toys, write comic books, make party favors, design T-shirts, create calendars, and more—all with your Apple II or Macintosh personal computer. Author Dan Gutman takes a look at this new wave of unusual—and unusually interesting—software.

Most kids love making lanyards, clay ashtrays, and popsicle-stick sculptures in school and summer camp. Now they can make them at home. It's the latest trend in software—computer arts and crafts. New programs are helping children of all ages make things we can print out and hold in our hands: Arts and crafts meets The Information Age.

Award-Winning Software

Certificate Maker (Springboard Software, $50, Apple II) is one of the niftiest little programs to come along for personal computers in a long time. It's essentially a disk filled with 220 predesigned award templates. Just about any type of award imaginable is here, for everything from sports and academic achievement to children's activities, religion, and business.

You can print up a "Community Service Award" for a member of your first-aid department or a "Spelling Award" for the kid in the class who gets *philatelist* right on the first try. "The World's Greatest Athlete" will certainly want a certificate up on the wall attesting this claim, and you can also give a certificate to the local "Computer Whiz Kid."

Any of these awards can be personalized, printed out, and passed out to all deserving—or undeserving—parties. There are 24 border designs to choose from (including little hearts or bears), and five different type styles for writing personal messages. It takes about five minutes to set up the certificate on the screen and a few more minutes to print it (black and white only).

The program can have practical applications for teachers, bosses, camp counselors, and presidents of organizations. But mostly, it's just fun. Who could resist awards like "Company Clown," "Greatest Backyard Chef," or "Foot In The Mouth Award"?

How would you like to get up on stage and be presented with a "Bad Haircut Award"? It's about time somebody came along with a nongame program that lets us laugh at ourselves. Or our friends.

Most of the awards feature graphics which relate to the topic. The "Fishing Award" shows a guy in a boat fighting with a boot at the end of his line. On the "Murphy's Law Degree," the word *Degree* doesn't quite fit on the certificate. To make your awards look even more professional, three dozen gold foil seals and colorful stickers are included in the package.

The only problem with *Certificate Maker* is that you can't invent your own categories, draw your own graphics, or move the graphics from one certificate to another. However, you can partially customize each template with a variety of type fonts and borders.

The arts-and-crafts fever that's suddenly gripping the home computer publishers is a direct offshoot of the desktop publishing phenomenon, currently taking the business world by storm. The wave can be traced back to Brøderbund's *The Print Shop*, which is used to make homemade greeting cards, signs, and banners. The success of this program, and of Springboard's bestselling *The Newsroom*—which creates newsletters—has spawned the current wave of arts-and-crafts-ware.

Your Own Toy Factory

The latest addition to this genre from Brøderbund is even more intriguing—*The Toy Shop* ($65, Apple II/Macintosh). This one can turn any kid's (or adult's) computer into a personal toy factory.

Back in the days before computers, kids used to make

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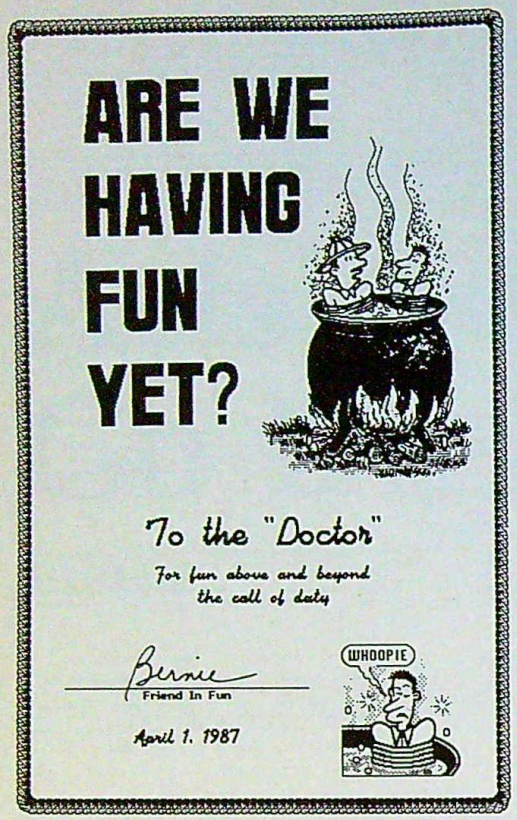
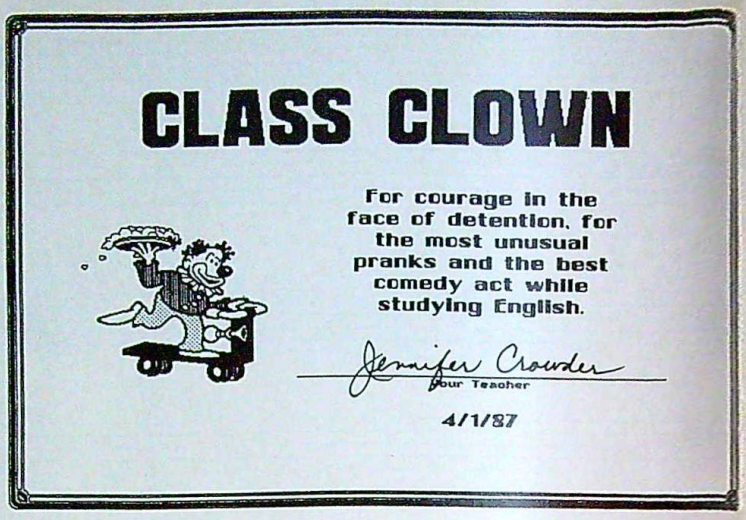
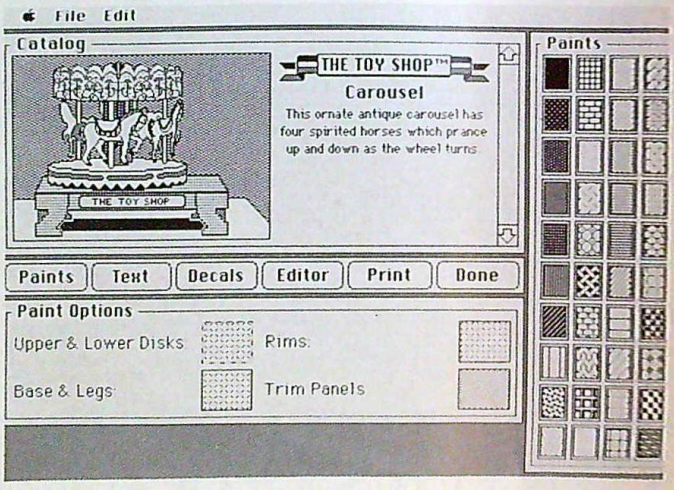




Certificate Maker *lets you create customized certificates using 200 predesigned templates. The just-released* Certificate Maker Library, Volume 1 *offers 105 additional certificates and 24 new borders.*



The Toy Shop *on the Macintosh lets you "paint" the toy with various patterns before you print it out.*

their own toys. A beat-up broom handle made a great stickball bat. A piece of rope lying around could be turned into a jump rope or cat's cradle. A branch from a tree made a better slingshot than any you could buy, and you had the added satisfaction of knowing you carved the thing with your bare hands.

The Toy Shop brings back the grand tradition of homemade toys. This is a construction set, but not like the ones you've seen. The program actually makes it possible to build real three-dimensional mechanical toys—toys that work.

The disk contains 20 graphic-image outlines of toys: a jet dragster, oil pump, zoetrope, steam engine, medieval catapult, equatorial sundial, carousel clockwork bank, tractor crane, antique truck, glider, flying propeller, a replica of *The Spirit of St. Louis*, and others.

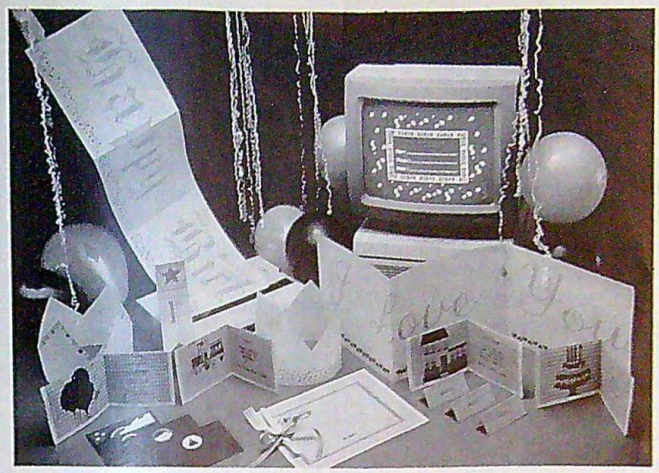
After you choose which toy you'd like to build, it appears on your screen. All the parts of the toy are represented as line drawings. You can personalize the images by adding text (for example, "Greg's Jet Dragster") or graphics. The program comes with computerized decals of flowers, American flags, dollar bills, and so on. These can be positioned on the surfaces of the toy, or you can create your own graphic images.

Next, you simply print out the toy on normal computer paper. *The Toy Shop* includes 25 sheets of stiff adhesive cardstock. You stick on your printout, cut it out along the dotted lines, color it in if you'd like, and assemble the toy. The program comes with wire, wooden dowels, rubber stripping, and balloons, which are needed for some of the toys. The only supplies you need to furnish are your own glue, scissors, ruler, knife, and enthusiasm.

The best thing about *The Toy Shop* is that every toy *does* something. The rubber band–powered helicraft really flies. The equatorial sundial tells accurate time. The horses on the turn-of-the-century carousel prance up and down. These aren't just screen images for you to look at.

Craig Marrimer of Casper, Wyoming has built five of the toys with his 12-year-old daughter, Chay. "I'm a longtime model builder," says Marrimer. "I thought it would be something we could work on together."

Some of the toys are easy to



With CardWare, *you can create place cards, hats, cards, and banners for almost any party.*

Select one of 50 predesigned pictures (or create your own), print it on transfer paper, and iron it onto a T-shirt. T-Shirt Shop *lets you create your own T-shirt designs, and even includes your first "blank" T-shirt.*

put together; others are pretty tough. Brøderbund suggests the program for anyone over the age of 12. A young person can't go too far wrong—if you make a mistake on your toy, you can just print out another copy and start again.

Twenty toy designs for $65? It's a bargain when you think about the price of some of today's toys. And who would think the computer would turn us back toward old-fashioned pastimes?

Be A Comic Genius!

In 1984, Mike Saentz and Peter Gillis created the world's first comic book produced entirely on computer—*Shatter*. Since last year, with the release of *ComicWorks* (Mindscape, $80, Macintosh), anyone can create their own computerized comics.

ComicWorks functions like most other graphics programs, but it has been tweaked so that it specializes in comics. A library of canned images is included (spaceships, planets, faces) that you can use as is or edit for your own creations. The graphics were drawn by *Shatter* artist Mike Saenz. They look great on the sharp Macintosh screen, and even better after you've colored them in.

As with a real comic, there are dialogue balloons and thought balloons of all sizes, which you can position around the screen to get your characters talking. Of course, you enter the text on the computer, and jazzy lettering makes the words leap off the page in true comic-book style.

For younger comic geniuses, there's *Walt Disney Comic Strip Maker* from Bantam ($40, Apple II). This program doesn't let you do the drawing. Instead, it includes 180 ready-to-use images of Mickey, Minnie, Goofy, and other Disney characters in many poses. You can move them around the screen, put them in different backgrounds, or flop them backwards. Dialogue balloons can be positioned anywhere on the screen, and you can fill them with a prewritten phrase or with one of your own. Then the comic can be printed out in black and white or color (color only if you have the right printer, such as the ImageWriter II).

Party Favors

As long as we're on the subject of Disney, the perfect program for a children's party is *Walt Disney Card & Party Shop* (Bantam, $40, Apple II). This one also contains graphics of favorite cartoon heroes, which can be printed out to create invitations, name tags, banners, wrapping paper, place mats, and other party paraphernalia.

That's not all. With *Mask Parade* (Springboard, $40, Apple II) or *Color Me* (Mindscape, $30, Apple II) kids can create stickers, buttons, coloring books, masks, badges, and jewelry. And using the *CardWare/HeartWare/PartyWare* line from Hi Tech Expressions ($10–$15, Apple II), you can send friends and loved ones three-minute personalized, animated greetings, or print your own party hats and ribbons.

For adults, there's *Murder Party* (Electronic Arts, $40, Apple II). Usually, when someone's murdered in your house, it doesn't make for an enjoyable evening. *Murder Party* is an exception. It's a game in which one of the guests is mysteriously "killed" and everyone else has to search for clues, interrogate each other as witnesses, and try to solve the crime. All the invitations, personalized clue booklets, evidence, and rules are printed out on your printer.

Quilts And T-Shirts

Maybe you'd rather stay home at night and sew. *Patchworks* (Random House, $50, Apple II) is perfect for anyone who makes patchwork quilts, needlepoint, stained glass, mosaic tile, or tapestry. It's basically a graphics program. The computer can take part of a design and "stamp" it all over the screen. You can create an infinite number of patterns by

CardWare/HeartWare/ PartyWare
Hi Tech Expressions
2699 S. Bayshore Dr.
Coconut Grove, FL 33133
305-854-2318

Certificate Maker
Mask Parade
Springboard
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Minneapolis MN 55435
612-944-3915

Color Me
ComicWorks
Mindscape
3444 Dundee Rd.
Northbrook IL 60062
312-480-7667

Create a Calendar
Epyx
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Redwood City, CA 94063
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The Great International Paper Airplane Construction Set
Simon & Schuster
Gulf + Western Building
One Gulf + Western Plaza
New York, NY 10023
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Murder Party
Electronic Arts
1820 Gateway Dr.
San Mateo CA 94404
415-571-7171

Patchworks
Random House
201 E. 50th St.
New York, NY 10022
212-872-8036

The Toy Shop
Brøderbund
17 Paul Dr.
San Rafael CA 94903
415-499-8661

T-Shirt Shop
Spinnaker
One Kendall Square
Cambridge MA 02139
617-494-1200

Walt Disney Comic Strip Maker
Walt Disney Card & Party Shop
Bantam
666 Fifth Ave.
New York, NY 10103
212-765-6500

laying down blocks, multiplying them, rotating them, inverting them, cycling them through colors, or making mirror images.

All the repetitive drudgery is taken care of, so the quilter can concentrate on creating designs. Instead of spending hours arranging and rearranging the patterns with paper or cloth, you can experiment endlessly with hundreds of designs on screen. When everything's perfect, just print out the design and use it as a blueprint for stitching your quilt.

For the T-shirt crowd, there's Spinnaker's new *T-Shirt Shop* ($50, Apple II). Another specialized graphics program, *T-Shirt Shop* includes all kinds of type styles and 50 predesigned pictures for your shirt—horoscope symbols, Ronald Reagan, Albert Einstein, even a Ninja warrior. You can also create your own graphics.

Next, you print out your design on a piece of transfer paper that comes in the program. This gets ironed right onto your T-shirt—there you have it, a homemade, personal statement that you can wear on your chest. Spinnaker even throws in a T-shirt with the package to get you started.

Up, Up, And Away

Back in 1966, *Scientific American* ran a contest in which readers were asked to send in their best designs for paper airplanes. To everyone's surprise, 11,851 entries poured into the magazine's offices. The contest spawned a successful book, films, a doctoral thesis, and even a computer program—*The Great International Paper Airplane Construction Set* (Simon & Schuster, $40, Apple II/Macintosh).

The program contains designs of some of the winners from that contest, as well as other paper airplane designs. There's a library of aviation graphics within the program too, so you can personalize your airplane with landing gear, bombs, stars, stripes, and even flight attendants. These can all be edited to your liking, or you can invent your own fuselage embellishments. Then just print the plane out on you printer, fold it on the dotted lines, and let it fly.

Futuristic Crafts

What's the future of high-tech arts and crafts? The computer industry has come to realize that just about *any* printed material can be printed using a computer. You can almost hear the wheels turning in Silicon Valley.

For example, by the time you read this, Epyx will have released a program called *Create a Calendar* ($30, Apple II). The program does exactly what the title says. You can make a daily, weekly, monthly, or yearly calendar for yourself using any year from 1753 (for the curious) to 9999 (for the optimistic). Like most of the programs already described, *Calendar* will include a wide variety of type fonts, borders, and graphics on the disk, and more graphics can be imported from any *Print Shop*–compatible program. It will even be possible to repeat an event at regular intervals throughout the year automatically, like a Boy Scout meeting which occurs on the second Thursday of every month. aa

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Dan Gutman's latest book is titled I Didn't Know You Could Do THAT With A Computer! *(COMPUTE! Books).*

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AppleWorks Forever

Christopher Van Buren

AppleWorks *is—by far—the bestselling software package for the Apple II series of personal computers.* AppleWorks *expert Christopher Van Buren explains what makes the program so popular, and lists some add-on programs which customize* AppleWorks.

What makes one program stand out from all others in its class? Is it the number of features, its ease of use, or something even more subjective?

Perhaps one of the best indicators is simple popularity. There's more to software than raw performance and power, and a large number of satisfied users is one of the strongest software recommendations around.

And when it comes to numbers of users, *AppleWorks* comes out far ahead of any other Apple II product. Apple claims that there are over 500,000 *AppleWorks* users—other sources say that the number is closer to one million. Whether half a million or twice that, these numbers provide stability. With that many people relying on *AppleWorks* for business and education, it's unlikely that another program will take its place. And first-time computer users feel safest with a product that has been tried and tested.

A Stable And Secure Investment

When you spend $2,000 or more for a computer, monitor, printer, disk drives, and other equipment, you hope the investment isn't just temporary. You want to believe that the computer won't quickly become obsolete. With its huge following, *AppleWorks* has insured the longevity of the Apple II computer. In fact, since *AppleWorks* was introduced, there has been a strong revival in the Apple II market.

More copies of *AppleWorks* have been sold than of any single Apple II program—ever. Its integration of word processing, database management, and spreadsheet analysis has made *AppleWorks* virtually a necessity for many Apple II users.

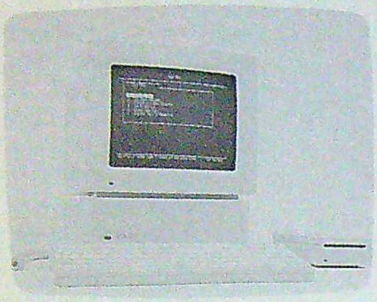
Ironically, however, most *AppleWorks* users don't take full advantage of its powers and expandability. Many users have never ventured into the spreadsheet, using only the database and word processor. Learning to use a spreadsheet for the first time can be a challenge. But here's where the abundance of *AppleWorks* users can help. Most likely, somebody is already doing what you want to do with *AppleWorks*.

AppleWorks Users Can Help

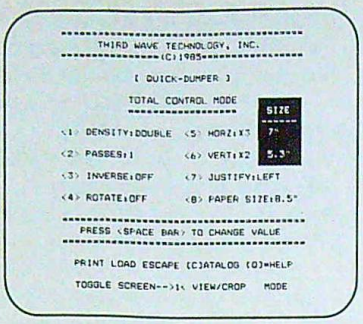
A huge following does more than just increase a product's life span. It provides a wealth of information for solving problems with your computer and software. *AppleWorks* user groups are sprouting up all over the country. Local Apple groups are forming *AppleWorks* SIGs (Special Interest Groups). And there are a few national groups dedicated to *AppleWorks*, with memberships in the thousands.

User groups often have libraries which include scores of public domain programs and *AppleWorks* templates (predesigned files). Most user groups publish newsletters with reviews of software products, tips, and other pertinent information. Just as important are user group meetings, where local *AppleWorks* experts are usually available to answer questions.

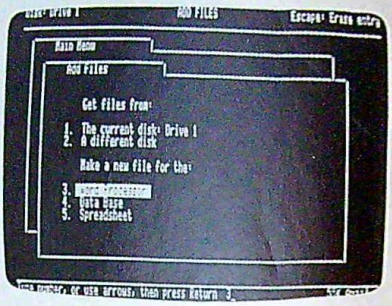
Additional help can be found in the number of good *AppleWorks* publications around—a recent count yielded over 30 *AppleWorks* books.



Quicken, *a check-writing and -printing program, works on the Apple IIGS. The program writes and prints your checks, helps balance your bank statement, and even transfers data to* AppleWorks *so that you can analyze your expenses and income.*



"Quick-Dumper" is just one of the five printer support utilities found in Print-Quick. *With Quick-Dumper, you can print all or part of any hi-res screen.*



AppleWorks' *familiar file folder–like desktop is just one of the things that have made it the bestselling program for the Apple II–series computers.*

Adding To *AppleWorks*

But all the user groups and help in the world can't change *AppleWorks* itself. You may find ways around some of the deficiencies in *AppleWorks*—taken individually, the program's three modules can't stack up against more powerful stand-alone software—but to truly get the most from *AppleWorks*, to make it do exactly what you need and want it to do, you'll need help from a different quarter.

AppleWorks scores even more points here, for it's supported by a variety of third-party software and hardware manufacturers. Using add-on products from third-party companies, you can customize your *AppleWorks* system so that it rivals any specialized software on the market.

There are three levels of add-on products for *AppleWorks*. Some products merely exchange files with *AppleWorks* files or let you convert files between the programs. After converting an *AppleWorks* spreadsheet, for example, you might use a graphing program to graph the data.

Other products can read *AppleWorks* files directly, even though these programs are separate, stand-alone software. For example, *FontWorks* from The Software Touch reads *AppleWorks* word processor files and then prints them with fancy fonts. You must leave *AppleWorks* to use these kinds of add-on products.

The highest degree of compatibility is found in the programs that "patch" *AppleWorks*. A program that patches *AppleWorks* actually changes *AppleWorks* itself—on a source code level. Patches usually add features or correct problems in *AppleWorks*. Most important, however, is that these programs are not separate from *AppleWorks*. They become part of *AppleWorks*. You never have to leave *AppleWorks* to use them.

Such power is not without drawbacks: Often, patches made by different manufacturers won't work together. Patching *AppleWorks* can also be confusing. Sometimes several patches are needed before your system works properly. And if a manufacturer updates its patch program, you usually have to repatch everything. But for the dedicated *AppleWorks* user, patches are difficult to live without.

Some Of The Enhancements

If you're an avid database user, you'll find many products that increase the size of the *AppleWorks* database. Most companies which create memory expansion hardware for the Apple II also provide an *AppleWorks* add-on that increases the program's database limits—letting you take advantage of the extra memory. Companies like Applied Engineering and Checkmate Technologies lead the field in these enhancements (which, by the way, are patches).

If you've run into limitations building database reports, you can expand these capabilities with a program called *ReportWorks* from Megahaus. *ReportWorks* lets you build any kind of report from *AppleWorks* information (including full-page forms) and lets you relate information among several *AppleWorks* files. You can sort these reports, calculate information in them, and even search for information. *ReportWorks* isn't a patch—it reads *AppleWorks* files and writes its files in *AppleWorks* word processor format. *ReportWorks* also enhances the *AppleWorks* spreadsheet, giving you more math capabilities.

Other spreadsheet enhancements include utilities which print sideways (for extra-wide spreadsheets), programs that provide graphing for data in spreadsheets, and more predesigned spreadsheet files than you can imagine. These predesigned files offer capabilities like trigonometric calculations, amortization, loan analysis, accounting, billing, and much more. Many of these templates are in the public domain, while others are available from commercial publishers.

You can also get word processor add-ons which offer more printing power for documents, including the ability to print using fancy type styles (fonts). Other

word processor add-ons correct errors in spelling and grammar. *Sensible Speller* and *Sensible Grammar* (both from Sensible Software) are two products in this category. Still other products provide mail-merging capabilities.

Accessories And Macros

Pinpoint Publishing introduced a completely new kind of add-on, called an *accessory*. An accessory is a small program which can be used while you're using *AppleWorks*. Popularized by the Macintosh computer (where the small applications are called *desk accessories*) and the IBM line (called *memory-resident utilities*), these programs include tools such as calculators, notepads, spelling checkers, and more.

Perhaps the most powerful kind of *AppleWorks* add-on you can get is a *macro* program. This lets you create, store, and run a macro—a series of keystrokes that have been "recorded" and which can be "played back" by pressing one or two keys—within *AppleWorks*. A simple macro might hold your name and address. By pressing one or two keys, you get the macro to automatically retype your name and address. Macros save time, and, when substituted for complex chains of commands, are easier to remember.

But macros can do much more than hold typed information such as names. They can also store commands and use functions—akin to a programming language. By combining these functions in a macro, you can overcome almost any *AppleWorks* limitation. For example, *Super MacroWorks* (Beagle Brothers) has sample macros that will automatically type the current date in several date formats (*AppleWorks* normally has only one date format), and one that will let you draw pictures in the word processor using characters.

These examples only hint at the tremendous power of macros. And you don't even have to create your own macros since many macros are available from publishers of the macro programs, and others from user groups.

It's easy to see why *AppleWorks* is the number-one program on the Apple II computer, and one of the top three bestselling computer programs ever. Just when you think you've mastered it, you'll find several new add-ons that increase its powers and give you more for your original *AppleWorks* investment. In a sense, *Appleworks* always seems to be growing and changing. It's a rich, protean program and, most users find, it's quite difficult to do without.

Christopher Van Buren is editor and publisher of AppleWorks Exclusive Reference *newsletter, and author of several books on* AppleWorks.

Add-On Software For *AppleWorks*

Macro Products

MacroWorks/Super MacroWorks
Beagle Brothers
3990 Old Town Rd.
San Diego, CA 92110
$34.95 (MacroWorks)
$49.95 (Super MacroWorks)

Super MacroWorks is probably the most powerful macro product available. It's flexible and full of features for creating custom macros. All special functions can be accessed in a record mode. Ten of its special functions can be used at any time during *AppleWorks*—it's like having more *AppleWorks* commands. Requires *AppleWorks* version 2.0.

Key Player
Pinpoint Publishing
P.O. Box 13323
Oakland, CA 94661
$49

Key Player has an easy-to-use interface. Recording custom macros is simple. *Key Player* has all the most important special macro functions such as logic statements, date formatting, and string functions. *Key Player* also works with other Pinpoint accessories.

AutoWorks
The Software Touch
9842 Hibert St., Suite 192
San Diego, CA 92131
$49.95

Like *Key Player*, *AutoWorks* also contains all of the important functions for custom macros. Overall, however, *AutoWorks* has the fewest functions of the macro programs. Newest versions of *AutoWorks* work with Pinpoint accessories on expanded memory. *AutoWorks* comes with an excellent mail-merge feature.

Print/Font Improvement

Power Print
Beagle Brothers
3990 Old Town Ave.
San Diego, CA 92110
$39.95

Power Print is a font downloader that lets you generate your own fonts to use on dot-matrix printers. It comes with several ready-made fonts and works with most printers and interface cards. You'll find this a useful program for adding borders and special graphics to your *AppleWorks* printouts.

Print Quick
Third Wave Technology
11934 Lorain Ave.
Cleveland, OH 44111
$49.95

Print Quick also lets you generate your own fonts and graphic images. It supports proportional spacing of fonts and offers a lot of space for creating a font. *Print Quick* comes with several other print enhancements, including a hi-res screen dump. Ask about extra font disks.

FontWorks
The Software Touch
9842 Hibert St., Suite 192
San Diego, CA 92131
$49.95

FontWorks is made specifically for *AppleWorks* word processor files. It provides excellent fonts and lets you use up to four fonts per file. You can alter the height and width of the fonts. This is a simple program to use.

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- ☐ Basic Electronics
- ☐ Electricians
- ☐ Small Engine Repair
- ☐ Air Conditioning, Heating, & Ref.
- ☐ Locksmithing & Electronic Security
- ☐ Photography
- ☐ Bookkeeping & Accounting

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Sideways
Funk Software
222 Third St.
Cambridge, MA 02142
$69.95

Sideways lets you print ProDOS, DOS 3.3, and *AppleWorks* spreadsheet files sideways down the length of the paper. Its main use is to print large spreadsheet files.

Slalom
Big Red Apple Computer
1105 S. 13th St., Suite 103
Norfolk, NE 68701
$5.00

Prints spreadsheets sideways.

Graphing/Graphics

GraphWorks
PBI Software
1111 Triton Dr., Suite 201
Foster City, CA 94404
$79.95

A graphing product made specifically for the *AppleWorks* spreadsheet. Import your spreadsheet data to *GraphWorks* and the graphs are generated automatically. Does have a limit in spreadsheet size that can be graphed. Graphs use hi-res graphics.

App-Stat
StatSoft
2832 East 10th St., Suite 4
Tulsa, OK 74104
$99

This isn't specifically made for *AppleWorks*, but it reads information from DIF files. Print your *AppleWorks* spreadsheet to a DIF file and you can use the powerful graphing capabilities in *App-Stat* to generate great-looking graphs.

Graph On
The Q-mar Group
5677 Oberlin Dr.
San Diego, CA 92121
$49.95

A set of template files for *AppleWorks*. The files use spreadsheet formulae to generate graphs within *AppleWorks*. The graphs, as a result, are low resolution, but are easy to manipulate and print within *AppleWorks*. The product shows you how to use the word processor to enhance the graphs. You can optionally print the graphs in color on the ImageWriter II printer.

Accounting

BusinessWorks
Manzanita Software
One Sierra Gate Plaza, Suite 200A
Roseville, CA 95678
$95 (System Manager, required)
$395 each (Accounts Payable, Ledger, Inventory modules)
$445 (Payroll module)

The most powerful (and the most expensive) accounting package available for the Apple II. This program has five modules and covers all the accounting tasks you might need. Reports can be printed to *AppleWorks* spreadsheet files so you can access the data in the spreadsheet.

General Ledger
The Q-mar Group
5677 Oberlin Dr.
San Diego, CA 92121
$89.95

A set of *AppleWorks* spreadsheet templates. The files are set up so that you can begin entering your transactions on a monthly basis. The program balances your accounts and prints your financial statements. Good for the small business that is currently using *AppleWorks*.

Quicken
Intuit
540 University Ave.
Palo Alto, CA 94301
$49

A check-writing and -printing program that works with *AppleWorks*. Enter your checks into the system and they're automatically printed. The complete check register can be printed to the *AppleWorks* spreadsheet so you can analyze the information.

Other

Pinpoint Accessories
Pinpoint Publishing
P.O. Box 13323
Oakland, CA 94661
$89

A complete accessory package for the Apple II. Since Pinpoint introduced their accessories for *AppleWorks*, they have made them work with many other Apple II programs and systems, including BASIC, *AppleWriter*, and others. Now Pinpoint has announced their *Toolkit*, which makes accessory programming available to anyone. Most Pinpoint products for *AppleWorks* are written in this accessory environment and work together. Accessories include a calculator, notepad, quick labeler, communications, and graph merge.

ThinkWorks
Megahaus
5703 Oberlin Dr.
San Diego, CA 92121
$49.95

ThinkWorks is an outline processor for *AppleWorks*. Although outlines are not entered into *AppleWorks* itself, you can print your work to an *AppleWorks* word processor file.

ReportWorks
Megahaus
5703 Oberlin Dr.
San Diego, CA 92121
$49.95

A powerful reporting program for *AppleWorks* spreadsheet and word processor files. Using *ReportWorks*, you can overcome many limitations in *AppleWorks*.

Templates

There are numerous templates available for *AppleWorks*. Here are a few sources:

The AppleWorks *User Group*
Box 24789
Denver, CO 80224

The Q-mar Group
5677 Oberlin Dr.
San Diego, CA 92121

Applied Scientific
416 Arnold
Boseman, MT 59715

Works Access
2636 Churn Creek Rd.
Redding, CA 96002

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Buyer's Guide
To Business Software

Apple's breakthrough into the business world has been nothing short of phenomenal. Last year was *the* year of the Macintosh—the introduction of the Macintosh Plus and the popularity of its power software made it Apple's designated business computer.

Over the last six months, more has been done to make the Mac an attractive alternative to IBM in business than ever before. There are more peripherals, from the LaserWriter Plus to several large display screens; more networking possibilities, from PhoneNet to TOPS; and especially more software, from seminal packages like *AppleShare* to integrated products like Microsoft *Works*.

Desktop publishing, word processing, and communications seem to be the most active areas in the Macintosh software world. That's evident in this guide—the number of word processors, for instance, has mushroomed with the unbundling of *MacWrite*. Networking and desktop communications—the latter, Apple's latest marketing phrase—has also increased in both the number and sophistication of packages.

The Apple II family of computers hasn't been disregarded by business, though—certainly not by small businesses or people who work at home. There are an impressive number of Apple IIe and IIc computers in businesses, and the introduction of the Apple IIGS offers an even better reason for investing in Apple II technology for the workplace. The trend toward making Apple II software more Macintosh-like—something started more than a year ago and best evident in the IIGS—is bringing a standard and easy-to-use interface to these machines.

This buyer's guide reflects a wide-ranging sample of the software products released between July 1986 and January 1987. It's not an exhaustive list, but it certainly provides a look at some of the newest and best business software.

Note that prices and machine availability may change at any time.

Name	Price	Publisher/ Vendor	Systems	Description
Word Processing				
Bank Street Writer Plus	$79.95	Brøderbund	IIe, IIc, IIGS	A 60,000-word dictionary, an online thesaurus, an editor, pull-down menus, and single-key commands are all included in this word processor.
Business Writer	$95.00	Stone Edge Technologies	II+, IIe, IIc, IIGS	Word processing and mail merge. Write anything from simple notes and memos to longer documents.
Feima	$395.00	WU	Mac, Mac+	Consists of a Chinese file manager, a Chinese word processor, and a multi-Chinese input system.
Fleet System 3	$79.95	Professional Software	IIe, IIc	Word processor—90,000-word dictionary; spell-checks ten pages per minute; thesaurus and mail merge.
Guide	$134.95	OWL International	Mac, Mac+	A hypertext system that incorporates the features of word processors and outline processors as well as information management and retrieval systems.
Habamerge	$49.95	Haba Systems	II, II+, IIe, IIc	Menu-driven form-letter and mailing-label program. Allows you to take your *AppleWorks* database and word processing files to create your own custom form letters and labels.
Habaword	$199.95	Haba Systems	Mac, Mac+	Allows you to view and edit text and graphics in multiple columns. Text may "snake" from the end of one column to the top of the next, as well as run vertically regardless of rulers or page breaks.
Laser Author	$199.95	Firebird	Mac	Full-featured word and page processor with sophisticated desktop publishing capabilities. Output to laser printers or digital typesetting computers via PostScript.

Name	Price	Publisher/ Vendor	Systems	Description
Megaspell	$59.95	Megahaus	II, II+, IIe, IIc	A spelling checker with a 40,000-word dictionary.
Microsoft Word 3.0	$395.00	Microsoft	Mac, Mac+	Fast word processing system offering flexible menus, page switching, page preview, the ability to place graphics and text side by side, and all other standard word processing features.
MindWrite	$125.00	MindWork Software	Mac, Mac+	Word processor with integrated outlining power, innovative editing, sorting, automatic labeling, formatting, and more.
MultiScribe 2.0	$69.95	StyleWare	IIe, IIc	Macintosh-like word processor with pull-down menus, multiple fonts, five print qualities, and header and footer placement.
Spelling Champion	$39.95	Champion Swiftware	Mac, Mac+	Three accessories to help write. Includes fast spelling checker for *MacWrite* and Microsoft *Word*, abbreviations expander, and document analyzer.
Thunder!	$49.95	Batteries Included	Mac, Mac+	A realtime 50,000-word spelling checker. Corrects your spelling as you type or corrects an entire document when you're finished.
Voilà!	$99.95	Target Software	Mac	A desk accessory outliner that supports the LaserWriter. Works under the Apple pull-down menu.
Webster's Thesaurus	$49.95	Target Software	Mac, Mac+	This library adds 45,000 entries, with up to 1.4 million combinations of synonyms, to *MacLightning*, the desk-accessory spelling checker.
Word Handler for the Macintosh	$79.95	Advanced Logic Systems	Mac, Mac+	Full-function word processing program for the 512K Macintosh and beyond. Incorporates the ease of use of *MacWrite* with the power of *Word*.
WordPerfect Version 1.1	$179.00	WordPerfect	IIe, IIc, IIGS	A full-featured professional word processing package. *WordPerfect* will automatically reformat text, number pages, assist with hyphenation, and repaginate allowing for headers, footers, and footnotes.
Spreadsheets And Database Management				
Basic Accounting Worksheet Macro	$9.00	Heizer Software	Mac, Mac+	This command macro sets up a user prompted X × Y worksheet, complete with numbered rows and columns. Compatible with *Excel*.
Customer Database	$15.00	Heizer Software	Mac, Mac+	Data entry form and database set up to record information about each customer. Compatible with *Excel*.
Filing System for AppleWriter	$99.95	Minuteware Publishing	IIe, IIc	Word processing or text-oriented filing system. There's no limit to field length, so you can store paragraphs, reviews, or other information.
Megafiler 2.1	$195.00	Megahaus	Mac, Mac+	File manager database. Prints out labels, mailing lists, and more.
1986 Federal Tax Forms	$39.95	SKY Computer Resources	IIe, IIc, IIGS	*AppleWorks* spreadsheet templates that calculate and reproduce 12 commonly used tax forms. *AppleWorks* required.
Omnis 3 Plus	$494.00	Blyth Software	Mac, Mac+	A complete business solution database including accounts receivable and payable, inventory control, sales management, and so on. Unlimited number of data files and simultaneous usage for up to 64 users.
Reflex on the Mac	$99.95	Borland International	Mac, Mac+	Relational database with various flexible layouts and calculation capabilities.
Sideways	$69.95	Funk SoftWare	II series	Prints wide *AppleWorks* spreadsheets on standard-width, continuous-form computer paper by rotating the text 90 degrees and printing lengthwise.
Tax Templates	$25.00	Heizer Software	Mac, Mac+	Forms for 1985 included 1040; 1040-ES; 2441; 3903; 4136; 4137; 4562; 4797; 5695; 6251; W-2; schedules A–G, R, SE, and U; and tax tables. Compatible with *Excel*.
Trapeze	$295.00	Data Tailor	Mac, Mac+	Versatile spreadsheet with more than 100 functions and formulas. Uses a block format rather than rows and columns.
Finances And Accounting				
Accountant's Choice Package	$297.00	Enchanted Software	Mac, Mac+	Versatile accounting package delivers ease of use, customized reports, database management. Limited only by disk space.
Asset Control Package 1.0	$295.00	Effective Solutions Consultant	Mac, Mac+	Reports by department, property code, type, and work order. Easy to use, this program has simple one-step data entry, selections, additions, and changes.
Decide Right Fixed Asset Accounting System	$500.00	Crowe, Chizek, and Company	Mac, Mac+	Management tool that calculates depreciation and generates reports designed to assist in the decision-making process.
Insight Accounts Payable	$594.86	Layered	Mac, Mac+	Supports either cash or accrual method of payable tracking. Capacities are unlimited.
Managing Your Money	$199.95	MECA	II series	Seven integrated programs such as checkbook management, tax planning, insurance and retirement planning, and portfolio management for home and small-business financial management.
On Balance	$99.95	Brøderbund	IIe, IIc	A personal-finance program with up to 175 different accounts like cash, checking, savings, auto, mortgage, and others.
Personal Accountant	$49.95	Softsync	II+, IIe, IIc	Double-entry bookkeeping system for personal or small-business use. Compiles financial reports and includes a name-and-address database.
Receivable/Payable Manager	$595.00	Microsystems Consulting	Mac, Mac+	Contains accounts-receivable and accounts-payable functions in one package. Allows posting to virtually unlimited income/expense accounts; maintains debit/credit values for bank accounts; maintains accounts-receivable and accounts-payable gain/loss numbers.
Small Business Works	$50.00	Heizer Software	Mac, Mac+	Twelve programs to automate tracking from sales/receivables through records to a balance sheet for the small business. Requires Microsoft *Works*.
Turbo Maccountant 2.0	$495.00	Digital	Mac	An integrated accounting program of payroll and budgeting.

Name	Price	Publisher/ Vendor	Systems	Description
Stocks				
Buysel	$154.95	Dynacomp	Mac, Mac+	Comprehensive package for performing analyses of stocks, commodities, and options.
Compusec Portfolio Manager	$79.95	Dynacomp	II+, IIe, IIc	Full-featured stock portfolio manager which ranks stocks, shows which stock should be reduced or eliminated, calculates compound growth rate, and more.
Market Analyzer-XL	$395.00	N-Squared Computing	II+, IIe, IIc	All features of the *Market Analyzer* version 4.5 and more, including eight additional operations to create indicators and manipulate data.
Market Pro	$395.00	Pro Plus Software	Mac, Mac+	A fully integrated portfolio-management system. Portfolio manager has eight detailed reports.
Portfolio I	$15.00	Heizer Software	Mac, Mac+	Fulfills all routine trading-record needs for most investors in stocks, bonds, and other securities. Compatible with *Excel*.
Stock Watch	$39.00	Encycloware	Mac, Mac+	Low-cost stock folio-management software.
Desktop Publishing				
Artmaker Electronic Clip Art	$35–$40	Artmaster	Mac	Electronic clip art for use in desktop publishing. Over 72 disk titles are planned, with 150–200 art proofs and graphics on each disk.
Desk Design	$69.95	Manhattan Graphics	Mac	Desktop publishing templates are included for ads, brochures, facts sheets, newsletters, and business forms. Its preformatted documents save time and require no previous design experience.
The DGI Type Shop	$175.00	Decision Graphics	II, II+, IIe, IIc	Create text signs, overhead transparencies, and more. Includes 14 fonts from formal to Greek.
GraphicWorks 1.1	$99.95	Mindscape	Mac, Mac+	Page-layout program for documents which require text and graphics on one page. Contains all the drawing features of paint programs and supports high-resolution scanners.
Letrapage	$495.00	Letraset	Mac, Mac+	Newsletters, manuals, flyers, and reports can be written, edited, laid out, and printed to a professional standard.
News Master	$39.95	Unison World	II+, IIe, IIc	Creates a variety of publications—one to ten columns per page, ten fonts in a variety of sizes, over 100 pieces of artwork, and automatic text flow around artwork, from column to column, and from page to page.
Notes for PageMaker	$78.86	Layered	Mac, Mac+	Makes learning and using *PageMaker* easier for beginners and intermediates. Installs as desk accessory.
PageMaker Portfolio: Designs for Newsletters	$79.00	Aldus	Mac, Mac+	A package of 21 different newsletter formats to be used with *PageMaker*. The designs are on disk, and a manual is included in the package.
Ready, Set, Go! Version 3	$295.00	Manhattan Graphics	Mac, Mac+	Create any documents from office memos to full-length novels with this desktop publishing software. Integrates a versatile word processor with a powerful desktop publishing program to save production time.
Springboard Publisher	$139.95	Springboard	IIe, IIc, IIGS	Page layout, word processing, and graphics creation all in one pro gram for the Apple II series. Pull-down menus and mouse control.
Productivity				
Desk Necessities	$29.95	Microsparc	Mac, Mac+	A grab bag of nine utilities, including *Desk Writer*, a word processor in a desk accessory.
Everybody's Planner	$99.95	Abracadata	II series	A project management tool with a flowchart program that helps users plan projects more quickly and efficiently.
inLARGE	$95.00	Berkeley System Design	Mac	Magnifies screen display 2–16 times for the visually impaired.
KIX	$49.95	Kyan Software	II series	A hard-disk manager for users who want to increase productivity and ease of use of the hard disk.
Macflow	$125.00	Mainstay	Mac, Mac+	A visual tool for logic and project flow. Features include resizing graphic elements for quick changes, quality output, and more.
Notepro	$59.95	Learning Skills	Mac, Mac+	An educational package for college and high school that teaches organization and use of notes. Five parts which can be used individually or as a whole.
Pert Program Evaluation and Review Technique	$23.00	NCSU Software	II+, IIe, IIc	Project management. Prints critical path, early and late start times, and prints Gantt charts.
Integrated Packages				
AutoWorks 2.0	$49.95	Software Touch	IIe, IIc, IIGS	Adds several important features to *AppleWorks*, including mail merge, file organizing, macros, *AppleWorks* commands, and mouse commands.
Lotus Jazz 1A	$395.00	Lotus	Mac, Mac+	A fully integrated, comprehensive, business-applications software product for the Macintosh personal computer. Combines the five most commonly used software functions of spreadsheet, database, graphics, word processing, and data communications in one integrated package.
Notes for Works	$78.86	Layered	Mac, Mac+	This desk accessory makes learning and using Microsoft *Works* easy, while providing complete reference to all of *Works'* functions.
PFS:Workmates	$250.00	Software Publishing	IIe, IIc	Includes *PFS:Write, PFS:File, PFS:Plan,* and *PFS:Report. PFS:Write* includes an integrated spelling checker.
Ragtime	$395.00	Orange Micro	Mac, Mac+	An integrated page processing program that includes desktop publishing, word processing, spreadsheet, and forms generation.
Utility Works	$50.00	Heizer Software	Mac, Mac+	Databases, templates for business forms and outlining, mailing label and font tools, and a Microsoft *Works* resource directory. Requires Microsoft *Works*.

Name	Price	Publisher/ Vendor	Systems	Description
Communications And Networking				
AppleShare	$799.00	Apple Computer	Mac+	Software that lets Macintosh users on the *AppleTalk* network share and exchange files. Requires a dedicated Mac+ and *AppleTalk* network.
ASCII Express—Mouse Talk	$149.95	United Software	IIe, IIc, IIGs	Advanced telecommunications package. Data-transfer features include standard ASCII, XMODEM, and receive to printer. Provides a built-in text editor.
Commworks Version 1.3	$95.00	PBI Software	IIe, IIc, IIGs	A complete telecommunications package. *Commworks* has advanced features, yet is extremely easy to learn and use.
Electronic Messaging System 3.0	$99.95	Snapp Systems	Apple II, II+, IIe, IIc	A powerful mail and messaging host for the Apple II family. Fully customizable: The user can create prompts, menus, and more.
Inbox	$295.00	Think Technologies	Mac, Mac+	Business communications and electronic mail for the *AppleTalk* network. Communicate within work groups, departments, and project teams.
Intermail	$300.00	Internet	Mac, Mac+	A comprehensive electronic Macintosh system for *AppleTalk*-compatible network systems. Allows the user to send messages and files across the *Appletalk* network to as many people as desired.
MacLink Plus	$195.00	Dataviz	Mac, Mac+	Translates documents and spreadsheets, and transfers any file between the Macintosh and the PC.
Phonelink	$99.95	Borland	Mac, Mac+	Automatically dials even while the modem is in use on some other task.
Point-to-Point 1.0	$129.00	Pinpoint Publishing	Apple IIe, IIc	A telecommunications program which features the *AppleWorks* filecard interface.
Telescape Pro VT100	$125.00	Mainstay	Mac, Mac+	Features include a communication directory, 40 onscreen softkeys (programmable), and both text and XMODEM file-transfer capabilities. The softkeys are particularly useful to automate repetitive operations for a given communication partner.
TOPS	$148.87	Centram Systems West	Mac, Mac+	Local area network which connects Macintoshes and IBM PCs in a transparent interface.
Graphics				
Clickart Business Image	$49.95	T/Maker	Mac, Mac+	A design portfolio and graphics template for creating a corporate identity. Contains the tools needed for producing newsletters and business letterheads, such as coordinated alphabets and symbols, professional and industry images, and borders.
Comic Strip Factory	$89.95	Foundation	Mac. Mac+	Character parts can be moved with the mouse to create new characters and whole comic strips. Backgrounds and dialogue balloons are also included.
816 Paint	$75.00	Baudville	IIe, IIc, IIGs	Designed to work with all graphics modes available in the Apple II family, including the new super-hi-res modes of the IIGs.
MGM Station: Professional CAD for Mac	$799.00	Micro CAD/CAM	Mac, Mac+	A sophisticated CAD program for professional engineers.
Quickplot Version 1.2	$49.95	Desktop Engineering	Mac, Mac+	Easy-to-use plotting program reads data from text file or the Clipboard, and creates line and scatter plots.
Super Paint	$99.00	Silicon Beach Software	Mac+	Combination of *MacPaint* and *MacDraw* with 300-dots-per-inch editing. Supports LaserWriter fonts and correct object/bitmapped printing.
VideoWorks Authoring System	$500.00	Macro Mind	Mac, Mac+	Advanced version of *VideoWorks*. Can create market-research interactive documents, training disks, and demos.
Z-3D	$99.00	Computer Graphics Center	Mac, Mac+	Three-dimensional modeling program for text and objects. Ability to show shadows cast by text and objects from variable sources.
Fonts And Images				
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Artfolio 1	$74.86	Dynamic Graphics	Mac, Mac+	A potpourri of illustrations and symbols—amimals, common objects, people, occupational art, and many more. More than 300 graphics stored as *MacPaint* documents.
Clip Art Collection—Volume 3	$29.95	Springboard Software	II+, IIe, IIc	Over 600 pieces of clip art featuring sports and recreational activities. This latest edition of clip art adds real value to owners of *The Newsroom*.
Drawart Version 1.0	$49.95	Desktop Graphics	Mac, Mac+	A collection of publishing-quality graphics images created with *MacDraw*.
Fontographer Fonts—Goudy Newstyle	$59.95	Altsys	Mac	Font which includes regular uppercase and lowercase letters, as well as a set of small caps for paragraph lead-ins and emphasis anywhere in a line.
Food & Feasting	$30.00	Image World	Mac, Mac+	Graphics from the turn of the century: festive food, table settings, menu frames, and scenes of people eating and feasting.
Graphics Scrapbook Chapter I: Sports	N/A	Epyx Computer Software	II+, IIe, IIc	One hundred images covering more than 15 sports. Requires *Print Shop*.
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Apple In The Office

Dan McNeill

Connectivity is one of the newest words in the Macintosh community, and according to McNeill's analysis, perhaps one of the reasons the Mac is making such impressive inroads into the IBM PC–dominated business world. Here he takes a look at how Apple and IBM can peacefully coexist in the same office.

The Amazon River rises high in the Andes and tumbles down rocky slopes to the plain of the South American rain forest, where for over 1500 miles it is relatively clear. Then at Manaus it joins the Rio Negro, a dark, turbid stream from the north. The two flow on in the same channel, but for miles they remain distinguishable, the muddy water on the left, the clear water on the right.

The Macintosh and the IBM PC are following such a path in the modern corporate office. For years they have traveled separate courses. Now they are coming together in the same environment, though they remain in many ways distinct.

Here's one story. Mike Rogers is a lead process engineer for Chevron Oil in a large refinery in Richmond, California, where pastel tanks dot the hills near San Francisco Bay. He was working in a Xerox Star network with 45 IBM PCs and 18 Xerox Star workstations, but he felt the arrangement was unsatisfactory. So he convinced management to replace the Xerox Stars with Macintoshes, the PhoneNet network, and the Centram TOPS translator.

"We were going against the grain somewhat," he says. "Chevron as a corporation has still not embraced the Macintosh."

But the refinery has. The 45 PCs remain, but there are now 35 Macintoshes as well. "We're growing all the time," Rogers says. "The Macs are really popular. The number of people who use computers is growing a lot because of the Macintosh."

Across the bay in San Francisco, the Macintosh has moved into the Sears Mortgage and Securities Corporation, though in lesser numbers. The office was once a pure IBM environment, with 130 PCs for its 135 employees. It first purchased a Macintosh for documentation, because of its graphics power. Then the LaserWriter appeared, and the marketing department got interested in the Macintosh. After that, according to information specialist Brian Voakes, "We bought a few more Macs. We also found that more employees were buying Macintoshes for their homes."

Apple has long dreamed of marching the Mac into large corporations, and the vision may be coming true at last. The Macintosh is making more and more inroads into the PC cloister.

But why now?

First, 1986 was the year the Macintosh became an indisputable business computer.

The machine didn't vault at once into the hearts of corporate America. Norm DeWitt, an analyst at Dataquest, a Silicon Valley market research firm, estimates that Apple sold around 282,000 Macs in 1984, its first year. Many of these purchasers were universities or early developers, and there was a distressing lack of software. In 1985, Apple sold 262,000 Macs, a decline from the prior year, and murmurs arose about the machine's potential (or lack of it) for business. But in 1986, buyers claimed 355,000 Macintosh computers.

"My guess is that 50 to 70 percent of the Macintoshes went into the business environment this past year," DeWitt says. "Apple has really turned the corner on making the Macintosh a very strong alternative to the PC. A year ago I don't think I would have said that."

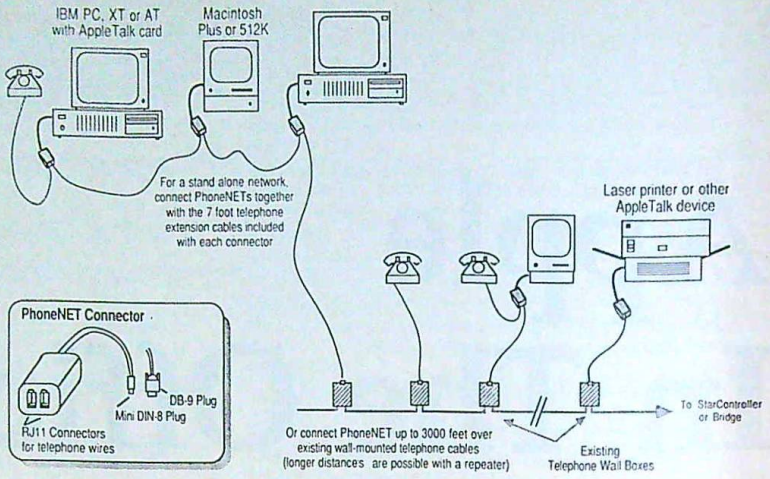
A number of factors have contributed to the upswing. These include the following.

• The introduction of the Macintosh Plus. One megabyte of

RAM, 800K disks, and a faster and more sophisticated ROM let the Macintosh compete effectively with almost any machine in its range, and have dispelled concern about its office prowess.

- The price reduction of the 512K Macintosh. In September, Apple cut its suggested retail price from $1,999 to $1,699, enhancing the machine's dollar-for-dollar appeal.
- The LaserWriter and the fast-growing field of desktop publishing it has pioneered. This machine has proved a remarkable flying wedge into the MS-DOS world, aided by such software as Adobe's *PostScript* and Aldus's *PageMaker.*
- New confidence in Apple's stability. "Business people don't just buy a computer. They buy a company," says Apple spokesperson Marianne Lettieri. "I think in 1986 they started seeing Apple as one that would be around for the long haul."
- The emergence of powerful, first-class programs such as *Excel* and Microsoft *Works,* and the prospect of such releases as *dBase* for the Macintosh. "A host of smaller companies have also done tremendous things for us," says Lettieri.
- The harvest from Apple's cultivation of big business. Throughout 1985, the company worked with many potential buyers, sometimes showing them products in advance, and occasionally loaning items to them. In 1986 the approach began to pay off.
- The appearance of inexpensive networks and programs that fluently translate files from Macintosh to PC and back.

These factors—reinforced by such inherent Macintosh virtues as superior graphics and ease of use—have spurred the machine into arenas previously dominated by IBM and other MS-DOS personal computers. For instance, engineers at Martin Marietta, Hughes Aircraft, and McDonnell Douglas quickly realized the Macintosh's capacity for design and slipped it into the workplace, often against the initial misgivings of management. Likewise, the "labtop" Macintosh has made gains on scientists' desks.



PhoneNET *connects Macintoshes and/or IBM PCs equipped with AppleTalk cards using the two extra wires within an existing phone network.* PhoneNET *is inexpensive and, since it doesn't use additional cable, very convenient in small- to middle-sized offices.*

The major potential market, however, lies in the Fortune 500 companies, which IBM, with its mainframe reputation and its pre-existing service ties, claimed years ago. To move into this arena, Apple believes it must become compatible.

Apple CEO John Sculley explained this approach in a recent speech to securities analysts. "Most of the installed base in most cases is made up of either IBM or DEC [Digital Equipment Corporation] equipment," he said. "If we're going to make the decision easier for those people to buy our products, then we ought to offer very good connectivity into their worlds."

At the moment, "connectivity into their worlds" involves networks, which in turn involve several layers of items—protocols, networks, bridges, and translators. At the top is AppleTalk, Apple's network and network protocol. You can use the protocol without the physical connectors, through systems such as PhoneNET and Centram TOPS. Since the most popular Macintosh networks are physically fairly short (1000 feet long in AppleTalk's case), some companies—such as Hayes with its InterBridge—sell bridges between them, which can extend an AppleTalk configuration. And finally, the translators enable cross-shuttling of data from IBM to Macintosh and vice versa. These allow you to, for instance, write a document with *WordStar* and change it into something *MacWrite* can read.

The linchpin is AppleTalk, a network that unites Apple and MS-DOS products. Says Voakes of Sears Mortgage and Securities, "We found that the cost, the headache, and the heartache associated with a first-time setup can be astronomical. AppleTalk is cheap and very, very easy to install. This was how we wanted to gain experience with a LAN [Local Area Network]."

First available in January 1985, AppleTalk is an alternative to more costly, high-speed networks. It supports only 32 *nodes,* or connections, at a time, and carries data only 1000 feet. It's also relatively slow, sending about 230,400 bits per second (bps) as opposed to the ten million bps of a high-end system like Ethernet. But it is very economical, costing $75 per Macintosh, and is simple to set up, a matter of laying down cables and snapping some connectors together. The slow speed doesn't impair performance critically, partly because relatively few people send data through the network at any one time, and partly because AppleTalk's protocol strips messages to their core, transmits them, and reassembles them at the other end.

AppleTalk has become widespread, boosted by the LaserWriter, which requires the protocol for full performance. "We have 200,000 AppleTalk connections out there," says Lettieri. "And the majority are in networks with third-party file servers. This product has been tremendously successful."

This isn't the only connector available, however. PhoneNET, from Farallon Computing of Berkeley, California, is also becoming popular. In fact, according to company spokesperson Steve Orme, Farallon recently sold 650 PhoneNETs for installation in the Cupertino headquarters of Apple itself.

"I have to believe that the Macintosh is gaining a lot of ground. It's more widespread than most people realize," says Orme. "It's an easier out for most people. People don't want to have to learn a lot of programs they'll just have to relearn when they come back to them later."

PhoneNET is distinctive in that it can exploit the two extra (and unused) wires the telephone company normally installs (in case one wire fails or the occupant orders a second phone). PhoneNET connections cost $49 each. Orme says the network can extend up to 3000 feet, though a few users have strung them farther than that. At the Chevron refinery in Richmond, Mike Rogers says there are 17 PhoneNET networks in 13 different buildings. Some are 7000 feet long.

It's still a relatively short distance, but at the refinery Rogers has overcome the limitation with the Hayes InterBridge, from Hayes Microcomputer Products, of Atlanta. InterBridge links all 17 networks at the refinery.

InterBridge acts as either a local or a remote bridge. As a local bridge, it joins several networks in one company. "I'm on the fourth floor of the technical center," says Rogers. "We have a network up here, but on some occasions I need to send data down to the third or second floor, which have their own networks." InterBridge lets him do it.

InterBridge can also use modems to act as a remote bridge, sharing information with other AppleTalk networks anywhere in the world. For instance, you could hook up your Macintosh or PC at home to the LaserWriter at work, and print as if it were next door. As a result, the length limitation of AppleTalk tends to vanish.

InterBridge can also save money. According to a Hayes spokesperson, "Instead of buying a laser printer for another network, for instance, you can just buy an InterBridge." InterBridge costs $800, considerably less than another laser printer.

But the best networks in the world won't move the Macintosh into the IBM/ MS-DOS domain without devices to translate work from one format to the other. Here, too, a number of products have emerged to smooth the way for the Macintosh.

One is the TOPS network, from Centram, of Berkeley, California. TOPS works with the AppleTalk physical apparatus, or comes with its own. It was introduced last July, and since then, according to marketing director Kim Criswell, "Sales have just about been doubling every month. It's really taken off."

"We expected to sell mostly Macintosh units," she says. "But we find we're selling about as many for the PC." The product binds PCs and Macs, and can also tie together an all-PC network, helpful for those who want to use a LaserWriter.

It has a transparent interface, so users work solely within their own operating system. For instance, one person can compile a spreadsheet on Lotus 1-2-3 and shift it over to another's Macintosh, where it will appear as an *Excel* document, complete with icon. It's almost painless to learn.

In addition, the *TOPS PRINT* program, announced in November, gives access to LaserWriter fonts through PC-DOS. "We've had very little press on this product, yet we've sold a lot of it. It's taken off on its own," says Criswell. Both Rogers at Chevron and Voakes at Sears use TOPS, and it has made it possible for them to integrate their computer environments.

Macintoshes and IBM PC (or compatibles) can "talk" with each other using the TOPS network.

Another translation product is *PC MacBridge*, from Tangent Technologies, Norcross, Georgia. *PC MacBridge* comes with a short slot card for the PC; *LaserScript/Plus* and *LaserGraph* software, which let a PC use a LaserWriter; and *MailBox*, an electronic mail file-transfer program. Tangent also makes *PC MacServe*, which controls access to file servers, and *PC MacText*, which converts from *WordStar*, *Multimate*, or any IBM ASCII file to *MacWrite* or *Word*.

"Often we see one person slip a Macintosh in the back door," says Steve Simpson, sales support manager at Tangent. "People then see what it can do with the LaserWriter. The learning curve isn't very steep, and they get it running fast. The bottom line is that corporate America is beginning to realize the potential of the Macintosh."

Yet another translation product is *MacLinkPlus*, which comes with a disk for the Macintosh, a disk for the PC, and a cable to connect the two computers. You can use it with TOPS and *PC MacBridge* via a modem. It translates *WordStar*, *Multimate*, and the DCA format from the PC into *MacWrite*. From *MacWrite*, you can convert to *Word*, *WriteNow*, or almost any other Macintosh word processor format. *MacLinkPlus* also changes Lotus 1-2-3 documents to *MultiPlan*, *Excel*, or *Jazz*, and works with *dBase II* and *dBase III*.

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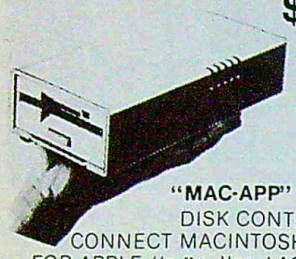

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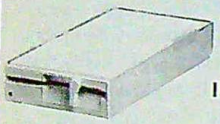

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There's no question that the Macintosh is now easing into the IBM-dominated world of business microcomputers. The Mac's momentum will likely increase. In addition to these products , the much-awaited Open Mac will likely make PC compatibility a matter of merely slipping in a card. Of course, the success of the new machine cannot yet be gauged, but industry observers seem optimistic. Last December, for instance, Apple's stock rose 24 percent during a two-week period when it gave key developers a peek at its new line.

The rivers are beginning to merge.

Dan McNeill is a freelance writer who specializes in computer-related topics. He is currently working on a reference guide to desktop publishing (COMPUTE! Books, 1987).

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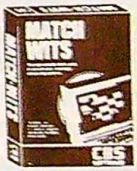

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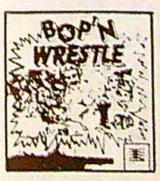

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Interviews With Apple's Educational Marketing Managers

From School To Shining School

Selby Bateman, Features Editor

From kindergarten through graduate school, Apple computers are in classrooms all over the nation. Making sure that Apple continues its dominance in the schools, Apple's two educational marketing managers are on the front lines of the fight for more—and better—computer use in the classroom. Here are their thoughts on Apple's success in the schools, the future of computers and instructional software, and the changing educational computing environment.

When it comes to selling computers to schools, nobody does it better than Apple. That's true in every educational arena—from elementary and secondary schools to colleges and universities. There are more Apple II-series computers in classrooms than any other computer. And on college campuses, the same can be said for the Macintosh.

Apple's emphasis on computer use in education is not only sound business for the company; it's clearly an outgrowth of Apple's own philosophy about the ultimate benefits that computers should bring to all users. For those reasons, the people who direct the marketing of Apple computers to schools and colleges are crucial to the company's overall goals.

Apple uses a team approach to the educational arena, splitting the market into two major segments: kindergarten through high school (K–12) and colleges and universities (higher education). Directing the educational marketing efforts for the K–12 group is 33-year-old Betsy Pace, who has worked in strategic planning and marketing for Apple since 1984. Pace's counterpart in higher education marketing is 32-year-old John (Bud) Colligan, who has worked for Apple since 1983 in the areas of international product marketing and marketing operations for the Macintosh.

Q&A

COMPUTE!: What are the biggest problems facing teachers and administrators as they try to stay abreast of computer use in the classroom?

Pace: The biggest one is basically training and [computer] literacy of educators, which actually breaks down into a combination of finding ways to get trained, but also staying abreast of the rapid technological developments.

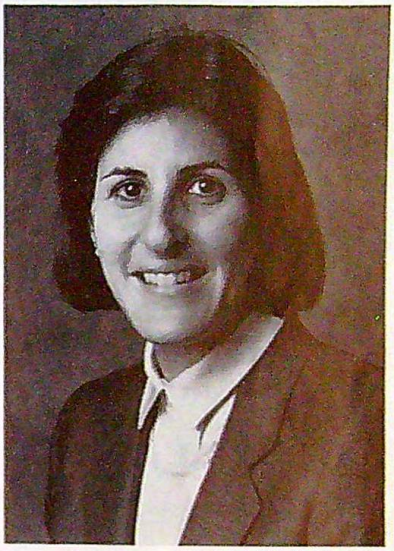
I think that there's a tremendous amount of pressure on teachers right now to teach well, and for not very high compensation in our socioeconomic hierarchy—to do so against increasing teacher shortages. And then at the same time, we want to turn around and tell them to change the way they teach and integrate these tools that they didn't grow up with. It is a tremendous challenge for school districts, for teachers themselves, and for us, to try to find a way to break into that.

Ultimately, [when children] who are in the first and second grade now are our teachers, they will be far more [computer] literate than any of us are. And they will look for ways to use computers because it will make their lives easier. But as with all new tools, there's a hump you have to get over first: It makes things more difficult for you, before it can make things easier for you.

COMPUTE!: How important is the educational market for Apple Computer today?

Pace: Education is a very significant business for Apple. It represents a big chunk of our revenues and therefore people all around the company work on education solutions.

There's tremendous agreement in the education community that computers are here to stay.



Courtesy of Apple Computer

Betsy Pace, Apple Computer's K–12 education marketing manager

"There's tremendous pressure in schools to make the changes that make computers meaningful."

But there's also tremendous pressure in schools to make the changes that make computers meaningful. You don't want a computer in every classroom in the back of the room being used as a table for the plants.

If schools are going to continue to invest substantial amounts of their very sparse funds in computer technology, they can only do that if they can use them in the classroom in a way that really enhances the learning process. So everybody's efforts are directed at that.

That doesn't mean that there's total consensus on what you do to achieve that. I think there's very strong consensus that we no longer want computers in the schools simply to teach kids about computers. Rather, we want to use computers as tools in the mainstream learning subjects: to teach reading, to teach writing, to teach math, to teach science, and to teach social studies—to teach basic and higher-order thinking skills that cross all those subjects. That's where computers really get interesting.

COMPUTE!: What should the long-term impact of computers in the classroom be?

Pace: My personal view is that where computers are going to make a difference in the long run is not taking what could be done in a workbook and making it into an electronic workbook. That has some merit, and I don't want to write that off.

But what's really interesting is where uses are devised for the computer that can't be done through other media. A good example would be a social studies curriculum. You might still use a textbook as your main delivery tool. Within the textook-driven social studies curriculum you can

have a unit that's based on constructing a database. Students go out and search for the information and build the database, and thereby learn how to search, how to sort, how to sift, how to select important information from nonimportant information. So it's focusing on the facts themselves.

COMPUTE!: Does Apple Computer's approach to the K–12 environment involve you more with the Apple II series or the Macintosh, or does it vary?

Pace: The bulk of what we sell to the education market is the Apple II series, which includes now the new Apple IIGS. Where we find that the Macintosh is attractive to schools [K–12] is in the administrative segment of the market, because administrators' needs are very similar to business needs.

COMPUTE!: How does Apple approach its relations with schools and school systems?

Pace: First, we provide them with products. To do that we have a direct sales program that is aimed directly at schools. In other words, any school can buy directly from Apple. We have a direct sales force and we have a direct price list.

However, the dealer is a very important player in that relationship. What the dealer provides is the onsite local pre- and postsales service support. Now at the marketing levels, we take every opportunity we can to forge this partnership with educators.

COMPUTE!: Can you give us an example of this partnership in action?

Pace: We have, out of our research and development group, an applied research program called the Apple Classroom of Tomorrow. That involves between six and seven sites where we have provided enough computers to allow every member of a classroom, including the teacher, to have a computer in school and a computer at home.

What we are trying to do is understand [what happens] when you remove the access barrier. If we remove that barrier and we provide as many computers as you could possibly want, what would happen? It took us the first year of operation that's just been concluded to basically install the sites and the trainers and get the classrooms up and running.

They're all over the country and they're in different grades and in different socioeconomic communities. We will now start to push in more advanced applications and so forth and test out how some things work better than others.

COMPUTE!: So 1987 is a big testing year now that you've gotten all that in place?

> **"We pride ourselves here on being very conscious of the real-world needs that schools face."**

Pace: That's right. I think that's really what is called for over the next few years.

There's a very strong instructional base of software on the market. But we are entering the next phase of software application potential and much more sophisticated applications. Until very recently, a large part of the installed base was only 48K [of computer memory].

Last year we ran a marketing program which was very successful, where we offered, in a number of different ways, the ability to upgrade the installed base [of Apple II–series computers]. Our numbers indicate now that as a result of that program, virtually half of the installed base of Apple computers—which represents half of all the computers in schools—are now 128K or more. That makes a tremendous difference for the software developers who can now start to use that extra memory to develop more interesting and sophisticated applications. I think that, combined with the GS, changes dramatically the installed base of hardware that developers have to work with.

COMPUTE!: Is there a typical school situation that you run into today, or do the numbers of computers and their uses vary all across the board?

Pace: It does run all across the board, but there are some models that you can point to.

For example, there's tremendous variation about whether the computers are in labs or in classrooms. We see both. There is an average you can point to. For example, I can tell you that there are forty-some-odd-million students and there are close to two million computers [in classrooms]. This would tell you that there is an average of 20 students for every computer.

But what you will find is that some schools have a ratio of 10 to 1 and some have 35 to 1. So it's pretty much all over the map. And since we serve such a large percentage of the market—our market share is extraordinarily high—we have to address all those.

COMPUTE!: Within the K–12 range of grades, are there major differences in computer usage and computer needs at different levels?

Pace: Yes. There are definitely grade segments emerging, and furthermore, within those grade segments, we think, about two levels of users: *expert* users and *novice* users, because their needs are different.

You can't begin with a conceptually sophisticated database approach to the curriculum if the teachers you're working with don't understand how to use a database. Just as textbook needs are different between high school and K–3, let's say, so too the way they will want to use computers is different.

What we are seeing is much more similarity in the intensity

with which schools would like to use them. In other words, there's just as much interest in using computers intensively in K–3 or 1–3 as there is in 9–12. But in 9–12, for example, education is far more discipline-oriented. In the early grades it's much more basic skills–oriented. So you get different types of applications.

COMPUTE!: Are there any trends that you can see away from trying to have computers in a lab and toward integrating them into the regular curriculum?

Pace: It's hard to say how the numbers will end up. I think there's a possibility that computers will infiltrate the classroom in K–6 faster, and remain more in labs in 9–12. I think it has an awful lot to do with the way the day is conducted, the way students move around in 9–12. They tend to be in a single classroom in the early grades. But I do think there will be models for both.

One trend we are seeing that's interesting is toward decentralized labs where, for example, a school puts a cluster of machines between two or three classrooms. That might end up being a pretty efficient way to do it.

We pride ourselves here on being very conscious of the real-world needs that schools face. Instead of going in and saying you have to connect everything to everything, we go in remembering that you can't use a telephone line–based system if there are no phone lines in the classroom. There are tremendous infrastructure implications to all this.

COMPUTE!: There are many colleges and universities today that are wiring their dormitories and classroom buildings for networking. Is this also going to occur in primary and secondary schools?

Pace: It will occur much more slowly. But, yes, I do think that there'll be tremendous growth in networking over the next few years. I think it will start very solidly, though, at the classroom level, so that you will see classrooms networked as a unit as opposed to classrooms networked to other classrooms.

COMPUTE!: What new initiatives and efforts will you be monitoring this year?

Pace: I guess the most dramatic thing for us this year is going to be watching the development of the Apple IIGS over the next six months, which largely focuses on what kinds of software come onto the market.

I think we're going to see a steady introduction of [IIGS] software—continuing through June, and then picking up again in September—that will take advantage of the new features of the GS and really open some doors that weren't there before. We will accompany all that wherever we can with training programs and various kinds of support that enables the integration of those new tools into the curriculum. That will be a major thrust of what we will be doing.

And I guess the other major trend in terms of product usage is growth and increased accessibility of some of the optical media devices like CD-ROM [Compact Disc/Read Only Memory], to a certain extent, and video discs.

I'm not sure that 1987 is going to change the mix of equipment that schools buy. I think '87 is the beginning of the next period where those products become significantly more important.

COMPUTE!: Based on your experience, what's the first thing that an interested parent or teacher or school administrator should do in working with Apple to get information about any kinds of special programs or purchase incentives—who do they contact and what's the first approach?

Pace: Depending on whether they're located in a metropolitan area, they can contact the local Apple sales office and [that office] can offer some basic information to them and also tell them who the dealers are. [The sales offices] are in major metropolitan areas, and there are about a dozen of them.

We have an 800 number that enables the school to call up and get the number of the local dealer [1-800-538-9696].

COMPUTE!: Are there any indications that school systems are backing away from commitments to computers in their classrooms, or additional purchases of computers once they have a few?

Pace: Well, there's definitely a lot of questioning. The same constituencies that were saying *You have to have computers so that my child will be literate* are now saying *Why do you need more of them?*

However, I don't see that in diminishing market numbers. I think that schools, parents, and legislators are asking critical, important questions. But they are continuing to add computers at the same time.

I think that the purchasers are much more informed and also have much stronger opinions about what they want to do with them today than they did five years ago. Their planning is increasingly sophisticated.

COMPUTE!: From your standpoint, what's the most challenging aspect of the work that you're involved with?

Pace: The most challenging aspect of it all is that there's so much to do. We would all love to change everything that needs to be changed overnight, to have computers fully integrated into curricula around the country. Obviously the schools can't do that, and we can't do that.

So the challenge becomes constantly deciding what you're going to do first, where you're going to put your resources and your energies, and how you're going to chip away the obstacles like training, like the need for additional equipment, like the development of more sophisticated applications.

The complementary challenge is that we're operating in a business and technology that's changing so quickly that you have to look out through a crystal ball where you can't see what's... coming, and have to use [good] judgment all the time.

Q&A

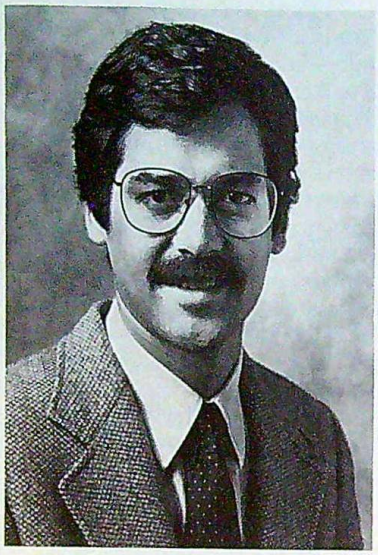
COMPUTE!: What has enabled Apple Computer to be so successful in the higher education market?

Colligan: We have really approached this market as a partnership—one in which we try to understand the needs of the students, the faculty, and the administrators at the colleges and universities in the United States and around the world, and then develop products and programs that meet those needs.

I start out by talking about this partnership because I think that it's unique. We get input from them in terms of our product plans. [For example], they've been critical in helping us design the open Macintosh which we think will make us the first computer manufacturer to fulfill the dream of what many higher education leaders have been talking about in terms of an advanced-function workstation, a scholar's workstation.

That also relates not only to products, but to the programmatic side: How to give students and faculty more access to computers? What's the best way for us to promote the development of software on campuses? How can we promote financing so that students can gain access to computers easier? What kinds of forums need to take place in order for faculty members to get together to really discuss how computers can affect their disciplines? What are the avenues for communication—whether it be printed, electronic, or face to face—to bring faculty, to bring administrators, together and have them discuss the common problems that are facing higher education?

COMPUTE!: How does Apple respond to this information from educators?



Courtesy of Apple Computer

Bud Colligan, Apple Computer's higher education marketing manager

"We're just at the beginning of being able to share information, of really understanding how computers can be used in each discipline."

Colligan: We listen very keenly to what they say, and basically our approach then is to leverage this partnership to feed back to the institutions what we hear that they want. We have basically done that by constructing what we call our academic program. Our academic program for us falls into four main areas: first, product; second, software development and distribution; third, the concept of a worldwide network of institutions; and the last is after-sales service and support.

Then we have taken that and structured it into a program which supports the overall objectives of higher education.

COMPUTE!: Apple's University Consortium program has been a widely publicized and successful venture. How has that progressed in helping Apple achieve its goals in the higher education market?

Colligan: The Apple University Consortium program was begun when we launched the Macintosh in January 1984, and we originally enlisted 24 institutions that made strong purchase and software development commitments to the Macintosh before it was announced. We announced these 24 institutions, the commitments they had made, and the commitment that we had made to them, on January 24, 1984.

That group has really been an advisory counsel to us. It has given us the input that I just discussed on our marketing and product plans, and it has been a very active source for courseware development on the Macintosh.

The organization has evolved over the last three years, and continues to play a vital role for us in helping us understand the market and where we should be going in the future. In April 1986, we added 8 additional members,

bringing the total membership to 32.

COMPUTE!: In what ways have the computing needs of higher education changed over the past several years?

Colligan: Needs have really changed, and I like to say that we are really only at the beginning, and we need to keep that in perspective. I mean, we are at the beginning of computers being intensively used on campuses; we're at the beginning of the Macintosh interface and what that's meant to teaching and learning.

The reason the Mac has been embraced so strongly in higher education is because the interface provides a better medium for teaching and learning, and on the academic side that's been clearly recognized. But we are just at the beginning of evolving that interface. We are just at the beginning of being able to share information, of really understanding how computers can be used in each discipline, and for the kinds of productivity and management functions that also go on at universities.

COMPUTE!: What have been the most immediate needs for colleges and universities?

Colligan: In terms of the needs, immediately computers became useful for word processing. There's a a huge need for word processing, and that's probably the most important way that they are being used now.

Over time, what we see is the productivity use continuing and still being very important, but a greater integration of computers into the academic environment. Right now they are principally being used in places in computer science and engineering—in traditional computer-intensive disciplines—but they are just beginning, and we are really trying to create more demand and understand the needs and the bottlenecks in other areas—in the humanities, for example.

COMPUTE!: Has there been an upsurge of interest for computer use in the humanities?

Colligan: That's certainly where our computers have been especially strong—in the humanities. Because they are easier to use—they don't require a lot of support or training, or the presence of a large computer science department for advice and counsel and so forth—we've seen the Macintosh [computers] really embraced in the liberal arts. They are being used in design, in the fine arts.

And they are being used very much in teaching people to write better, basically in prewriting, writing, and revision.

> **"Our philosophy is to create technologies to allow people to pursue their own styles, whether that's teaching, learning, or research."**

In biology and the social sciences—to create and manage databases for analysis—statistics are certainly a big use. Really, it's branching out: foreign languages and [type] fonts—the Macintosh is very strong in foreign languages because of the bitmap screen and the ability to create fonts from any different language all the way from ancient Greek to modern Romance languages like French or Italian.

COMPUTE!: Do you work jointly with any of the software companies in providing specific programs for higher education?

Colligan: Yes. We do work with software developers and we also have developed a distribution vehicle for our own software that is developed by the universities. With commercial developers—generally we have worked with these commercial developers to create special packages for the universities to get to their students.

With every Macintosh purchase at Drexel University, they also get a copy of *MacWrite*, *MacPaint*, Microsoft *Excel*, a database, and *Macintosh Pascal*. So in that case we worked with Microsoft to put together that turnkey package that every student receives for a very attractive price.

COMPUTE!: So, everyone ends up working with the same materials?

Colligan: That's really the key. You can achieve certain economies when the faculty members can make the assumption that all the students have certain kinds of tools and vice versa.

And then we see the administration. I was just at Dartmouth College, a highly recommended Macintosh school, and initially the Macintosh was primarily focused at the academic segment. Usually about 80 percent of the incoming freshmen buy a Macintosh, and there are public access labs for those who can't afford or don't wish to purchase their own Macintosh.

So we see that initially on the academic side. And then what happens is that, over time, the big hot item is the administrative segment. All the different administrators in the university now are networking and using a LaserWriter [printer] and using the general-productivity tools and so forth. They are finding that their training seminars on teaching the Macintosh generally have more secretaries in them than students. Students learn on their own, but the secretaries really want the structured training.

COMPUTE!: What other ways does Apple foster support within the higher-education community?

Colligan: There's a lot of software over the last three years that's been developed by both AUC [Apple University Consortium] schools and non-AUC schools

where faculty members have become very interested in how the computer can work in their discipline and have developed a piece of software.

The biggest impediment—and what we were trying to get around—was, How can we get that software out from that one college or university to all the different colleges and universities who might want to take advantage of it? Developing software takes a lot of money and time.

So in January 1986 we launched something called the Academic Courseware Exchange in conjunction with Kinko's Copy Centers. They have about 300 stores nationwide, all located near colleges and universities, and that covers about 500 or 600 colleges and universities. They were interested in diversifying and getting closer to the academic environment as well, and so we put together this joint venture by which they are distributing software, developed by university developers, at textbook prices. We published our first catalog in April of 1986, and we just published our second catalog. We now have 65 different discipline-oriented applications in that catalog, and this can be ordered at any of the Kinko's stores nationwide.

COMPUTE!: What will be the biggest challenges for Apple and higher education during the next two to three years in the use of computers?

Colligan: First, on the product side, we want to continue to bring innovative technology to the marketplace. I say that in two ways. We've really blazed the path with the Macintosh in terms of a better medium for teaching and learning. I don't want to stop there. I want to explore the realm of simulations and different kinds of learning environments in the software area. I want to really introduce some breakthrough technology in the area of authoring systems so that faculty members can develop their own tools.

I think that we really need to make tools available to faculty members that are powerful, and yet easy enough to use so that you don't need professional programmers to figure out how to use them. Right now there is a bottleneck in that faculty members have the academic and the intellectual content, but they don't have the programming expertise. So it's very difficult to create tools in mass quantities.

We want to change the ratios there from 1000 or 2000 people developing software to 20,000 or 30,000, or 50,000 faculty members having the capability and the interest in using our tools to develop interesting courseware on the Macintosh.

We want to continue to push our technology to enable people to do what they do best. So our overall philosophy is to create enabling technologies to allow people to pursue their own styles, whether that's teaching, learning, or research.

Our academic philosophy, if I can call it that, is to provide the enabling technologies and continue to innovate, produce breakthrough software and hardware that give people ideas of what might be possible in the future. And it's through that seeding and through working with the leaders and then taking that to the rest of the faculty and student population that we'll really get progress and dramatic innovation in the marketplace.

COMPUTE!: What do you think has been the key, or a couple of the keys, to getting the Macintosh so widely accepted?

Colligan: I've already mentioned one thing that I think has been really important about the Macintosh, and that's the graphic interface.

I think, secondarily, there's a huge amount of software that's been generated on the Macintosh, both in the productivity and academic areas. So when you combine that powerful application with the ease of learning, there are facilities for almost everyone to find applications that will help them to do their jobs better. Right now, the higher-education market is less mature than the K–12 market. It's growing more rapidly. This year we'll probably have growth somewhere between 50 and 75 percent.

COMPUTE!: Why the difference there?

Colligan: The reason is because K–12 is mostly institutional purchases—there's no student component—whereas with higher education a large majority of the purchases are from the student segment. There are over 12 million students, about 900,000 staff and administrators, and about 500,000 faculty members. So you can see just by the numbers that the volume is going to go to students.

COMPUTE!: What happens when today's computer-using youngsters, those in the early grades, get to college?

Colligan: We hope that the franchise that we established in K–12 helps us in higher education. We are right now the leader in higher education, and we would like to enhance our position in the future, so there is no question about Apple's leadership and commitment in the long term with education. aa

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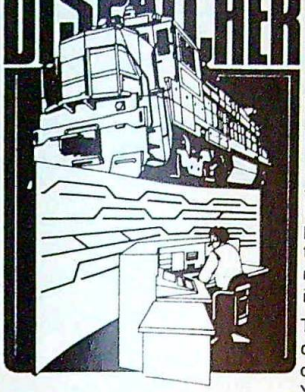

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Educational
Software Buyer's Guide

Apple Computer and educational computing are almost synonymous. In classrooms, there are more Apple II–series computers than any other type of computer. On college campuses, the Macintosh is the computer of choice for thousands of students in every subject area.

The company's newest computer—the IIGS—can only make Apple's position in education stronger. The IIGS's sophisticated graphics and sound capabilities seem perfect for high-powered educational software. Some of that potential is already showing up in programs like *Talking TextWriter* and *Reader Rabbit*.

It's hard to imagine Apple being displaced in the educational arena. With thousands upon thousands of programs already available and hundreds of new packages appearing each year, the choices teachers, parents, and students face are nearly overwhelming.

To help select the right educational software, we've put together a list of the newest and best Apple II and Macintosh programs. The programs included here are just some of those released since July 1986. This buyer's guide isn't an exhaustive one, but it does give you an idea of what's available.

Note that prices and machine availability can change.

Name	Price	Publisher/ Vendor	Systems	Description
Composition and Spelling				
Commas	$18.00	Right On Programs	II+, IIe, IIc	Practice inserting commas and separating word series, introductory phrases, nonrestrictive clauses, parenthetical expressions.
Developing Reading Power	$49.95	Learning Well	II+, IIe, IIc	Improve literal comprehension using Cloze formula-proven structure in a set of graded stories or by creating your own story. Students develop ability to use syntactic and semantic clues.
Grammar	$39.95	Gamco Industries	II, II+, IIe, IIc	Combines guided drill in basic grammar skills, a student/program management system, and an arcade-style reward game.
Improving Writing Style Basic	$90.00	Right On Programs	II+, IIe, IIc	Aimed at the user who would like to write more effectively.
Mastertype's Writing Wizard	$79.95	Scarborough	IIe, IIc	Word processor for the whole family.
Please Help Me!—Spelling Grades 3/4	$69.00	Focus Media	II, II+, IIe, IIc	Enter your weekly spelling list, and the program creates all the activities based on your word list.
Run-On Sentences	$18.00	Right On Programs	II+, IIc	Reviews basics of comma and end mark use of to avoid run-on sentences and comma errors.
Spelling Worksheet Generator	$54.86	D. C. Heath & Company	II+, IIe, IIc	Creates spelling worksheets from lists of up to 40 words or syllables, which the teacher can save on a disk.
Story Writer	$49.95	Learning Well	II+, IIe, IIc	Word processing program that invites students to enjoy the writing process. Allows students to write and illustrate their own stories.
Term Paper Writer	$59.95	Activision	II, II+, IIe, IIc	A multipurpose software program for writing and formatting school term papers. Includes notetaker, outliner, writer, and both footnote compiler and bibliography compiler.
Text Tiger	$39.99	Mindplay	II series	A word processing package for grades 1–12 that includes four skill-building games—*Keyboard Quest, Tiffy Text, Cursor Rally,* and *Eagle-Eye Editor*—to teach word processing skills.
Writing Well Series	$199.00	Learning Well	II+, IIe, IIc	Combined package of *Story Writer, Pre-write, That's My Story,* and *Poetry Express.*

Name	Price	Publisher/ Vendor	Systems	Description
Writing With a Micro	$65.86	D. C. Heath & Company	IIe, IIc	Develops and stimulates students' writing skills using the cinquain, triolet, and short story. Grades 4–12.
Word Attack	$49.95	Davidson & Associates	Mac, Mac+	The classic vocabulary program, now with speech synthesis. Type or select a word and the computer speaks it.
Working with Antonyms	$49.95	Custom Micro Systems	II, II+, IIc	Used in vocabulary development under a no pressure environment. Controlled vocabulary is used, and antonyms are applied in context.
Reading				
Alphabet Zoo	$29.95	Spinnaker	II+, IIe, IIc	Children develop and sharpen their spelling and vocabulary skills as they race through the maze after letters that fit the picture. Ages 3–7.
Branching Story	$34.95	Albion	II, II+, IIe, IIc	A story is presented, and the unfolding of the plot depends on the choice of options after each paragraph.
Flights into Fiction Package	$109.00	Focus Media	II, II+, IIe, IIc	Contains fairy tales, classic stories, and modern stories.
Giant World	$39.95	Gessler Educational Software	II+, IIe, IIc	Available in French, Spanish, German, and English versions to teach students vocabulary and reading comprehension skills.
Novel Approach—Lord of the Flies	$59.95	CBS Interactive Learning	II, II+, IIe, IIc	Helps students to focus on aspects of *Lord of the Flies*. Grades 7–12.
Phonics Prime Time: Final Consonants	$20.00	Minnesota Educational	II+, IIe, IIc, IIcs	Grades K–1. Children practice recognizing final consonants of everyday words.
Picture It with Words	$35.00	Micro Learningware	II, IIe, IIc	Grades 1–2 will learn 100 words and have fun with over 300 brightly colored hi-res pictures, bold graphics, letters and music.
Reading Well Series	$538.80	Learning Well	II+, IIe	Twelve reading comprehension skills programs—getting the main idea, drawing conclusions, context clues, and more.
Ready to Read	$39.95	Rune	Mac, Mac+	Teaches preschoolers and first graders reading-readiness skills.
Super Wordfind	$49.95	Hartley Courseware	II, II+, IIe, IIc, IIcs	Word puzzles to introduce new vocabulary in any content area. Super Wordfind lets the user prepare larger puzzles.
Talking Text Writer with Echoboard	$249.95	Scholastic	II, IIe, IIc, IIcs	Aids beginning readers and writers by repeating aloud whatever is typed into it. Combines word processing with speech synthesizing.
Word Pairs	$39.95	CBS Interactive Learning	II+, IIe, IIc	Two-part program offers instruction and practice on correct and incorrect word pair usage.
Math				
Addition Circus	$39.95	Gamco	II, II+, IIe, IIc	Uses exciting arcade games to provide drill on basic number facts.
Algebra II	$49.95	True Basic	Mac, Mac+	Includes systems of equations, quadratics, repeating decimals, inequalities, prime factoring, and more.
Fractions: Multiplication & Division	$39.95	Gamco	II, II+, IIe, IIc	Interactive guided drill in math skills in an arcade-style game.
Green Globs and Graphics Equations	$58.86	Sunburst	II, IIe, IIc	Provides four activities that help students learn about graphing equations.
Gulp!!/Frenzy	$34.95	Milliken Publishing	II, II+, IIe, IIc	Consists of two programs that deal with the basic facts problems of addition, subtraction, multiplication, and division.
Heath Arithmetic Classroom: Grade 6 Package	$209.86	D. C. Heath & Co.	II+, IIe, IIc	Helps students to master basic math skills. Packages available for all other grades.
High School Math Competency Series Worksheet Generator.	$49.95	Developer For CBS Interactive	II+, IIe, IIc	Print your own worksheets for drill and remediation. Grades 9–12.
Intelligent Tutor—Algebra 1	$40.95	Intelligent Software	II+, IIe, IIc, IIcs, Mac, Mac+	Helps students master the principles and concepts of elementary algebra and develop problem-solving skills.
Mathematics Unlimited: Adventures in Problem Solving	$99.00	Holt Rinehart and Winston	II+, IIe, IIc	A series of mini-adventures puts students' reasoning and computational skills to the test.
Math Rabbit	$39.95	The Learning Company	II+, IIe, IIc	Players begin by matching sets of objects to numbers. Later, *Math Rabbit* teaches children how to add and subtract numbers.
Math Skills	$40.00	Diversified Educational	II+, IIe, IIc, IIcs	A two-part program designed to motivate students to develop math skills and use deductive reasoning. Grades 5–10.
Math Talk	$79.95	First Byte	Mac, Mac+	Mathematics learning tool that will increase ability to solve basic addition, subtraction, multiplication and division problems.
New Arithmetic Classroom: Problem Solving	$99.86	D. C. Heath & Co.	II+, IIe, IIc	An elementary school mathematics program covering whole numbers.
Speedway Math	$49.00	Minnesota Educational	II+, IIe, IIc	Encourages students to practice their basic math skills to increase their speed and accuracy.
Time Explorers	$39.95	Gamco	II, II+, IIe, IIc	By answering questions correctly, players work their way through the tunnels of a cavern in an attempt to be the first to discover gold.
Science				
All About Simple Machines	$49.95	Ventura Educational Systems	II, II+, IIe, IIc	Presents easy-to-understand information about the history and also the function of the gear, inclined plane, pulley, screw and wheel.
Biology Dissection: Crayfish	$29.95	Cross Educational Software	II, II+, IIe, IIc	Teaches students how to dissect a crayfish.

Name	Price	Publisher/ Vendor	Systems	Description
The Blood System: A Liquid of Life	$39.95	Marshware	II series	Plasma, platelets, red and white bood cells, transfusions, blood diseases, and more are covered in this tutorial on blood.
Botanical Gardens	$59.00	Sunburst	II series	This greenhouse simulation teaches students in grades 6–12 the importance of controlling variables and analyzing data in scientific experiments.
Designer Genes	$50.00	QED Educational Software	II, II+, IIe, IIc	An introduction to the study of heredity and human genetics.
Diet Analysis	$49.95	Albion	II, II+, IIe, IIc	Breaks down the foods into energy, protein, fat, carbohydrate, calcium, iron, and, if required, vitamins. Check the nutritional value of menus from the school cafeteria.
Dr. Know 1.0	$49.95	Ventura Educational Systems	II, II+, IIe, IIc	A comprehensive introduction to the periodic table for grade 7 through adult. Presents the elements of the periodic table according to their symbol, classification, and position.
Great Knowledge Race: Biology Series	$49.00	Achievement	II+, IIc	Covers a year of high school biology. Four categories of questions to choose from, plus a miscellaneous pot luck category.
Human Systems: Series 3	$119.00	Focus Media	II, II+, IIe, IIc	Teaches about the respiratory system, the excretory system, the reproductive system, and human genetics. Use as a tutorial, a drill-and-practice, a game program, or all three.
MacKids: Bodyworks	$34.95	Nordic Software	Mac, Mac+	Identify different parts of the human anatomy in a fun way.
Moving Molecules	$69.99	HRM Software	II+, IIe, IIc	Demonstrates the behavior of gases as temperature changes during diffusion of gases and liquids and within an ideal gas. Grades 7–12.
Observatory	$64.95	CBS Interactive Learning	II+, IIe, IIc	Comprehensive astronomy program which can transform a classroom computer into an exciting and informative simulation of the sky. Includes a "software telescope" which students can set up anywhere on Earth.
Orbiter	$49.95	Spectrum HoloByte	Mac, Mac+	Space shuttle simulation with 16 missions, including satellite repair and space walks. Command the shuttle from launch to landing with this sophisticated and educational program.
Planetarium on Computer: The Solar System	$69.00	Focus Media	II, II+, IIe, IIc	Three programs about the solar system. Moving through the solar system, your weight, and your age on the planets.
The Science Professor	$39.00 each	Bergwall Educational Software	II+, IIe, IIc	Ten self-paced programs for grades 4–6. Topics include insects, machines, muscles and bones, and more.
Tribbles Revisited	$40.00	Conduit	II, II+, IIe, IIc, IIGS	Gives students a working understanding of the scientific method.
Weather Forecasting	$49.95	Albion	II, II+, IIe, IIc	Students identify the type of weather situation from one of 24 simulated weather maps.
Visifrog 2.0	$39.95	Ventura Educational Systems	II, II+, IIe, IIc	A vertebrate anatomy learning program using computer graphics that display the anatomy of the frog.
The Vocabulary of Science	$45.00	Focus Media	II series	A series of four separate programs—All About Your Body, Living Things in the Environment, Our Home Planet, and All About Matter and Energy—that help students in grades 5–8 learn science vocabulary words.
Social Studies and Economics				
Business Simulations Package	$325.00	Albion	II, II+, IIe, IIc	Nine business simulations, each documented with student and teacher manuals containing background information.
Campaign	$49.95	Albion	II, II+, IIe, IIc	Students assume the role of Edward III during the Normandy Campaign of 1346.
Choice or Chance	$111.00	Rand McNally	II+, IIe, IIc, IIGS	The Florida swamps, the Santa Fe Trail, and the white-hot steel industry are yours to conquer in these simulations.
Decisions, Decisions—Colonization	$89.95	Tom Snyder Productions	II+, IIe, IIc	Promotes in-depth class discussions and decisions in our new age of exploration. Grades 5–12.
Decisions, Decisions—Foreign Policy	$89.95	Tom Snyder Productions	II+, IIe, IIc	Students in grades 8–12 confront challenging foreign policy issues.
Drugs: Their Effects on You	$49.95	Marshware	II series	Teaches students about commonly used drugs and their positive as well as harmful effects. Includes discussions on peer pressure.
Economics: What, How, and For Whom?	$159.00	Focus Media	II, II+, IIe, IIc	Overview of economics, including its laws and definitions, a comparison of traditional, market, and command economies, and more.
Great World History Knowledge Race	$79.00	Focus Media	II, II+, IIe, IIc	Students attempt to answer challenging questions drawn from a traditional secondary-level world history curriculum.
MacKids: Lemonade Stand	$34.95	Nordic Software	Mac, Mac+	An economic simulation that helps young enterpreneurs learn to make solid business decisions.
Presidential Profiles	$49.95	CBS Interactive Learning	II, II+, IIe, IIc	Trace the records of each of the U.S. presidents through four activities. Grades 5–12.
Sailing Ships	$44.95	Albion	II, II+, IIe, IIc	Simulate navigating a large sailing ship around the world's oceans.
Surveys Unlimited	$49.95	Learning Well	II+, IIe, IIc	Introduction to designs and uses of this vital social science tool. For grades 3 and up.
Teddytronic	$59.95	Albion	II, II+, IIe, IIc	Introduction to the problems in running a business. Run a teddy bear factory successfully and respond to random problems.
Time Tunnel: Sports History	$39.00	Achievement	II+, IIe, IIc	Go back into history and meet famous athletes of the 20th century.
Voyages of Discovery	$69.00	HRM Software	II, II+, IIe, IIc	Challenging, colorful game that simulates the historic Lewis and Clark expedition of 1804–06. Puts the player in charge of the expedition from its formation at St. Louis on the Missouri River.

Name	Price	Publisher/ Vendor	Systems	Description
Watergate Simulation	$20.00	NCSU Software	II+, IIe, IIc, IIGS	Decision-making game/tutorial in which the student plays the roles of journalists Woodward and Berstein during Watergate. Illustrates political dynamics and journalistic strategies.
Geography				
Continents and Countries	$49.95	CBS Interactive Learning	II, II+, IIe, IIc	Students travel around the world learning facts and improving their knowledge of nations and their people. For grades 5–12.
Geoworld	$79.95	Tom Snyder Productions	II+, IIe, IIc	Illuminates concepts in world geology, mineral distribution, and rock formation. Grades 5–12.
Ghost Hunt	$49.95	Learning Well	II+, IIe, IIc	Discover how much fun map reading can be by learning map skills. Grades 1–3.
Great States Race	$34.95	Milliken Publishing	II+, IIe, IIc	The players race across the states in hot air balloons and answer questions about the state they're flying over.
MacChoro	$295.00	Image Mapping Systems	Mac, Mac+	A menu-driven data classification and statistical mapping program that can be used to create maps and much more.
MacKids: Earthworks	$34.95	Nordic Software	Mac, Mac+	A powerful learning tool for geography and related topics that teaches the names of states, capitols, and major cities.
Satellite Down: World Edition	$79.00	Focus Media	II, II+, IIe, IIc	Students' mission is to determine the location of each satellite using their wits and their knowledge of geography.
Travels With ZA-ZOOM: Around the U.S.	$39.00	Achievement	II+, IIe, IIc	User travels on a magic carpet with ZA-ZOOM to learn about all 50 states.
Early Childhood				
Does It Belong?	$35.00	Micro Learningware	II, IIe, IIc	Three games to introduce children, grades K–1, to classification, discrimination, and problem-solving skills.
First Shapes	$59.95	First Byte	Mac, Mac+	Ted E. Bear teaches shape identification and size relationships in a playful environment.
Learning Is Fun	$39.95	Rune Software	Mac	Teaches preschool and first grade children about circles, rectangles, squares, and triangles.
Learning to Write Series	$60.00	Right On Programs	II+, IIe, IIc	Children learn letter shapes and each stroke needed to write them.
MacKids: Shapeworks	$34.95	Nordic Software	Mac, Mac+	In an entertaining manner, teaches children to recognize sizes, shapes, and patterns.
Read and Rhyme	$39.95	Unicorn Software	II, II+, IIc	Four teaching programs, covering rhyming, alphabetizing, and reading.
Shape Starship	$39.95	Gamco Industries	II, II+, IIe, IIc	Provides reinforcement of basic readiness skills, includes a program/student management system.
Size and Logic	$35.95	Hartley Courseware	II, II+, IIe, IIc, IIGS	Animated graphics help to improve the ability to discriminate among objects according to size.
"Talking" Reader Rabbit	$44.95	The Learning Company	II, IIe, IIc, IIGS	Four animated games help develop and improve reading, spelling, word recognition, vocabulary, and concentration.
Graphics				
Award Maker	$39.95	Baudville	II+, IIe, IIc, IIGS	Create professional quality certificates with colored, detailed borders; specialized graphics; and personalized messages.
Card Shop	$49.95	Artsci	Mac, Mac+	Create greeting cards. Load with *MacPaint*, or any other application which uses *MacPaint* documents.
Cardware	$9.95	Hi Tech Expressions	II+, IIe, IIc, IIGS	Birthday greeting disk and all-occasion card maker. Animated birthday story set to music.
Electric Crayon	$14.95	Polarware	IIe, IIc	Series of computer coloring books for children ages 3–13. Children can color line drawings on the screen, print line drawings and color by hand, or create monthly calendars.
Greeting Card Maker	$39.95	Activision	II, II+, IIe, IIc	Design cards, invitations, and announcements for any occasion. Print in color or black and white.
Imaginator	$88.50	Hearlihy & Co.	II+, IIe, IIc	Create, edit, manipulate, and display 3-D graphics images from any viewpoint. Students can "fly" their images around using special orbital routines.
Print Shop Mac	$79.95	Broderbund	Mac, Mac+	Simplifies the process of designing and printing out greeting cards, banners and signs. Clip art selections included on disk.
Walt Disney Card and Party Shop	$39.95	Bantam Books	II, II+, IIe, IIc	Create cards, banners, posters, and signs. Great for parties.
Test Preparation				
College Entrance Examination Prep Verbal Strategy	$160.00	Educational Technology	II+, IIe, IIc	Prepares for the SAT or aptitude tests by mastering verbal strategy such as analogies, reading comprehension, and sentence completion.
Intelligent Tutor—SAT Math 1.0	$69.95	Intelligent Software	II+, IIe, IIc	Helps students prepare for the math section of the SAT exam and develops their math problem-solving skills.
Smart Words: College Prep Vocabulary	$49.95	Addison-Wesley	II, II+, IIe, IIc, Mac, Mac+	Includes many words that are found on standardized college placement examinations. To give students an edge when taking the exams.
Computer Skills				
Apple's Core Parts I and II	$99.95	The Professor	II, II+, IIe, IIc	Introduction to Applesoft computer programming.
Basic Animation Kit	$39.95	Sierra Vista	II+, IIe, IIc	Lessons in programming lo-res and hi-res animation. Teaches, step-by-step, how to write basic animation programs.
Math Worlds: Turtle Symmetry Level 1	$69.86	D. C. Heath & Company	II+, IIe, IIc	Students learn a form of Logo and use this language to construct geometric drawings on the computer.

The data for this guide was supplied by .MENU—The International Database Corporation. For further evaluative information, or to insure that your product is included in the database, contact .MENU, 1520 S College Ave., Fort Collins, Colorado 80524.

Newsroom To *Print Shop* Graphics Converter

James R. Haynes

Quickly convert Newsroom *photo files to* Print Shop *graphics file format with this easy-to-use utility. Share your* Newsroom*-produced creations with your* Print Shop *graphics libraries and get more out of both programs.*

The Newsroom (by Springboard Software) and *The Print Shop* (by Brøderbund) are two of the most popular commercial printing programs for Apple II–series computers. In fact, many people have found them useful complements. *The Newsroom* can easily produce double-column newsletters, while *The Print Shop* is best at designing and printing handbills, posters, and banners. Both make widespread use of graphics.

Though *The Print Shop* has its own graphics package, you may want to share graphics with your *Newsroom*-produced creations. Perhaps you want to create a handbill or poster with the same graphic (a logo, for example) that you've used in a newsletter.

That's where "*Newsroom* To *Print Shop* Graphics Converter" comes in. With this program, you can convert your *Newsroom* graphics files (called photos) to *Print Shop* graphics files. It opens the complete *Newsroom Clip Art* collection for use by *The Print Shop*. Graphics Converter works strictly with photo files that you've created with *The Newsroom's Clip Art*, or with its own graphics drawing options.

Incompatible Files

The photo files created by *The Newsroom* and the graphics files used by *The Print Shop* are about as incompatible as two graphics files can get. *Newsroom*'s photo files are stored with seven-bit inverse bytes, while *Print Shop*'s graphics files are stored with eight-bit bytes.

Newsroom's photo file is of variable size (with size information stored in the file); *Print Shop*'s graphics file is a fixed size of 88 × 52 bits, relatively small when compared to the *Newsroom*'s photo file. The actual starting location of a *Newsroom* photo file picture can vary, depending on the way it was created.

Entering The Program

Newsroom To *Print Shop* Graphics Converter is compatible with either DOS 3.3 or ProDOS. However, it must be consistent with the data disks you'll work with. Both *The Newsroom* and *The Print Shop* come on disks formatted in DOS 3.3.

This utility is written in BASIC, though most of the bit graphics manipulation is performed in machine language (ML) for speed reasons. Program 1 (NEWSPRINT) loads a binary program (NRTPS, for *Newsroom* to *Print Shop*) and performs the conversions. Program 2 (BIN.MAKER) is another BASIC program which creates the ML program NRTPS and saves a copy to disk.

Use "Apple Automatic Proofreader" to type in both programs; then save them to a DOS 3.3 formatted disk. Run Program 2 first to create the binary file for Program 1. (Once you've created the NRTPS file, you shouldn't need Program 2 again.)

Line 30 of Program 1 contains the default disk drive numbers. Change the default values of DR$ (read drive) or DW$ (write drive) if you want to work with a drive other than drive 1.

Running The Converter

Newsroom To *Print Shop* Graphics Converter is menu-driven and is designed to be self-explanatory. The first screen you see (Figure 1) is an introduction and reminder to insert the *Newsroom* data file disk in the default drive.

Figure 1

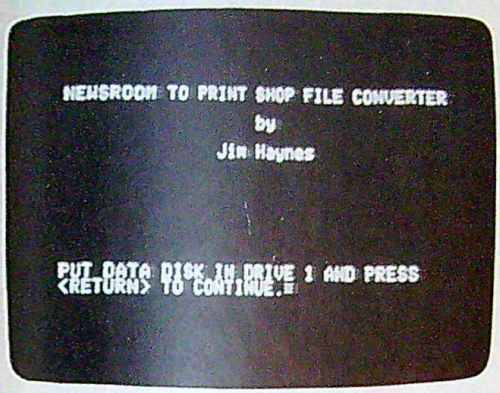


Figure 2

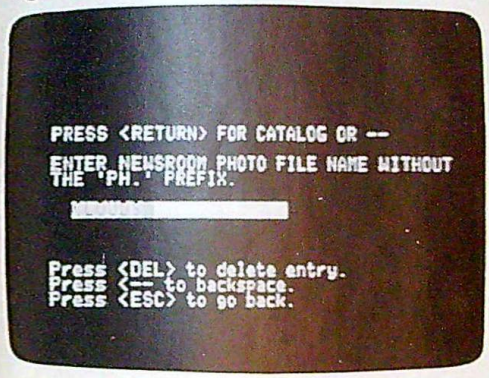


Figure 3

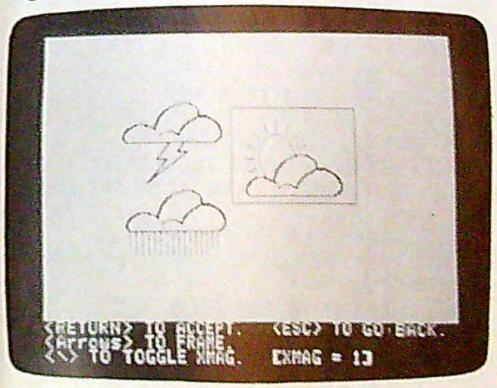
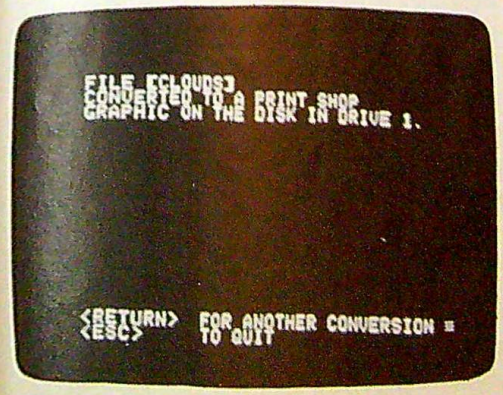


Figure 4



The second screen (Figure 2) is where you enter the *Newsroom* photo filename. As shown on the screen, use the Delete key and cursor-left key, respectively, to delete the entry entirely or erase the last character. Press Escape (Esc) to return to the previous screen.

Pressing the Return key (without entering a filename) displays a catalog of the disk. You can tell which filenames are *Newsroom* photo files—they have a prefix of *PH.* Type the photo filename, omitting the PH. prefix, on the inverse line. Invalid filename characters will be ignored.

The third screen (Figure 3) is the framing screen. The *Newsroom* photo is placed on the screen and a movable frame lets you "crop" the photo, or a portion of it, for a standard size *Print Shop* graphic. Move the frame with the cursor keys until it's in the desired location. To change the size of the frame, press the backward slash key (\ ) to toggle between double and single horizontal magnification. The frame size changes accordingly.

The double magnification maintains the same height/width proportion normally output by *Newsroom.* (The *Newsroom* program uses two horizontal pixels for each vertical pixel in its graphics, while *The Print Shop* has a one-to-one ratio.) The double magnification creates the graphic with double width so that when it's printed it will appear proportional. The single magnification can be used to squeeze more into the graphic. Try it for some interesting effects.

When everything is satisfactory, press the Return key and the conversion takes place. A new file is created for the *Print Shop* graphic using the same filename, though without a *PH.* prefix. Since the *Newsroom* photo file is not destroyed, it can be converted as many times as you want.

As before, the Esc key returns you to the previous menu.

Note that since *Print Shop* graphics are small compared to *Newsroom* photos, only the smaller *Newsroom Clip Art* figures can be completely fitted into the frame.

The fourth screen (Figure 4) announces that the conversion is accomplished and lets you quit the program or continue with another conversion.

See The Results

The converted graphic can be viewed by booting the *Print Shop* disk and entering the Graphic Editor option. Select Control-G to load and examine the graphic.

You can use all the normal *Print Shop* features on your own graphics disk, including a disk with files converted from *Newsroom.*

Program 1: NEWSPRINT

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
27 10 PRINT CHR$ (4)"BLOAD NRTPS ,D1": POK
      E 233,99: POKE 232,92: SCALE= 4: ROT
      = Ø
CB 20 MG$ = "1": REM  DEFAULT XMAG
BC 30 DR$ = "1":DW$ = "1": REM  DEFAULT DA
      TA DRIVES
B6 40 MG = VAL (MG$): POKE 227,MG - 1:CF$
      = DR$: PRINT CHR$ (21)
F3 50 ONERR GOTO 360
9F 60 TEXT : HOME : GOSUB 780: GOSUB 740:
      IF X$ < > CHR$ (13) THEN 60
A6 70 HOME : GOSUB 790
AA 80 CF$ = DR$: GOSUB 760: PRINT "ENTER N
      EWSROOM PHOTO FILE NAME WITHOUT": PR
      INT "THE 'PH.' PREFIX. ": GOSUB 770:
      A$ = "":X = 3
79 90 HTAB X: VTAB 15: GET X$: GOTO 910
3D 100 A$ = A$ + X$:X = X + 1: PRINT X$;:
       IF X < 23 THEN 90
1E 110 NORMAL : PRINT ::A$ = "PH." + A$: I
       F A$ = "PH." THEN GOSUB 800: NORMAL
        : HOME : GOTO 70
C6 120 CALL 25215: REM  CLEAR MEMORY
08 130 PRINT CHR$ (4);"BLOAD";A$;",D";CF$
6A 140 XS = Ø:YS = Ø: GOSUB 600
64 150 W = PEEK (16389) - PEEK (16388) + 1
       : IF W < Ø THEN W = Ø
38 160 H = PEEK (16387) - PEEK (16386) + 1
       : IF H < Ø THEN H = Ø
0F 170 IF H > 120 THEN H = 120
50 180 WB = INT (W / 7):WR = W - 7 * WB: I
       F WR > Ø THEN WB = WB + 1
8E 190 GOSUB 870: CALL 25368:K = PEEK (25)
       :WR = PEEK (Ø9)
E9 200 GOSUB 460: VTAB 10: HTAB 1: PRINT "
       CONVERTING---PLEASE WAIT!"
50 210 GOSUB 870
60 220 FOR Y = YS + 1 TO YS + H
4B 230 P = 11 * (Y - 1) + XB + 22528
8A 240 POKE 28, INT (P / 256): POKE 27,(P
       / 256 - INT (P / 256)) * 256: POKE
       235,LS: POKE 238,10 - XB
F2 250 CALL 25084: REM  CONVERT ONE LINE O
       F GRAPHIC
F2 260 NEXT Y
EF 270 PRINT
75 280 A$ = RIGHT$ (A$, LEN (A$) - 3): REM
        STRIP 'PH.' PREFIX
33 290 PRINT :CF$ = DW$
1F 300 PRINT CHR$ (4) + "BSAVE" + A$ + ",A
       $5800,L$240,D";CF$
05 310 TEXT : HOME : VTAB 5: HTAB 1: PRINT
        "FILE ["A$"]": PRINT "CONVERTED TO
        A PRINT SHOP": PRINT "GRAPHIC ON T
       HE DISK IN DRIVE "CF$"."
43 320 VTAB 21: HTAB 1: PRINT "<RETURN>  F
       OR ANOTHER CONVERSION": PRINT "<ESC
       >      TO QUIT ";: HTAB 34: VTAB 21
A1 330 GET X$: IF X$ = CHR$ (27) THEN TEXT
       : HOME : END
11 340 IF X$ = CHR$ (13) THEN HOME : GOSUB
        790: GOTO 80
9A 350 GOTO 330
E8 360 X = PEEK (222): PRINT CHR$ (7): REM
        ERROR RECOVERY
8F 370 Y = PEEK (218) + PEEK (219) * 256
DF 380 IF X = 9 THEN HOME : PRINT "DISK FU
       LL": GOSUB 750: GOSUB 740: GOTO 440
BB 390 IF X = 8 THEN HOME : PRINT "I/O ERR
       OR": GOSUB 750: GOSUB 740: GOTO 440
8F 400 IF X = 6 OR X = 7 THEN HOME : PRINT
        "FILE NOT FOUND": CALL 62248: GOSU
       B 790: GOTO 80
36 410 IF X = 4 THEN HOME : PRINT "WRITE P
       ROTECTED , REMOVE TAB AND PRESS": P
       RINT "<RETURN>. ";: GET X$: PRINT :
        GOTO 440
5E 420 IF X = 254 THEN PRINT "BAD RESPONSE
        TO INPUT": RESUME
01 430 HOME : PRINT "ERROR ";X;" IN LINE "
       ;Y: CALL 62248: POKE 216,Ø: TEXT :
       VTAB 10: STOP : GOTO 50
F5 440 IF X$ = CHR$ (27) THEN CALL 62248:
       HOME : GOSUB 790: GOTO 80
72 450 RESUME
92 460 HGR : HCOLOR= 3: HPLOT Ø,Ø: CALL -
       3082: REM  SCREEN AND FRAME
9B 470 POKE 6,WB - 1: CALL 24832: GOSUB 87
       Ø
18 480 GOSUB 900: GOSUB 870
52 490 GOSUB 600
9C 500 GOSUB 650: GET X$
24 510 IF X$ = CHR$ (13) THEN TEXT : HOME
       : RETURN
F5 520 IF X$ = CHR$ (27) THEN POP : TEXT :
        HOME : GOSUB 790: GOTO 80
56 530 IF X$ = CHR$ (11) THEN YT = YT + 1:
        GOTO 590
1C 540 IF X$ = CHR$ (10) THEN YT = YT - 1:
        GOTO 590
ED 550 IF X$ = CHR$ (21) THEN XT = XT - 1:
        GOTO 590
6D 560 IF X$ = CHR$ (08) THEN XT = XT + 1:
        GOTO 590
5A 570 IF X$ = CHR$ (92) THEN GOSUB 690: G
       OTO 480
A0 580 GOTO 500
41 590 GOSUB 900:XS = XT:YS = YT: GOSUB 60
       Ø: GOTO 480
FF 600 IF XS < - 142 THEN XS = - 142
2D 610 IF XS > 49 THEN XS = 49
59 620 IF YS > 40 THEN YS = 40
E7 630 IF YS < - 67 THEN YS = - 67
F8 640 XT = XS:YT = YS: RETURN
A7 650 HOME : HTAB 1: VTAB 21: PRINT "<RET
       URN> TO ACCEPT.   <ESC> TO GO BACK.
       "
5F 660 PRINT "<Arrows> TO FRAME."
B4 670 PRINT "<\> TO TOGGLE XMAG.    [XMAG
       = ";MG$;"]"
CE 680 HTAB 1: VTAB 1: RETURN
F7 690 PRINT
C1 700 GOSUB 900: IF MG$ = "1" THEN MG$ =
       "2": POKE 227,1: GOTO 720
22 710 MG$ = "1": POKE 227,Ø
2C 720 MG = VAL (MG$)
1D 730 RETURN
C1 740 HTAB 1: VTAB 15: PRINT "PUT DATA DI
       SK IN DRIVE ";CF$;" AND PRESS": PRI
       NT "<RETURN> TO CONTINUE.";: GET X$
       : PRINT : RETURN
9B 750 HTAB 1: VTAB 20: PRINT "Press <ESC>
        to go back. ";: RETURN
38 760 HTAB 1: VTAB 10: PRINT "PRESS <RETU
       RN> FOR CATALOG OR --": PRINT : RET
       URN
C1 770 HTAB 3: VTAB 15: INVERSE : PRINT "
                              ": RETURN
07 780 HTAB 1: VTAB 3: PRINT "NEWSROOM TO
       PRINT SHOP FILE CONVERTER": HTAB 19
       : VTAB 5: PRINT "by": HTAB 15: VTAB
        7: PRINT "Jim Haynes": RETURN
```

```
8B 790 HTAB 1: VTAB 19: PRINT "Press <DEL>
       to delete entry. ": HTAB 1: VTAB 2
       0: PRINT "Press <-- to backspace. "
       : HTAB 1: VTAB 21: PRINT "Press <ES
       C> to go back.": RETURN
58 800 HOME : PRINT CHR$ (4)"CATALOG,D";CF
       $
E9 810 PRINT
38 820 PRINT "PRESS <RETURN> TO CONTINUE.
       ";
9B 830 GET X$: IF X$ = CHR$ (13) THEN HOME
       : GOTO 850
28 840 GOTO 830
22 850 RETURN
73 860 REM  RESET BINARY DATA
8E 870 XB = INT (XS * MG / 8):XR = (XS * M
       G / 8 - XB) * 8
3A 880 LS = 0: IF XB < 0 THEN LS = 256 + X
       B:XB = 0
F9 890 POKE 06,WB: POKE 09,WR: POKE 26,64:
       POKE 30,H - 1: POKE 08,XR: POKE 25
       ,K: RETURN
62 900 XDRAW MG AT 49 - XS,40 - YS: RETURN
40 910 IF X$ = CHR$ (8) AND LEN (A$) > 1 T
       HEN X = X - 1:A$ = LEFT$ (A$, LEN (
       A$) - 1): HTAB X: VTAB 15: PRINT "
       ";: GOTO 90
D0 920 IF X$ = CHR$ (8) AND ( LEN (A$) = 1
       OR LEN (A$) = 0) THEN A$ = "":X =
       3: HTAB 3: VTAB 15: PRINT " ";: GOT
       O 90
3D 930 IF X$ = CHR$ (27) THEN NORMAL : GOT
       O 50
7D 940 IF X$ = CHR$ (13) THEN 110
F0 950 IF X$ = CHR$ (127) THEN A$ = "":X =
       3: GOSUB 770: GOTO 90
08 960 IF X$ < CHR$ (46) OR X$ > CHR$ (91)
       THEN GOTO 90
A0 970 GOTO 100
```

Program 2: BIN.MAKER

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
EB 10 RESTORE : REM BIN.MAKER
3C 20 FOR I = 24832 TO 25503: READ A: POKE
      I,A:X = X + A: NEXT I
8E 30 IF X < > 74717 THEN PRINT "ERROR IN
      DATA STATEMENTS.": STOP
E8 40 PRINT CHR$ (4);"BSAVE NRTPS,A$6100,L
      $29F"
8A 50 DATA 162,5,134,235,162,0,134,236
1B 60 DATA 134,237,134,223,134,254,169,64
3B 70 DATA 133,26,169,34,133,251,169,128
85 80 DATA 133,250,165,250,24,105,7,133
A4 90 DATA 250,166,237,228,6,208,7,76
82 100 DATA 173,98,234,76,129,97,32,160
7D 110 DATA 97,76,33,97,165,251,166,236
46 120 DATA 224,7,208,7,162,0,134,236
70 130 DATA 76,192,97,24,105,4,133,251
77 140 DATA 230,236,76,33,97,165,250,166
B3 150 DATA 235,224,7,208,7,162,0,134
A4 160 DATA 235,76,206,97,24,105,128,133
5C 170 DATA 250,144,2,230,251,230,235,76
75 180 DATA 33,97,165,250,166,223,224,2
12 190 DATA 208,1,96,24,105,40,133,250
82 200 DATA 144,2,230,251,230,223,76,33
48 210 DATA 97,166,254,228,30,208,1,96
9D 220 DATA 230,254,234,234,56,165,250,229
EF 230 DATA 237,133,250,176,2,198,251,162
AF 240 DATA 0,134,237,76,52,97,255,0
14 250 DATA 160,0,177,25,145,250,24,165
98 260 DATA 25,105,1,133,25,144,2,230
BC 270 DATA 26,230,237,24,165,250,105,1
DF 280 DATA 133,250,144,2,230,251,96,0
FF 290 DATA 169,28,133,253,169,0,133,252
D8 300 DATA 32,220,97,76,77,97,169,3
7B 310 DATA 133,253,169,128,133,252,32,220
55 320 DATA 97,76,106,97,56,165,250,229
5B 330 DATA 252,133,250,176,2,198,251,56
9A 340 DATA 165,251,229,253,133,251,96,0
59 350 DATA 0,0,0,0,0,0,0,0
8D 360 DATA 0,0,0,0,169,0,133,239
7D 370 DATA 169,0,133,29,165,6,133,7
75 380 DATA 56,169,8,229,8,170,160,8
16 390 DATA 76,28,98,234,234,234,234,234
DD 400 DATA 234,234,234,234,32,15,99,73
EA 410 DATA 255,136,192,0,240,5,106,72
7C 420 DATA 76,67,98,198,7,165,7,201
8E 430 DATA 0,240,46,230,25,165,25,201
80 440 DATA 0,240,3,76,14,98,230,26
C2 450 DATA 76,14,98,32,205,98,104,76
B1 460 DATA 33,98,162,8,165,235,48,13
F3 470 DATA 32,161,98,230,27,165,27,201
01 480 DATA 0,208,2,230,28,230,235,96
D6 490 DATA 0,165,29,24,42,133,29,202
13 500 DATA 224,0,240,3,76,97,98,165
EA 510 DATA 29,32,246,98,230,25,165,25
5E 520 DATA 201,0,208,2,230,26,96,160
21 530 DATA 0,169,64,133,28,169,0,133
B3 540 DATA 27,169,0,145,27,230,27,165
E6 550 DATA 27,201,0,208,2,230,28,165
EC 560 DATA 28,201,97,240,3,76,137,98
EE 570 DATA 96,162,8,165,29,32,246,98
2A 580 DATA 169,0,133,29,96,160,0,177
52 590 DATA 25,133,29,69,9,234,234,145
CA 600 DATA 25,32,160,97,76,43,97,0
54 610 DATA 0,0,0,0,0,0,0,0
01 620 DATA 0,0,0,0,96,169,24,144
BD 630 DATA 2,169,56,141,233,98,165,29
65 640 DATA 42,133,29,202,224,0,208,3
69 650 DATA 32,74,98,165,227,240,14,165
4D 660 DATA 29,24,42,133,29,202,224,0
31 670 DATA 208,3,32,74,98,96,132,237
69 680 DATA 160,97,56,196,28,48,11,164
F1 690 DATA 238,56,196,239,48,4,160,0
33 700 DATA 145,27,164,237,230,239,96,132
E2 710 DATA 237,160,0,177,25,164,237,96
82 720 DATA 169,0,133,25,169,64,133,26
A8 730 DATA 160,0,177,25,217,84,99,208
8E 740 DATA 8,200,192,8,240,15,76,34
CF 750 DATA 99,230,25,165,25,201,0,208
9B 760 DATA 231,169,248,133,25,24,165,25
D7 770 DATA 105,16,133,25,162,0,169,255
77 780 DATA 234,234,24,42,232,228,9,208
C7 790 DATA 249,133,9,96,206,197,215,211
6B 800 DATA 210,207,207,205,2,0,6,0
CA 810 DATA 42,0,45,45,45,45,45,45
B0 820 DATA 45,45,45,45,45,54,54,54
A7 830 DATA 54,54,54,62,63,63,63,63
49 840 DATA 63,63,63,63,63,63,39,36
B0 850 DATA 36,36,36,36,36,0,45,45
AD 860 DATA 45,45,45,53,54,54,54,54
22 870 DATA 54,54,63,63,63,63,63,39
A2 880 DATA 36,36,36,36,36,36,0,39
```

aa

Hickory, Dickory, Dock

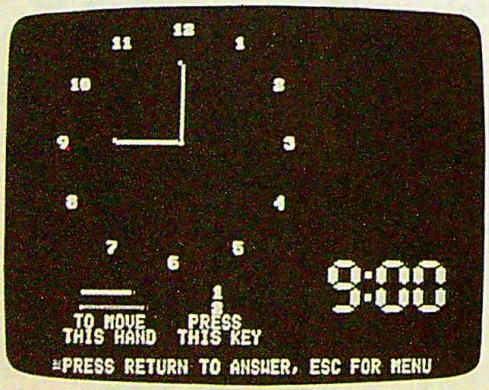
Barbara H. Schulak
Apple Version by Tim Victor

This fun, educational program helps children learn the concepts of telling time by relating a digital clock display to a conventional clock face. For all Apple II–series computers, including the II+, IIe, IIc, and IIGS using either DOS 3.3 or ProDOS.

"Hickory, Dickory, Dock" offers an enjoyable way for children to learn how to tell time. Type in the program for your computer, then save a copy before running it.

When you run Hickory, Dickory, Dock, it displays a round clock face as well as a digital display. Four different activities are available. The first option lets youngsters practice telling time. As the positions of the clock hands change on the screen, the digital clock display changes as well. This shows the relationship between the spatial position of hands on a clock face and the numeric representation of time.

The other three activities test a youngster's time-telling ability for hours only, hours and half-hours, or five-minute intervals.



"Hickory, Dickory, Dock" teaches children how to tell time by matching the hands on a clock with a digital display.

To move the hands to the correct position, press the 1 key to shift the minutes hand and the 2 key to move the hours hand. Press Return when the hands are in the right places. After three incorrect choices, the program automatically moves the clock hands to the correct position.

Hit the Esc (Escape) key to return to the main menu.

Hickory, Dickory, Dock

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
6F 100 PI = 4 * ATN (1)
ED 110 DIM DP(4,7),CX(12),CY(12)
77 120 GOSUB 840: GOSUB 960: GOSUB 1120: G
       OSUB 1160: POKE 6,0: POKE 7,138
25 130 IF PEEK (190 * 256) = 76 THEN PRINT
        CHR$ (4);"PR#A$300": GOTO 150
BA 140 POKE 54,0: POKE 55,3: CALL 1002
32 150 HGR : GOSUB 510
39 160 HGR : HOME : GOSUB 600
1E 170 VTAB 19: HTAB 16: PRINT "1": HTAB 1
       6: PRINT "2"
1C 180 FOR I = 0 TO 1: HCOLOR= 5 + I: FOR
       J = 0 TO 1: HPLOT 18,147 + J + 8 *
       I TO 52 + 8 * I,147 + J + 8 * I: NE
       XT : NEXT
85 190 VTAB 21: HTAB 3: PRINT "TO MOVE";:
       HTAB 14: PRINT "PRESS": HTAB 2: PRI
       NT "THIS HAND";: HTAB 13: PRINT "TH
       IS KEY"
BB 200 CH = 213: FOR CV = 138 TO 150 STEP
       12: GOSUB 770: NEXT
3C 210 FOR I = 1 TO 4:DD(I) = 10: FOR J =
       1 TO 7:DP(I,J) = 0: NEXT : NEXT
E5 220 HH = 84:HV = 35:MH = 83:MV = 24
D7 230 IF GM = 1 THEN 410
46 240 NW = 0:TH = INT ( RND (1) * 12) + 1
       :TM = INT ( RND (1) * 60)
1F 250 IF GM = 2 THEN TM = 0
B7 260 IF GM = 3 THEN TM = 30 * INT (TM /
       30)
5D 270 IF GM = 4 THEN TM = 5 * INT (TM / 5
       )
77 280 HR = TH:MN = TM: GOSUB 610
C5 290 HR = 1:MN = 0
```

```
4C 300 VTAB 24: HTAB 2: PRINT "PRESS RETUR
       N TO ANSWER, ESC FOR MENU";
4F 310 GOSUB 670
CF 320 GOSUB 460: IF A$ = CHR$ (27) THEN 1
       50
33 330 IF A$ = CHR$ (13) THEN 350
96 340 GOTO 310
23 350 IF TH = HR AND TM = MN THEN 390
47 360 NW = NW + 1: IF NW < 3 THEN VTAB 24
       : HTAB 2: PRINT SPC( 38);: HTAB 5:
       PRINT "THAT IS NOT CORRECT, TRY AGA
       IN";: FOR I = 1 TO 1000: NEXT : GOT
       O 300
C8 370 HR = TH:MN = TM: GOSUB 670: VTAB 24
       : HTAB 2: PRINT SPC( 38);: HTAB 7:
       PRINT "THIS IS THE CORRECT ANSWER";
DE 380 FOR I = 1 TO 1500: NEXT : GOTO 240
37 390 VTAB 24: HTAB 2: PRINT SPC( 38);: H
       TAB 10: PRINT "CORRECT! GOOD ANSWER
       ";
7F 400 FOR I = 1 TO 1000: NEXT : GOTO 240
DD 410 VTAB 24: HTAB 11: PRINT "PRESS ESC
       FOR MENU";
B9 420 HR = 1:MN = 0
89 430 GOSUB 610: GOSUB 670
D4 440 GOSUB 460: IF A$ = CHR$ (27) THEN 1
       50
1C 450 GOTO 430
2A 460 VTAB 24: HTAB 1: GET A$: IF A$ = CH
       R$ (27) THEN RETURN
94 470 IF A$ = CHR$ (13) THEN RETURN
8E 480 IF A$ = "1" THEN HR = HR + 1 - 12 *
        (HR = 12): RETURN
EF 490 IF A$ = "2" THEN MN = MN + 5 - 60 *
        (MN = 55): RETURN
16 500 GOTO 460
56 510 TEXT : HOME : VTAB 6: HTAB 8: PRINT
        "PRESS KEY TO CHOOSE GAME:"
6B 520 VTAB 10: HTAB 7: PRINT "1: PRACTICE
       "
BA 530 VTAB 12: HTAB 7: PRINT "2: HOURS TE
       ST"
2D 540 VTAB 14: HTAB 7: PRINT "3: HOURS AN
       D HALF HOURS TEST"
46 550 VTAB 16: HTAB 7: PRINT "4: 5 MINUTE
        INTERVALS TEST"
59 560 VTAB 18: HTAB 7: PRINT "5: QUIT"
26 570 VTAB 24: GET A$: IF A$ < "1" OR A$
       > "5" THEN 570
58 580 IF A$ = "5" THEN END
6B 590 GM = VAL (A$): RETURN
69 600 FOR I = 1 TO 12: VTAB CY(I): HTAB C
       X(I): PRINT I: NEXT : RETURN
CE 610 DE = 1:HC = 160:DC = INT (HR / 10):
        IF DC = 0 THEN DC = 10
AC 620 IF DC < > DD(1) THEN GOSUB 790
45 630 DD(1) = DC:HC = 186:DE = 2:DC = HR
       - 10 * INT (HR / 10): IF DC < > DD(
       2) THEN GOSUB 790
6F 640 DD(2) = DC:HC = 220:DE = 3:DC = INT
        (MN / 10): IF DC < > DD(3) THEN GO
       SUB 790
04 650 DD(3) = DC:HC = 246:DE = 4:DC = MN
       - DC * 10: IF DC < > DD(4) THEN GOS
       UB 790
13 660 DD(4) = DC: RETURN
95 670 HCOLOR= 0: GOSUB 700: GOSUB 720
A7 680 GOSUB 690: GOSUB 710: RETURN
E3 690 A = (HR / 6 + MN / 360) * PI:HV = 6
       8 - 33 * COS (A):HH = 84 + 44 * SIN
        (A): HCOLOR= 5
F6 700 HPLOT 84,68 TO HH,HV: HPLOT 83,67 T
       O HH - 1,HV - 1: RETURN
94 710 A = MN / 30 * PI:MV = 68 - 44 * COS
        (A):MH = 83 + 59 * SIN (A): HCOLOR
       = 6
DC 720 HPLOT 84,68 TO MH,MV: HPLOT 83,67 T
       O MH - 1,MV - 1: RETURN
65 730 FOR I = - 2 TO 2: HPLOT CH + I,CV -
        4 + ( ABS (I) = 2) TO CH + I,CV +
       4 - ( ABS (I) = 2): NEXT
1F 740 RETURN
5B 750 FOR I = - 1 TO 1: HPLOT CH - 5 - (I
        = 0),CV + I TO CH + 5 + (I = 0),CV
       + I: NEXT
23 760 RETURN
27 770 HCOLOR= 2: FOR I = - 2 TO 2: HPLOT
       CH + I,CV - 2 + ( ABS (I) < 2) TO C
       H + I,CV + 2 - ( ABS (I) < 2): NEXT
27 780 RETURN
8B 790 CI = 0:CH = HC + 10: FOR CV = 132 T
       O 156 STEP 12: GOSUB 830: IF DP(DE,
       CI) < > PC THEN GOSUB 750:DP(DE,CI)
        = PC
FF 800 NEXT
7A 810 FOR CV = 138 TO 150 STEP 12: FOR CH
        = HC + 2 TO HC + 18 STEP 16: GOSUB
        830: IF DP(DE,CI) < > PC THEN GOSU
       B 730:DP(DE,CI) = PC
5E 820 NEXT : NEXT : RETURN
CB 830 CI = CI + 1:PC = VAL ( MID$ (SS$(DC
       ),CI,1)): HCOLOR= 2 * PC: RETURN
F0 840 FOR I = 35456 TO I + 72 STEP 8: POK
       E I,128: POKE I + 7,128
D8 850 FOR J = 1 TO 6: READ A: POKE I + J,
       A: NEXT : NEXT : RETURN
98 860 DATA 188,230,246,238,230,188
B1 870 DATA 152,156,152,152,152,188
75 880 DATA 188,230,176,140,230,254
88 890 DATA 188,230,176,224,230,188
9F 900 DATA 176,184,180,254,176,176
5D 910 DATA 254,134,190,224,230,188
79 920 DATA 188,134,190,230,230,188
8A 930 DATA 254,224,176,152,140,140
14 940 DATA 188,230,188,230,230,188
88 950 DATA 188,230,230,252,176,152
E8 960 FOR I = 768 TO I + 87: READ A: POKE
        I,A: NEXT : RETURN
A4 970 DATA 216,120,133,69,134,70
58 980 DATA 132,71,166,7,10,10
5B 990 DATA 176,4,16,62,48,4
A2 1000 DATA 16,1,232,232,10,134
4A 1010 DATA 27,24,101,6,133,26
8D 1020 DATA 144,2,230,27,165,40
7F 1030 DATA 133,8,165,41,41,3
6B 1040 DATA 5,230,133,9,162,8
28 1050 DATA 160,0,177,26,36,50
73 1060 DATA 48,2,73,127,164,36
57 1070 DATA 145,8,230,26,208,2
AF 1080 DATA 230,27,165,9,24,105
1F 1090 DATA 4,133,9,202,208,226
71 1100 DATA 165,69,166,70,164,71
5C 1110 DATA 88,76,240,253
A1 1120 FOR DC = 0 TO 10: READ SS$(DC): NE
       XT : RETURN
02 1130 DATA 1011111,0000101,1110110,11101
       01
14 1140 DATA 0101101,1111001,1111011,10001
       01
8E 1150 DATA 1111111,1111101,0000000
42 1160 FOR I = 1 TO 12: READ CY(I),CX(I):
        NEXT : RETURN
AC 1170 DATA 2,18,5,22,9,23
23 1180 DATA 13,22,16,18,17,12
5B 1190 DATA 16,6,13,2,9,1
65 1200 DATA 5,2,2,6,1,12
```

aa

Memory Mate

Brian Flynn

In this intriguing game of recall, your Apple II computer draws violins, knights, bunnies, and other shapes on the screen; then it quickly covers each one. You have to remember where all the objects are, and the order in which they were drawn. For Apple II+, IIe, IIc, and IIGS computers using either DOS 3.3 or ProDOS.

"Memory Mate" is a one-player game that can challenge anyone's memory. With its six difficulty levels and two speeds on the Apple IIGS, this game can be played by children and adults alike.

Enter The Shapes

Memory Mate consists of two program files. The first, Program 1, is the actual game. It's written in BASIC and can easily be typed in using "Apple Automatic Proofreader," an error-checking utility found elsewhere in this issue.

Program 2, though, is a MLX listing that creates a binary shape file. This file is read by Program 1 and generates the eight highly-detailed object shapes you see on the screen.

To type in Program 2, run "Apple MLX" and answer the prompts like this:

```
STARTING ADDRESS? 4000
ENDING ADDRESS?   43E9
```

You'll see an options menu—press E for Enter. If you're just beginning to enter Program 2, specify the starting address by typing in **4000**. (If you're picking up from a prior typing session, enter the address which follows your last entry.)

When you've typed in all of Program 2, save it to the same disk as Program 1 by pressing S for Save. This next step is important—*make sure you name the file* MM.SHAPE. *Otherwise, Memory Mate will not be able to load the binary shape file, and the program won't work.*

More And More Memory

Run Memory Mate and answer the question about the kind of display you're using. The program then reads the binary shape file and displays this menu:

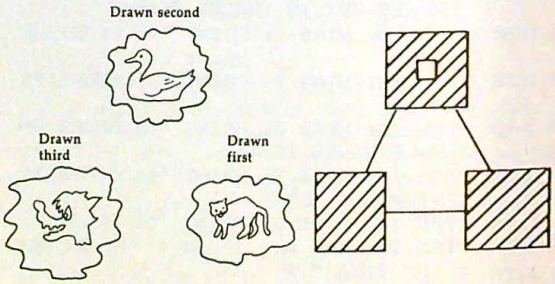
```
GAME (3 = EASIEST)
     3 TRIANGLE
     4 BOX
     5 PENTAGON
     6 PYRAMID
     7 V
     8 CIRCLE
  ==>
```

The easiest level (3) draws three objects in the shape of a triangle, while the most difficult draws eight objects in a circle.

To learn how to play, start with a triangle. This is the easiest game, and a good place to learn the rules.

Assume that the computer draws a cat, a duck, and a fox on the screen—in that order, and in the locations you see in the figure below. After covering all the creatures, the cursor is repositioned at the top of the triangle.

The Easiest Level



Move the cursor by using the space bar. Press it six times, and you'll see the cursor fly from one box of the triangle to another. But where do you want it to stop? The rightmost box is the correct answer since an object was drawn there first.

Hit C for cat—the cat was drawn before any other creature. Next, move the cursor to the highest box of the triangle and hit D for duck. Then hit F for fox in the remaining square.

That wasn't too bad, was it? But then again, this was the easiest game. Try the pentagon, and you'll have five objects and five positions to remember, or ten pieces of information in all.

On The Apple IIGS

If you're playing Memory Mate on an Apple IIGS, you have two game speeds to choose

from. This has nothing to do with the program itself, but comes from the fact that your IIGS computer has two operating speeds.

Before running Memory Mate, press Option-Control-Reset (press all three keys at the same time). Press 1 to enter the Control Panel, then use the cursor keys to select System Speed. Hit Return.

If you want to run Memory Mate at its normal speed, make sure that *Normal* is displayed alongside System Speed on this screen. Normal speed would be best for those beginning to learn how to play, or for younger children.

But if you want a real challenge, where the shapes are drawn and covered more than twice as fast, use the cursor keys to display *Fast* beside System Speed. Fast Memory Mate is doubly difficult, even on the lower levels.

Once you've made your choice, press Return, quit the Control Panel, and the disk in the drive will reboot. You can then run Memory Mate.

Program 1: Memory Mate

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
17 100 LOMEM: 17500
8F 110 REM MEMORY MATE
A8 120 REM INITIALIZE
45 130 GOSUB 230
5D 140 REM PLAY GAME
4F 150 GOSUB 830
EC 160 REM PLAY AGAIN
8F 170 VTAB 24: HTAB 12: PRINT "PLAY AGAIN
       (Y/N) ? ";BELL$;
62 180 GET S$
E4 190 IF S$ = "Y" OR S$ = "y" THEN 150
F6 200 IF S$ < > "N" AND S$ < > "n" THEN 1
       70
E2 210 TEXT : HOME : PRINT "BYE-BYE"
8E 220 END
AB 230 REM INITIALIZE
2B 240 REM TITLE
4B 250 GOSUB 330
B8 260 REM INSTRUCTIONS
5B 270 GOSUB 390
58 280 REM VALUES
53 290 GOSUB 520
F6 300 REM SHAPES
58 310 GOSUB 770
17 320 RETURN
2A 330 REM TITLE
2D 340 PRINT CHR$ (21): TEXT : HOME
D6 350 VTAB 12: HTAB 15: PRINT "MEMORY MAT
       E"
FC 360 FOR PAUSE = 1 TO 2000: NEXT
94 370 BELL$ = CHR$ (7):Z = - 16336: REM C
       LICK
23 380 RETURN
8F 390 REM INSTRUCTIONS
47 400 HOME
AD 410 PRINT "I'M ABOUT TO DRAW BETWEEN 3
       AND 8 ITEMS"
3D 420 PRINT "ON YOUR SCREEN. I'LL COVER U
       P EACH ONE"
9E 430 PRINT "AS I GO.": PRINT
3A 440 PRINT "TRY TO RECALL WHERE EACH OBJ
       ECT IS, AND"
25 450 PRINT "THE ORDER IN WHICH I DREW IT
       ."
33 460 VTAB 9: HTAB 1: PRINT "ARE YOU USIN
       G A COLOR MONITOR (Y/N) ? ";BELL$;
63 470 GET S$
8C 480 IF S$ < > "Y" AND S$ < > "y" AND S$
        < > "N" AND S$ < > "n" THEN 460
2C 490 K1 = 3:K2 = 3
84 500 IF S$ = "Y" OR S$ = "y" THEN K1 = 5
       :K2 = 6
17 510 RETURN
4F 520 REM VALUES
E1 530 : REM X & Y COORDINATES
B5 540 DATA 140,50,100,100,180,100
E8 550 DATA 175,50,105,50,105,100,175,100
81 560 DATA 140,40,85,80,110,120,170,120,1
       95,80
8C 570 DATA 140,30,105,75,175,75,70,120,14
       0,120,210,120
1B 580 DATA 50,26,80,58,110,90,140,122,170
       ,90,200,58,230,26
75 590 DATA 140,21,87,35,66,80,87,124,140,
       138,193,124,214,80,193,35
1C 600 FOR I = 3 TO 8
E4 610 FOR J = 1 TO I
C6 620 READ XC(I,J),YC(I,J)
A9 630 NEXT J,I
4F 640 : REM OBJECTS
E8 650 DATA DUCK,FOX,CAT,WITCH,VIOLIN,KNIG
       HT,APPLE,BUNNY
26 660 FOR I = 1 TO 8
4F 670 READ NM$(I)
8E 680 NEXT
B8 690 NM$(7) = NM$(7) + CHR$ (32) + CHR$
       (32)
A6 700 TIME = 2000: REM TIME TO VIEW SHAPE
8E 710 : REM FIGURES
D2 720 DATA TRIANGLE,BOX,PENTAGON,PYRAMID,
       V,CIRCLE
23 730 FOR I = 3 TO 8
A6 740 READ FIG$(I)
89 750 NEXT
23 760 RETURN
89 770 REM SHAPES
5A 780 HOME
2B 790 VTAB 12: HTAB 17: PRINT "READING"
F5 800 PRINT CHR$ (4);"BLOAD MM.SHAPE"
95 810 POKE 233,64: POKE 232,0
1C 820 RETURN
BB 830 REM GAME
A5 840 : REM DIFFICULTY
57 850 GOSUB 930
52 860 : REM APPLE'S TURN
E2 870 GOSUB 1040
F4 880 : REM HUMAN'S TURN
E6 890 GOSUB 1610
84 900 : REM VICTORY
6E 910 IF GAME$ = "ON" THEN GOSUB 2300
1D 920 RETURN
59 930 REM DIFFICULTY
64 940 TEXT : HOME
54 950 VTAB 4: HTAB 11: PRINT "GAME (3 = E
       ASIEST)"
2B 960 FOR I = 3 TO 8
B0 970 VTAB 2 * I + 1: HTAB 15: INVERSE :
       PRINT I;: NORMAL : PRINT CHR$ (32);
       FIG$(I)
11 980 NEXT
A4 990 VTAB 20: HTAB 14: PRINT "==> ";BELL
       $;
54 1000 GET S$
97 1010 K = VAL (S$)
E6 1020 IF K < 3 OR K > 8 THEN 990
```

```
DD 1030 RETURN
FE 1040 REM APPLE'S TURN
FB 1050 HOME : VTAB 8: HTAB 14: PRINT "FIG
      URE: ";: INVERSE : PRINT FIG$(K)
A5 1060 : REM GET X&Y COORDINATES
63 1070 GOSUB 1130
28 1080 : REM GET NAMES
87 1090 GOSUB 1260
EB 1100 : REM DRAW
85 1110 GOSUB 1390
DB 1120 RETURN
44 1130 REM COORDINATES
9D 1140 : REM RANDOM DIGITS
A2 1150 FOR I = 1 TO K:SQ(I) = 0: NEXT
25 1160 FOR I = 1 TO K
4F 1170 V = INT (K * RND (1) + 1): IF SQ(V
      ) < > 0 THEN 1170
D6 1180 SQ(V) = I
C7 1190 NEXT
3B 1200 : REM SHUFFLE X&Y VALUES
13 1210 FOR I = 1 TO K
75 1220 X(I) = XC(K,SQ(I))
8B 1230 Y(I) = YC(K,SQ(I))
B5 1240 NEXT
E9 1250 RETURN
4B 1260 REM NAMES
AB 1270 : REM RANDOM DIGITS
61 1280 FOR I = 1 TO K:R(I) = 0: NEXT
33 1290 FOR I = 1 TO K
42 1300 V = INT (K * RND (1) + 1): IF R(V)
      < > 0 THEN 1300
83 1310 R(V) = I
AF 1320 NEXT
A6 1330 : REM ASCII VALUES OF FIRST LETTER
      S
21 1340 FOR I = 1 TO K
21 1350 N$ = NM$(R(I))
AD 1360 LTR(I) = ASC ( LEFT$ (N$,1))
C3 1370 NEXT
F7 1380 RETURN
F6 1390 REM DRAW
FE 1400 VTAB 12: HTAB 7: PRINT "<SPACE BAR
      >";: NORMAL : PRINT " MOVES THE CU
      RSOR"
82 1410 VTAB 14: HTAB 7: PRINT "& FIRST LE
      TTER GETS AN OBJECT"
B6 1420 VTAB 23: HTAB 14: PRINT "PRESS ANY
       KEY"
BB 1430 R = RND (1): IF PEEK ( - 16384) <
      128 THEN 1430
DF 1440 POKE - 16368,0
0F 1450 HOME : HGR : ROT= 0: SCALE= 1
A3 1460 : REM SHAPES
2F 1470 FOR I = 1 TO K
6F 1480 GOSUB 1510
97 1490 NEXT I
DB 1500 RETURN
A7 1510 REM SHAPES
E3 1520 X = X(I):Y = Y(I)
1F 1530 : REM SHAPE
F4 1540 HCOLOR= K1: DRAW R(I) AT X,Y
6A 1550 FOR PAUSE = 1 TO TIME: NEXT PAUSE
A1 1560 : REM BOX
38 1570 FOR J = Y - 12 TO Y + 12
7D 1580 HCOLOR= K2: DRAW 11 AT X,J: DRAW 1
      2 AT X,J
9A 1590 NEXT J
DD 1600 RETURN
9D 1610 REM HUMAN'S TURN
DF 1620 FOR I = 1 TO K:BX(I) = 0: NEXT
8E 1630 : REM DISPLAY WORDS
73 1640 GOSUB 1720
2B 1650 FOR I = 1 TO K
75 1660 : REM SELECT
F6 1670 IF GAME$ = "ON" THEN GOSUB 1790
74 1680 : REM EVALUATE
D4 1690 IF GAME$ = "ON" THEN GOSUB 2070
79 1700 NEXT I
E3 1710 RETURN
DD 1720 REM WORDS
A5 1730 VTAB 21: HTAB 1
29 1740 FOR I = 1 TO K
FB 1750 INVERSE : PRINT LEFT$ (NM$(I),1);:
       NORMAL : PRINT MID$ (NM$(I),2); S
      PC( 1);
C7 1760 NEXT
FA 1770 GAME$ = "ON"
FF 1780 RETURN
B2 1790 REM SELECT
3C 1800 VTAB 24: HTAB 16: NORMAL : PRINT "
      OBJECT# ";: INVERSE : PRINT I;: NO
      RMAL
DF 1810 H = 0
4C 1820 H = H + 1: IF H = K + 1 THEN H = 1
92 1830 IF BX(H) = - 9 THEN 1820: REM OBJE
      CT IDENTIFIED
43 1840 X = XC(K,H):Y = YC(K,H): HCOLOR= 0
      : DRAW 9 AT X,Y
DB 1850 : REM GET ENTRY
87 1860 GOSUB 1920
BC 1870 IF A = 32 THEN CLICK = PEEK (Z): H
      COLOR= K2: DRAW 9 AT X,Y: GOTO 182
      0
E6 1880 : REM CHECK LEGALITY
69 1890 GOSUB 2010
54 1900 IF M$ = "ILLEGAL" THEN PRINT BELL$
      ;: GOTO 1860
E7 1910 RETURN
44 1920 REM ENTRY
89 1930 FOR J = 3 TO 0 STEP - 3
06 1940 HCOLOR= J: DRAW 10 AT X,Y
14 1950 FOR PAUSE = 1 TO 10:P = PEEK ( - 1
      6384): NEXT PAUSE
96 1960 NEXT J
E7 1970 IF P < 128 THEN 1930
F9 1980 POKE - 16368,0
4D 1990 A = P - 128: IF A > 96 THEN A = A
      - 32
D2 2000 RETURN
90 2010 REM LEGALITY
94 2020 M$ = "ILLEGAL"
98 2030 FOR J = 1 TO K
A7 2040 IF A = LTR(J) THEN M$ = "LEGAL":J
      = K
81 2050 NEXT J
EA 2060 RETURN
19 2070 REM EVALUATE
FD 2080 IF NOT (A = LTR(I) AND H = SQ(I))
       THEN GAME$ = "OVER": GOSUB 2110
AE 2090 IF GAME$ = "ON" THEN BX(H) = - 9:
      GOSUB 2210
D4 2100 RETURN
D5 2110 REM WRONG ANSWER
0A 2120 VTAB 24: HTAB 15: PRINT SPC( 15);:
       HTAB 17: FLASH : PRINT "WRONG";:
      NORMAL
BF 2130 FOR J = 1 TO 200:CLICK = PEEK (Z):
       NEXT J: FOR J = 1 TO 1000: NEXT J
B1 2140 VTAB 24: HTAB 9: PRINT "VIEW OBJEC
      T# ";I;" (Y/N) ? ";BELL$;
4C 2150 GET S$:V = ASC (S$): IF V > 96 THE
      N V = V - 32
12 2160 L$ = CHR$ (V)
9A 2170 IF L$ < > "Y" AND L$ < > "N" THEN
      2140
F1 2180 IF L$ = "Y" THEN X = XC(K,SQ(I)):Y
       = YC(K,SQ(I)): GOSUB 2210
1F 2190 VTAB 24: HTAB 9: PRINT SPC( 22);
```

```
D6 2200 RETURN
82 2210 REM DRAW OBJECT
8C 2220 : REM BOX
8D 2230 HCOLOR= 0
27 2240 FOR J = Y - 12 TO Y + 12
47 2250 DRAW 11 AT X,J: DRAW 12 AT X,J
89 2260 NEXT J
68 2270 : REM OBJECT
FF 2280 HCOLOR= K1: DRAW R(I) AT X,Y
FA 2290 RETURN
82 2300 REM VICTORY
A9 2310 VTAB 21: HTAB 1: PRINT SPC( 46)
1D 2320 VTAB 21: HTAB 13: INVERSE : PRINT
      "CONGRATULATIONS!";: NORMAL
9A 2330 FOR I = 1 TO 10: PRINT BELL$;: NEX
      T
E8 2340 RETURN
```

Program 2: MM.SHAPE

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
4000: 0C 00 1A 00 6A 00 D8 00 CE
4008: 57 01 C7 01 F9 01 91 02 76
4010: FE 02 94 03 C7 03 D5 03 4C
4018: DF 03 27 3C 2C 2C 32 2E 96
4020: 3E 3E 2E 36 2D 2E 2D 2C 21
4028: 25 2D 15 2E 2E 3D 27 3F FF
4030: 3E 3C 3F 3E 37 27 17 17 46
4038: 27 2C 27 27 3C 24 3C 24 BD
4040: 3D 24 27 3C 3C 34 36 35 65
4048: 2F 2E 36 36 35 36 35 2E 31
4050: 36 27 37 27 3C 3E 24 3D 6F
4058: 37 3E 3C 27 3F 2D 2D 25 2C
4060: 2C 2D 26 3C 27 25 2F 24 1B
4068: 04 00 25 24 24 3F 3E 27 93
4070: 21 3F 26 0C 2D 2E 2C 2E 7F
4078: 2C 2A 35 2D 25 2D 2C 3D 86
4080: 3E 3E 3E 3F 3F 3C 37 35 F9
4088: 3D 37 35 2D 2C 2E 2C 34 95
4090: 2E 2E 2D 37 3F 27 3F 3F 21
4098: 3F 34 2E 2D 2D 2E 3F 33 32
40A0: 0E 2E 3E 2E 3F 27 24 27 64
40A8: 2C 3F 36 2E 36 3F 25 24 D5
40B0: 3C 37 3F 3E 3F 37 3F 27 65
40B8: 27 27 27 25 3F 20 0C 35 95
40C0: 36 35 2E 24 15 2E 2C 36 A1
40C8: 37 2D 24 2C 36 25 2C 2E 44
40D0: 2C 25 3F 2F 24 23 24 00 81
40D8: 2D 2E 36 3E 36 37 3F 1F 52
40E0: 23 24 2C 24 2D 24 2D 2D 45
40E8: 2E 36 36 1E 15 2D 20 25 79
40F0: 27 3D 3C 2C 2C 2C 2C 2D 36
40F8: 2E 36 36 17 17 2D 20 25 29
4100: 24 27 27 27 3F 37 24 3D 12
4108: 3C 26 27 37 36 35 3E 26 B3
4110: 27 3D 24 24 3C 36 36 36 99
4118: 27 24 24 3C 36 36 36 27 9D
4120: 24 24 3C 32 36 36 36 27 86
4128: 24 24 3C 32 36 36 36 37 9E
4130: 36 16 1F 2F 24 2C 24 2C 70
4138: 24 24 3C 3C 3C 34 3F 3F 91
4140: 2B 2A 2D 35 35 35 36 37 FD
4148: 36 37 24 27 25 27 2D 3C 07
4150: 3C 27 1F 2E 36 2D 00 20 08
4158: 27 2C 24 2D 26 3D 24 3D 7C
4160: 27 3F 34 35 2E 3F 17 2E EA
4168: 35 0E 0E 35 2D 2D 0C 25 79
4170: 29 0C 1E 37 1A 13 1B 3B 50
4178: 17 37 2E 3E 36 37 37 37 32
4180: 3C 37 3C 3F 25 2D 25 1F B1
4188: 0C 0D 26 25 27 0D 3C 3F 90
4190: 3E 3E 37 33 38 1E 36 37 D1
4198: 3F 24 25 25 09 25 21 28 02
41A0: 25 25 3D 1F 3E 25 2C 25 9C
41A8: 2D 29 25 1F 3F 24 27 38 B3
41B0: 3E 3C 3A 3E 3C 32 3D 27 D8
41B8: 17 37 2D 2E 26 2D 20 29 6C
41C0: 2D 3E 37 3D 37 06 00 29 1F
41C8: 35 37 27 37 3E 34 37 2F 6C
41D0: 35 37 3D 36 3B 3F 2C 2C 22
41D8: 3D 3F 37 3C 2C 25 1F 2C D4
41E0: 28 26 2C 2E 26 25 2F 2C B9
41E8: 26 25 27 25 2D 3E 2E 29 E6
41F0: 1C 0C 0C 0C 0C 0C 2C 36 E5
41F8: 00 24 24 24 2C 3C 24 25 0B
4200: 3F 37 2F 35 3F 2E 35 3F 87
4208: 2E 35 3F 37 2D 31 3F 3B 34
4210: 34 3F 3F 2F 2D 2D 2E 2D 01
4218: 2D 25 24 36 2D 25 25 35 E1
4220: 35 2D 2D 2D 2D 34 3D 3E F5
4228: 1B 1B 1B 36 27 3C 3E 24 92
4230: 37 3F 33 29 35 3F 3F 27 65
4238: 3F 3F 17 3F 3F 17 3F 27 FE
4240: 27 37 0A 29 2D 2D 2D 2D 9F
4248: 2D 28 2E 2D 2D 2D 3A 3F D7
4250: 3F 3F 3B 3F 3F 3F 3F 2F 44
4258: 2E 2D 2D 2D 2D 0D 2D 2D DC
4260: 2D 3E 3F 3F 1F 3B 3F 3F 8A
4268: 3F 3F 2E 2D 2D 2D 2D 2D 9A
4270: 2D 2D 2D 32 35 17 1E 1E FF
4278: 04 08 3C 27 25 3F 3C 3F D8
4280: 3E 3F 3F 3C 37 3F 2E 35 E7
4288: 0E 15 1F 3A 20 23 37 06 E2
4290: 00 24 24 25 24 25 35 12 27
4298: 35 2D 35 35 2E 36 36 27 DA
42A0: 24 3C 3C 3C 37 2E 36 36 A6
42A8: 0E 25 35 3E 3E 3C 36 3D 94
42B0: 37 24 24 24 24 27 24 3C E2
42B8: 36 36 2E 36 36 36 3E 24 3A
42C0: 24 24 37 36 36 27 24 24 65
42C8: 2C 24 24 3C 1C 36 36 36 11
42D0: 36 36 36 3E 24 24 24 24 C6
42D8: 24 24 3C 36 36 36 36 36 90
42E0: 36 26 27 24 24 24 24 24 4F
42E8: 37 36 36 36 36 36 3C 24 E7
42F0: 24 24 24 24 3E 36 36 36 C4
42F8: 36 24 27 24 24 00 2D 2C 70
4300: 25 2F 2C 25 25 24 25 2C EC
4308: 35 2C 2C 27 37 27 34 3E 29
4310: 36 37 37 33 3E 1C 24 2C 70
4318: 24 25 34 37 37 3E 36 36 49
4320: 3E 3E 24 25 3F 2C 24 25 44
4328: 3C 3C 34 35 36 3E 3F 2E 0D
4330: 32 3B 27 07 38 3A 3C 3C 53
4338: 24 25 3E 3E 3F 35 36 2C 2D
4340: 2C 35 35 35 15 35 25 35 21
4348: 35 2D 3E 3F 3C 16 09 2D E9
4350: 2D 25 36 35 3F 3C 3F 37 71
4358: 2D 35 2D 35 2A 2E 35 35 65
4360: 2A 2D 2E 37 27 37 27 37 1C
4368: 3F 3C 2C 25 25 3F 3E 27 3F
4370: 25 27 3C 36 36 07 20 24 70
4378: 07 38 16 35 3E 38 24 27 E8
4380: 17 2E 36 35 36 37 3F 2C 71
4388: 24 37 27 27 3C 24 35 35 58
4390: 2E 2C 05 00 2C 36 3F 24 B6
4398: 2C 2D 36 36 3F 3F 24 24 0E
43A0: 2C 2D 2D 36 36 36 3F 3F D9
43A8: 3F 24 24 24 2C 2D 2D 2D 3C
43B0: 36 36 36 36 3E 3C 3E 3C A5
43B8: 3E 3C 3E 3C 26 24 24 24 27
43C0: 24 2C 2D 2D 2D 2D 00 04 FE
43C8: 28 31 33 31 3A 38 3A 20 70
43D0: 20 33 32 2A 00 2D 2D 2D 59
43D8: 2D 2D 2D 2D 2D 2D 00 3F 17
43E0: 3F 3F 3F 3F 3F 3F 3F 3F 67
43E8: 00 FF 00 00 FF FF 00 00 6F
```

Are you searching for a special or out-of-the-ordinary electronic bulletin board? Telecommunications expert Arlan Levitan has located some of the most interesting and unusual boards around. Use your Apple or Macintosh, modem, and the phone to sign on and give them a try.

18 Intriguing Computer Bulletin Boards

Arlan R. Levitan

It's difficult to pinpoint when the first bulletin board appeared. Medieval royal proclamations were posted in the town square. Even further back, the hunters of antiquity told tales and passed down information about their prey through colorful cave drawings.

The modern bulletin board, made up of a wide variety of messages tacked to almost any surface, abounds in our supermarkets, factories, community centers, and city halls. Bulletin boards involve more than just giving away kittens or selling tires; they are where people who have a message reach out to the entire community.

The desire to share thoughts and ideas hasn't slackened in this age of instant information. In fact, the huge volume of data thrown at us every day makes something like a bulletin board even more valuable. Information must be sifted—using the experience of others is one of the most valuable filtering devices around.

That's why electronic bulletin board systems, often referred to as *BBSs*, are so popular. With all due respect to the myriad sources of information available about computers today (including this magazine), there's no substitute for that special kind of interaction possible only between two or more like minds.

The thousands of computer-based BBSs online today offer much more than simple messages. Imagine trying to maintain a series of communications with other people using a regular bulletin board at a supermarket. Actually traveling to the market every time you want to leave a message makes the idea inconvenient at best. Even if you made the trip regularly, you might miss the very reply you were looking for.

The fact that BBS systems can be accessed without leaving home makes an ongoing dialogue simple. A computer running a BBS manages the messages—not only numbering and indexing them, but also automatically notifying its many users of messages intended specifically for them. And just like a cork-and-tack bulletin board, messages posted on BBSs are public. The question-and-answer exchanges can be seen by others, who often throw in their own opinions. Even if you just "watch," you'll still learn by following the flow of conversation.

In recent years, BBSs have begun expanding into new areas. While most continue to be microcomputer related, a growing number of BBSs have steered off the beaten track. BBSs dedicated to everything from law to genealogy are appearing with increasing frequency. People with common interests search out BBSs focused on their special topic.

But such themes as medicine and real estate are almost old hat by now. For the truly unusual, the out of the ordinary, one has to look even further afield.

Here's a sampling of just some of the BBSs that are among the most unusual. All are free; your sole cost is the phone call. All phone numbers were correct and operating as of January 28, 1987. Please observe each board's rules and keep common courtesy in mind. Remember, you are a guest in the system operator's (SYSOP's) "house."

Arlan Levitan has written several computer books and writes a monthly column for COMPUTE! magazine, "Telecomputing Today."

Entertainment

Videoman
(213) 666-8588
Hollywood, CA
SYSOP: Norman H.

A public access computer for the Hollywood entertainment industry. For producers, directors, writers, and editors. Discussions of production technologies and creative techniques.

Electronic Call Board
(718) 499-1633
Brooklyn, NY
SYSOP: Bobby Ballard

Dedicated to the performing arts. Participate in electronic role playing. Aspiring actors can check for casting notices and participate in special-interest sections covering theater, film, video, music, and art. Also includes listings of stage shows playing around the country.

Call Sheet
(818) 363-3192
San Fernando, CA
SYSOP: Wayne Parsons

Primarily intended for film and television industry professionals. Messages about upcoming productions, crews, locations, and equipment needs.

The Hotline
(818) 766-6442
N. Hollywood, CA
SYSOP: None listed

If you're interested in the latest TV ratings, most popular albums, compact discs, and home videotapes, it's all here. Also some interesting BBS lists

Aviation

Aviation Connection
(214) 245-5633
Dallas, TX
SYSOP: None listed

The Aviation Connection is dedicated to those interested in flying. Drop the flaps on your modem and check in.

Cryptography

Cryptologic Research
(703) 237-4322
McLean, WV
SYSOP: Robert Jueneman
Hours: 5:30 p.m.–8:00 a.m. EST (M–F)

A service to the International Association for Cryptologic Research (IACR) and to anyone else interested in cryptography and computer security.

Hacking

The Guideboard
(415) 864-3858
San Francisco, CA
SYSOP: Unknown

Get a cabbie's eye view of the "City by the Bay." Restaurant and entertainment information also.

Gambling

The Casino BBS
(609) 652-6030
Atlantic City, NJ
SYSOP: "Dave"

Feel lucky? Find out what's happening by the Boardwalk. Bulletins cover Atlantic City casino information, and include nightlife and entertainment guides.

Collectibles

Collector's Network
(213) 204-0646
Los Angeles, CA
SYSOP: Harry Rosenfeld

Information on coins, stamps, baseball cards, and just about anything else that's collectible. Heavy trading action in the message base. Excellent BBS lists.

The Train Board
(513) 398-0928
Mason, OH
SYSOP: Decker Dogget

Information on train collecting and radio-control hobbies.

Real Genius?

MensaBBS
(305) 842-1861
Palm Beach, FL
SYSOP: Molly Campbell

A stern warning informs callers that this system is restricted to Mensa members (an association of people with very high IQs).

Guns

Bullet 'N Board
(703) 971-4491
Silver Spring, VA
SYSOP: Tanya Metaksa

F & W Guns
(714) 653-0494
Sunnymead, CA
SYSOP: None listed

Both BBSs are dedicated to the Second Amendment and firearms. News on the latest legislative happenings and weaponry. Gun show schedules and National Rifle Association information abound. One interesting note: These boards are free, but require that you register.

Law Enforcement

Crime Prevention BBS
(214) 578-1311
Plano, TX
SYSOP: Captain Lyndon Payne and others

Who needs a police scanner? Follow the saga of crime in Plano, Texas. Tips on spotting con artists, prevention of criminal mischief, and personal protection. Take a look at the "Crime of the Week."

Electronic Music

Midi World Network BBS
(213) 826-4288
Los Angeles, CA
SYSOPs: R. Moore, S. Daystrom, and J. Fitzpatrick

Excellent BBS devoted to MIDI-related computer use. Highly recommended if one of your keyboards has black and white keys.

Sports

Sports
(213) 559-7306
Los Angeles, CA
SYSOP: None listed

The latest betting lines, weather, injuries, and points. Up-and-coming game information and spirited discussion.

Top of the Rockies BBS
(303) 963-3688
Roaring Fork, CO
SYSOP: Barry Clements

Ski information for Aspen, Snowmass, Sunlight, and the rest of the country. Also tasty recipes and nutrition information.

Survival

Survival Communication Forum
Fido
(707) 545-0746
Napa Valley, CA
SYSOP: Don Kulha

Pack the freeze-dried food, hop in the jeep, and head for the mountains. And don't forget your modem-equipped laptop. Forums on survival, self sufficiency, and emergency preparedness. Discussion areas on medicine, food, alternative energy, radio communications, weaponscraft, and survival vehicles.

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Getting To Know The Apple SIGs

Chuck Doherty

An immense amount of Apple-oriented information, software, and conversation hums across telephone lines and into American homes and businesses every day. Learn how to tap into the information conduit that the special-interest groups (SIGs) and forums dedicated to Apple personal computers have to offer.

Local users' groups and electronic bulletin boards provide Apple enthusiasts with a wide array of programs and advice, but few local services can match the scope available on the national information services. Large, time-share systems such as The Source, Delphi, CompuServe, GEnie, and others have much to offer Apple owners, and are often a valuable resource for technical information, user-supported and public domain software, and lively discussion.

Getting On

Although these services may be located thousands of miles away, most provide local telephone numbers in larger metropolitan areas, or an 800 number at a slight surcharge for connecting to the database. And even if a local access number is not available, services such as Tymnet and Telenet can usually be reached locally. These systems, called *packet-switching services*, let you connect to a commercial information service at a lower cost than long-distance dialing.

Connect charges vary from service to service, and are usually higher during prime operating hours, normally between 7:00 a.m. and 6:00 p.m. Monday through Friday. The Source, for example, charges $0.43 per minute ($25.80 per hour) during prime time at 1200 bps. After 6:00 p.m. on weekdays or on weekends or holidays, though, this rate drops to $0.18 per minute ($10.80 per hour). In addition, some services charge more when you're connected at 1200 or 2400 bits per second (bps) than for 300-bps access.

Logging onto (connecting with) any service requires a valid account number and password. Some services provide an online registration feature which lets you call in without an account and establish one over the phone. CompuServe offers a subscription kit through computer retailers or directly through the mail. In this $39.95 kit, you'll find a valid account number and password, an operator's manual, and a credit for $25.00 worth of connect time.

Regardless of how a particular service requires you to register, you must have a valid account before you can use any of the service's features.

The Popular Services

One of the oldest and largest services is CompuServe, based in Columbus, Ohio. CompuServe offers a wide array of services, including several computer special-interest groups (SIGs). The menu-driven operating system of CompuServe makes it easy to find your way around and to locate the SIGs you're interested in.

CompuServe

CompuServe has six separate Apple-specific special-interest sections, with something for everyone. CompuServe's MAUG (Micronetworked Apple Users' Group), has a wide selection of technical and programming info, bug work-arounds, and general operating tips.

There's a considerable amount of information on CompuServe for Apple IIGS users, including diagnostic, graphics, and utility programs. In addition, Apple II users will find numerous tips on *AppleWorks*, various Applesoft BASIC utilities, and even hardware and repair techniques for every part of the system.

In a quick visit to the Apple Software Forum, I found a helpful tip for converting the Apple IIe/IIc delete key into a destructive backspace, along with several other interesting ideas.

The Source

The Source has its own share of Apple-specific information, and several interest groups for Apple II and Macintosh users. The Source appears to have a generally slower response time and a more complex command structure. In fact, I found it necessary to download and read several help files before I was able to use even the simplest parts of the system.

Nevertheless, the sheer size of The Source guarantees plenty of up-to-date information. And the more you use the system, obviously the more familiar you'll become with its command structure. The Source provides a lower rate when you're using some of the special-interest sections, and offers some services (such as its necessary operating tutorial) free.

Delphi

Delphi has been around now for several years and has all of the features found in the older, more established systems such as CompuServe and The Source.

Delphi's menu-driven, prompted operating system is extremely easy to use.

Delphi has several Apple special-interest groups (called *groups* or *clubs* on Delphi), although at times the level of user activity in some is low. Although this makes it seem that there's little going on, it's more a case of Delphi providing so many different subsections that not all of them are used to the fullest.

The selection of programs for downloading on Delphi is good, and many programs are available for free (public domain) or as *shareware* (where you pay the author a set fee only if you decide to use the program), while others entail a surcharge. The latter include many high-level utilities and diagnostic programs, and are almost always a bargain.

GEnie

General Electric's national telecommunications service, GEnie, is the new kid on the block, and is aggressively offering a wide array of features and low connect charges. Despite a somewhat unusual log-on sequence, GEnie's easy-to-follow, menu-driven system makes it a snap to use.

The structure of GEnie's conferences, or *round tables*, as they're called, takes some getting used to. Each conference is divided into categories, and each message is assigned a topic.

At first, the number of commands necessary to reach a particular message seems overwhelming, but after a while the logic behind the commands becomes apparent and operation is a breeze.

GEnie's downloading facility is very easy to operate and is consistent with a wide variety of telecommunications software. The selection of software for Macintosh users is outstanding, and includes many new programs that you're not likely to find anywhere else. Apple II and IIGS users will also find plenty to choose from. A list of files available for download showed over 1200 different programs available.

Downloading Software

There are a number of methods by which you can download programs and text from online services. The simplest is the *capture*.

This is a function in which the information coming from the service is recorded and stored as an ASCII (American Standard Code for Information Interchange) file, and is found in most communications software. You can use the capture method to record Applesoft BASIC programs as text files, which may then be converted into BASIC programs with the Applesoft EXEC command.

When downloading binary or machine language programs, you must usually use some type of error-correcting protocol. One of the most popular communications protocols is XMODEM, which sends data in 128-byte blocks and verifies each block as it's received. At 1200 bps, XMODEM protocol sends about one block per second. This technique prevents line noise errors from resulting in lost data. Each of the major services supports XMODEM protocol, and most popular Apple communications software (such as *ASCII Express*) do as well.

The actual process for downloading a program is easy—simply select the program you want (either by name or number), specify the protocol to be used, and the communications software does the rest. The time required to download a file depends on its size. Some large programs can take as long as 20 or 30 minutes to download at 1200 bps, and four times longer at 300 bps, although a typical program downloads in just a minute or two.

Discussion Groups

On most services, discussion groups are organized in such a way that you can follow the course of a particular subject, without reading every message in the system to see which are related. For instance, one message may ask for technical help in getting a certain program to work with a particular hardware option. Several days and dozens of messages later, someone leaves a reply with a solution. A few days after that, another user checks in with a further comment. The message-handling part of the system automatically groups these related messages together, making it easier to follow the discussion.

On Delphi, I followed the course of an interesting discussion regarding Apple IIe system crashes caused by a particular modem/serial-card combination. After a few messages passed back and forth, a user was able to come up with a software-based solution that seemed to do the trick.

The level of technical discussions on the services runs the gamut from simple, "How do I get this to do that?" questions to very advanced subjects from professional software developers.

Because there's such a wide array of subject matter, novice users have no reason to feel intimidated by asking a basic question, and experienced users know that it's likely there is someone on the service who can answer any question asked.

Along with message-and-reply-style conferences, all of the

services offer realtime conferences with users throughout the country. In one such conference, I "chatted" with an Apple user in Seattle, another in Dayton, and still another in Boston. These online conferences are available by subject (such as for Apple II or Macintosh enthusiasts), or in an open format where any subject may come up. In some online conferences, the discussions can become quite lively.

Most services schedule special-interest conferences ahead of time to allow anyone who is interested ample time to check in. In addition, some services schedule guest speakers, often well-known computer developers, to address users via a realtime conference. Users can usually ask questions of the speaker and get a reply immediately. Because some of these conferences can attract a large number of users, they're often structured to allow only a limited amount of two-way communications.

Getting The Most From A Service

Because the connect charges for online services can add up quickly, it's best to have a clear idea of what you want to do before logging on. One technique that works well, especially when downloading programs, is to log on and download a list of available programs, then disconnect from the service and print out the list. After reading the descriptions and selecting the programs you want, log back onto the system and download only those programs you're interested in.

Although there are many national services to choose from, most users select one service and stick with it. After using one system for a while, you'll learn shortcuts that will allow you to go quickly from one section to another, saving both time and money. In addition, you'll soon develop a group of online friends who share your skills and interests.

Chuck Doherty is a freelance writer and computer consultant whose work has appeared in a variety of computer and audio publications.

Gems In The Rough

Gregg Keizer, Editor

One of the major attractions to large, well-run Apple SIGs is the sheer number of high-quality applications, games, utilities, and just plain strange software you can download. For many people, downloading new software, then trying it out, is what services like CompuServe, The Source, GEnie, and Delphi—all of which have extensive program libraries—are all about.

Almost everyone knows you can download software from commercial services. But just what *kind* of software? Software junk or software jewels?

At The Oasis

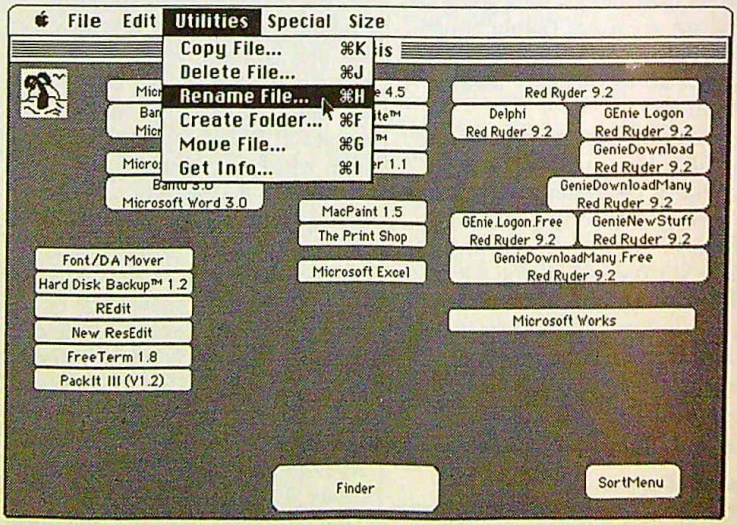
One example of the topnotch software you can download from an Apple SIG is the Macintosh program called *Oasis*. A Finder replacement that's best used on a hard disk, *Oasis* is *shareware*. That means you pay the author only if you use the program. If you decide the program's not for you, you simply pass it on to someone else or erase it from your disk.

There's a reason for replacing the Finder, especially when you're using a hard disk. Every time you quit from an application, the Finder must rebuild the desktop before it's displayed. If there's a large number of files, folders, or even volume partitions, it can take the Finder a long time—sometimes close to a minute—to rebuild the desktop. Using a Finder substitute like *Oasis* means that delays when quitting are minimal.

Once properly installed in the System folder on your disk, *Oasis* effectively takes the place of the Finder. Anytime you quit another application, you return to *Oasis*, not the Finder. And it's within the *Oasis* environment that you'll do all your desktop-style work, from copying or deleting files to renaming or commenting them.

But that's just a small part of what *Oasis* does. Its primary function is to launch applications, something you normally do by double-clicking on an icon found on the desktop. Finding an application on a folder-strewn hard disk desktop can be difficult, but with *Oasis* all you have to do is click on a labeled button.

With *Oasis* you can customize the screen with application-launching buttons in whatever size or pattern best fits your needs. Even better, you can create buttons that, when clicked, open a



Oasis *is an excellent Finder replacement which you can easily customize. Simply click on any of the buttons to launch an application. Note the utilities available in the pull-down menu.*

particular document of a specific application (the only restriction seems to be that both the application and the document must be in the same volume—on the same disk if you're using floppies; in the same drawer or partition if your hard disk allows these things). This is the same as double-clicking on a document (assuming its application is available), but faster—you don't have to paw through folders looking for the document.

Creating, resizing, moving, deleting, and renaming your custom buttons is usually as simple as clicking the mouse. File maintenance—renaming, deleting, copying, and so on—is easily done from within *Oasis*. If you want, you can even create a button labeled *Finder* that sends you to the Finder.

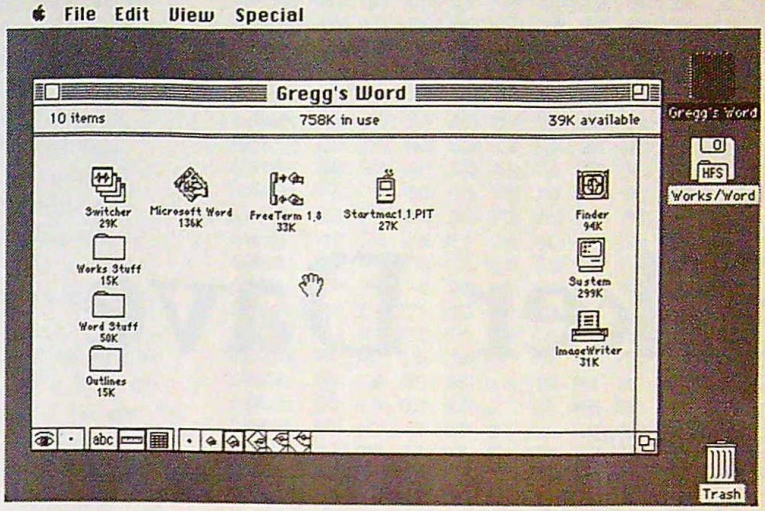
In several months of operation, *Oasis* hasn't presented any significant problems. It's well-designed, fast, and efficient, all hallmarks of high-quality software.

Your Servant

Another example of the kind of quality you can find in SIG software is *Servant*, another Finder replacement. Written by Andy Hertzfeld, who wrote portions of the Macintosh's system software, a beta test version (in other words, a prerelease version) of *Servant* can be found in several of the Apple SIGs.

Not every feature of *Servant* is implemented, but what does work clearly shows the program's potential. You still see a desktop, but when you open a volume by double-clicking on a disk, the window looks different.

Servant is an application that combines functions of the Finder, *Switcher*, and a resource editor. When *Servant* is fully functional, you'll still be able to carry out all the traditional desktop maintenance duties (copying and deleting files, organizing files in folders, and the like). But when you run an application under *Servant*, another menu selection appears at the top of the bar. Pull down this menu and you'll see Servant listed. Select it and the desktop-style window appears on the screen. From here you can run another program (or more if your computer has the memory). You've effectively duplicated *Switcher*—the Macintosh program which lets you keep more than one program in memory at a time. It's easy to move back and forth between applications, cutting and pasting from one to the other. For the moment, you still must use *Switcher* to size the partitions—if you don't, they default to 256K each.



Servant's desktop window looks considerably different from the usual Finder. The icons at the bottom of the window control the movement and size of the icons, as well as what's displayed beneath them.

Not only do you have Finder- and *Switcher*-style features at your command, but you can also edit an application's resources, the data that makes the program what it is. For instance, you can alter the menu items by renaming them or adding (or changing) the Command key sequences. Or you can modify an icon on the desktop, turning one of those bland generic Macintosh icons into something a bit more descriptive.

Servant isn't finished yet—a number of features are still not functional. That's part of the attraction of the program, though, for few computer users get a chance to see software as a work in progress. Much of the software found in the Apple SIGs, however, is just that—still in progress. Software authors who upload their work to a SIG (whether that software is free or shareware) often seem to be more interested in the process than the finished work, going so far as to continually update their program(s).

Jewels And Junk

Oasis and *Servant* are just two samples of the kind of Apple programs you can find on a broad-based SIG. You'll find some junk software as well, but jewels like these make SIG membership what it is—interesting, useful, and informative.

CompuServe

P.O. Box 20212, Columbus, OH 43220, (800) 848-8199
Registration Fee $39.95; Prime-time Access $12.50/hr (300 bps) $15.00/hr (1200 bps); Non-prime-time $6.00/hr (300 bps) $12.50/hr (1200 bps)

Delphi

3 Blackstone Ct., Cambridge, MA 02139, 800-544-4005
Registration Fee $49.95; Prime-time Access $17.40/hr; Non-prime-time $7.20/hr

General Electric Information Services

410 N. Washington St., Rockville, MD 20850, (800) 638-9636, ext. 21
Registration Fee $18; Prime-time Access $35/hr; Non-prime-time $5/hr

The Source

1616 Anderson Rd., McLean, VA 22102, 800-336-3366
Registration Fee $49.95; $10.00/month or usage (whichever is greater); Prime-time Access $21.60/hr (300 bps) $25.80/hr (1200 bps); Non-prime-time $8.40/hr (300 bps) $10.80/hr (1200 bps) aa

Biker Dave

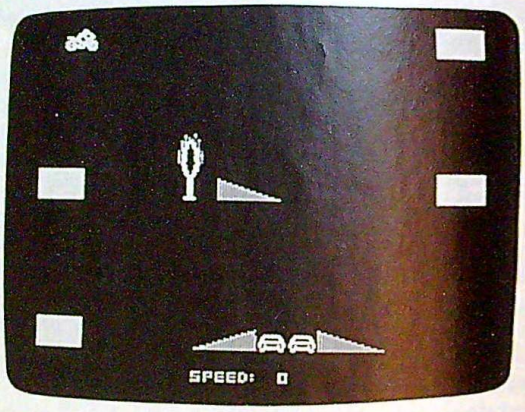
David Schwener
Apple version by Tim Victor, Editorial Programmer

This machine language game is guaranteed to bring out the daredevil in you. Settle in the seat, twist the throttle, and get ready for the motorcycle ride of your life. Works with all Apple II computers in either DOS 3.3 or ProDOS.

As the ramp nears, you focus your mind, tighten your grip on the handlebars, and accelerate the motorcycle for the final approach. The deep, throaty cry of your machine's powerful engine drowns the spectators' cheers, and the onrushing wind pushes against your body like a gigantic hand. If your speed and timing aren't exactly right, you may overshoot the ramp and lose control, or fall short into the line of cars.

Will you earn fame by surviving the jump or tumble into anonymity with a cartwheeling crash? As your speed mounts and the sidelines fade into a blur, there's no more time to wonder and no chance to turn back. Only the utmost in coordination and skill will bring you safely to earth on the other side.

"Biker Dave" is a realistic computer game that simulates the thrills and challenge of motorcycle acrobatics.



Jump your cycle through a flaming hoop and over a row of parked cars in "Biker Dave," an arcade-quality game for the Apple.

Typing In The Game

Though Biker Dave is written in machine language, you don't have to be a programmer—in fact, you don't have to know anything about machine language—to type it in.

Make sure you have a copy of "Apple MLX," a typing utility you'll find elsewhere in this issue, on disk before you begin entering Biker Dave. Load and run Apple MLX, then answer the two prompts with

```
STARTING ADDRESS?  6000
ENDING ADDRESS?    75C7
```

An options menu appears next. Press E to enter the program, then type the address at which you'd like to start typing. (If you're just beginning to enter Biker Dave, use **6000**.) Type in the game. When you're through, save it to disk as DAVE.

Over The Ramp

To play Biker Dave, type **BRUN DAVE** and press Return.

You'll first see the scoring screen, which tells you the currect score (if you've just started the game, it will be 000), the cars you've jumped (00), and the bikes you have left (5).

Press any key, and the game screen appears. Your rider and motorcycle are in the upper left corner of the screen. The rest of the screen contains the racetrack, with a number of tunnels (the blue blocks) along the way.

The most formidable obstacle consists of several autos flanked by launching and landing ramps near the bottom right. Press the space bar to accelerate the bike. Your goal is to ride down the track, through the tunnels, and toward the final obstacle, gaining just enough speed to jump over the cars without crashing.

There's also a large, fiery hoop midway through the course. The hoop has a launching ramp, but no landing ramp. Each time a car is added to the final obstacle, the hoop's launching ramp moves farther away, too.

That may sound easy, but it's not as simple as you might think. For one thing, your bike is a specially built stunt machine with no brakes. There's no way to slow down. And if you accelerate too fast, the bike pulls up into a wheelie. That's not bad in itself, but if you accelerate too hard from a wheelie, the bike tips backwards and crashes. And you go skidding across the pavement.

As you approach the launching ramp, you need to go just fast enough to clear the parked cars, but not so fast that you lose control and miss the landing ramp on the other side. A successful jump requires precise timing and sure control of the throttle. The score you earn depends on the number of cars jumped and the number of attempts you made at that level.

Each time you jump over the cars, the racetrack crew moves the launching ramp. When it has been shifted far enough, the crew also adds another car to the lineup. Unfortunately, the crew is somewhat unreliable and has been known to change the launching ramp's angle slightly when moving it. Thus, even though you may have jumped three cars at a speed of 100 miles per hour, there's no guarantee that the same speed will work every time.

When you crash, press the space bar and the scoring screen appears, just to remind you of the score, cars jumped, and bikes left.

Biker Dave

For mistake-proof program entry, use "Apple MLX," found elsewhere this issue, to type in this program.

```
START ADDRESS:  6000
END ADDRESS:    75C7

6000: A9 63 85 EC A9 79 85 ED 1A
6008: A9 E0 8D C9 75 A9 67 8D D2
6010: CA 75 A2 3F A9 FF 9D 23 87
6018: 78 CA 10 FA A2 00 8A 9D 41
6020: 63 78 E8 D0 FA A9 00 8D E6
6028: C7 75 8D C8 75 A9 72 85 25
6030: FA A9 6A 85 FB 20 31 73 B4
6038: A9 0E 85 FA A9 68 85 FB A7
6040: 20 F1 72 A2 03 BC 6B 61 49
6048: A9 00 99 C2 67 A9 0C 99 D0
6050: C3 67 A9 3C 99 C4 67 A9 1E
6058: 01 99 C5 67 CA 10 E6 8D 21
6060: 00 C0 8D 0C C0 20 58 FC F7
6068: A9 00 8D F1 75 8D F2 75 0C
6070: 8D F3 75 8D F6 75 A9 01 5E
6078: 8D F4 75 A9 05 8D F5 75 46
6080: 20 79 74 8D 54 C0 8D 51 29
6088: C0 AD 00 C0 10 FB 20 DD AF
6090: 60 B0 1D 18 AD D6 75 6D F3
6098: F6 75 8D F6 75 20 0C 75 0D
60A0: EE F3 75 AD F3 75 C9 09 71
60A8: D0 D6 20 E7 74 4C B8 60 B0
60B0: EE F4 75 CE F5 75 D0 C8 B1
60B8: 20 79 74 20 D9 74 8D 54 88
60C0: C0 8D 51 C0 AD 00 C0 10 7A
60C8: FB C9 D1 F0 04 C9 F1 D0 3F
60D0: 94 AD 10 C0 AD 51 C0 AD 37
60D8: 54 C0 4C D0 03 A9 01 8D D8
60E0: 05 68 8D 99 67 A9 00 8D F8
60E8: B5 67 A9 20 85 E6 20 F2 90
60F0: F3 A9 40 85 E6 20 F2 F3 08
60F8: 20 80 66 AD 57 C0 AD 54 FE
6100: C0 AD 52 C0 AD 50 C0 AE C3
6108: F3 75 BD 8A 61 8D DB 75 F0
6110: BD A5 61 8D DC 75 BD AE 07
6118: 61 8D DD 75 BD B7 61 8D 1F
6120: DE 75 BD C0 61 8D DF 75 E9
6128: BD C9 61 8D E0 75 A9 00 71
6130: 8D ED 75 8D EE 75 8D E5 0B
6138: 75 8D E6 75 8D E7 75 8D D1
6140: E8 75 AD 10 C0 20 D2 61 19
6148: B0 0A 20 0C 62 B0 05 20 AA
6150: C8 62 B0 00 08 2C 10 C0 F7
6158: 2C 00 C0 30 09 20 90 65 9B
6160: 20 63 70 4C 58 61 2C 10 8F
6168: C0 28 60 00 10 20 30 02 05
6170: 02 02 03 03 03 04 04 04 79
6178: 10 10 10 11 11 11 11 13 5C
6180: 13 00 00 00 01 01 05 05 E7
6188: 01 01 4A 4A 4A 4E 4E 50 72
6190: 50 54 54 19 1A 1B 1C 1D 3F
6198: 1E 1F 20 21 05 04 03 04 8A
61A0: 03 02 03 04 05 53 56 59 81
61A8: 5D 60 63 67 6B 6F 0C 0C 52
61B0: 0C 0D 0D 0E 0E 0F 0F 0E 18
61B8: 0E 0E 0F 0F 11 11 12 12 DB
61C0: 0E 0F 10 11 12 13 14 14 7A
61C8: 15 10 11 12 13 13 14 15 7F
61D0: 15 16 A9 00 8D 02 68 A9 C7
61D8: 00 8D 04 68 A9 24 8D 03 02
61E0: 68 A9 00 8D E1 75 8D E2 FD
61E8: 75 8D E4 75 A9 00 8D E3 0A
61F0: 75 A9 78 8D F0 75 20 FF 5E
61F8: 64 90 0F 20 E0 65 AD EE DC
6200: 75 C9 28 90 F1 20 64 64 3D
6208: 38 60 18 60 A9 00 8D 02 74
6210: 68 A9 24 8D 03 68 A9 50 2E
6218: 8D 04 68 A9 78 8D E1 75 7F
6220: A9 00 8D E2 75 8D E4 75 BA
6228: A9 50 8D E3 75 AD E6 75 6B
6230: AE E5 75 20 B2 72 8D E6 D7
6238: 75 8E E5 75 AD DB 75 8D C4
6240: F0 75 20 FF 64 90 10 20 84
6248: E0 65 AD EE 75 C9 28 90 2F
6250: F1 20 23 64 4C C6 62 A9 AC
6258: 00 8D 03 68 A9 05 8D EF D3
6260: 75 38 AD F0 75 E9 06 8D 9F
6268: F0 75 20 DB 64 38 AD F0 15
6270: 75 E9 15 8D F0 75 20 3D C0
6278: 65 AD ED 75 CD DD 75 90 D1
6280: 06 18 ED DE 75 90 06 20 14
6288: BF 63 4C C6 62 20 5C 65 AD
6290: 38 AD E8 75 E9 28 8D E8 45
6298: 75 B0 03 CE E7 75 20 B9 A0
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62A8: A9 50 8D E3 75 A9 04 8D 2E
62B0: EF 75 A9 00 8D E7 75 8D 84
62B8: E8 75 A9 01 CD E1 75 B0 26
62C0: 03 20 DB 64 18 60 38 60 E3
62C8: A9 00 8D 02 68 A9 00 8D AB
62D0: 03 68 A9 A0 8D 04 68 A9 67
62D8: 04 8D E1 75 A9 00 8D E2 E1
62E0: 75 8D E4 75 A9 A0 8D E3 86
62E8: 75 A9 00 8D EF 75 AD E6 43
62F0: 75 AE E5 75 20 B2 72 8D 6E
62F8: E6 75 8E E5 75 A9 22 8D E2
6300: F0 75 20 FF 64 90 10 20 46
6308: E0 65 AD EE 75 C9 28 90 F0
6310: F1 20 64 64 4C BD 63 A9 74
6318: 01 8D EF 75 A9 28 20 ED 34
6320: 64 A9 3D 8D F0 75 20 3D DE
6328: 65 AD ED 75 CD DF 75 90 8B
6330: 06 18 ED E0 75 90 06 20 E5
6338: F0 63 4C BD 63 AD E8 75 CE
6340: 8D EC 75 AD E7 75 8D EB AE
6348: 75 AD E3 75 8D E9 75 20 28
6350: 5C 65 38 AD E8 75 E9 28 99
6358: 8D E8 75 B0 03 CE E7 75 72
6360: 20 B9 65 AD E1 75 CD DC 8A
6368: 75 90 E4 18 AD EA 75 6D 9D
6370: EC 75 8D EA 75 AD E9 75 17
6378: 6D EB 75 8D E9 75 AD E3 DC
6380: 75 C9 A0 B0 21 CD E9 75 1D
6388: 90 C5 AD EC 75 AE EB 75 41
6390: 20 B2 72 8D E8 75 8E E7 5D
6398: 75 20 5C 65 20 B9 65 AD 64
63A0: E3 75 C9 A0 90 F3 A9 00 A1
63A8: 8D EF 75 8D E7 75 8D E8 D2
63B0: 75 A9 A0 8D E3 75 A9 86 58
63B8: 20 ED 64 18 60 38 60 A9 67
63C0: 06 8D EF 75 20 5C 65 38 B8
63C8: AD E8 75 E9 28 8D E8 75 AC
63D0: B0 03 CE E7 75 20 B9 65 0E
63D8: AD E1 75 30 12 AD E3 75 25
63E0: C9 50 90 E0 A9 00 8D E7 11
63E8: 75 8D E8 75 20 23 64 60 F8
63F0: A9 02 8D EF 75 20 5C 65 08
63F8: 38 AD E8 75 E9 28 8D E8 AF
6400: 75 B0 03 CE E7 75 20 B9 0C
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6418: 00 8D E7 75 8D E8 75 20 B3
6420: 64 64 60 A9 06 8D EF 75 96
6428: AD E1 75 38 E9 08 20 DB FD
6430: 64 EE EF 75 A9 01 8D B5 5E
6438: 67 AD BE 67 8D B6 67 AD 32
6440: BF 67 8D B7 67 20 B3 64 77
6448: 20 5C 65 20 B9 65 2C E1 84
6450: 75 30 10 AD E6 75 18 69 63
6458: 0C 8D E6 75 90 E7 EE E5 A6
6460: 75 30 E2 60 A9 7C AE E3 D2
6468: 75 F0 02 A9 88 8D 9F 64 21
6470: A9 02 8D EF 75 AD E1 75 DA
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6480: 75 A9 01 8D B5 67 AD BC CA
6488: 67 8D B6 67 AD BD 67 8D 76
6490: B7 67 20 B3 64 20 5C 65 10
6498: 20 B9 65 AD E1 75 C9 FF DF
64A0: B0 10 AD E6 75 38 E9 0C 56
64A8: 8D E6 75 B0 E5 CE E5 75 57
64B0: 10 E0 60 A9 B0 85 EE A9 83
64B8: 67 85 EF 18 A9 F8 2C E5 85
64C0: 75 10 02 A9 14 6D E1 75 B2
64C8: 20 C0 72 AD E3 75 8D B4 BF
64D0: 67 20 6F 74 0A 10 03 CE EF
64D8: B4 67 60 8D F0 75 20 5C B4
64E0: 65 20 B9 65 AD F0 75 CD DB
64E8: E1 75 30 F2 60 8D F0 75 C5
64F0: 20 5C 65 20 B9 65 AD E1 30
64F8: 75 CD F0 75 90 F2 60 A2 19
6500: 00 2C E5 75 10 02 A2 04 BB
6508: AD EE 75 C9 14 90 01 E8 7E
6510: 8E EF 75 20 5C 65 AD 00 A2
6518: C0 10 08 2C 10 C0 8D D4 7E
6520: 75 38 60 20 B9 65 AD E1 62
6528: 75 2C E5 75 30 07 CD F0 F6
6530: 75 90 CC B0 06 18 ED F0 DB
6538: 75 B0 C4 18 60 20 4F 72 98
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6548: 75 2C E5 75 30 07 CD F0 17
6550: 75 90 ED B0 06 18 ED F0 20
6558: 75 B0 E5 60 20 90 65 A9 84
6560: 94 85 EE A9 67 85 EF AD 2E
6568: EF 75 0A AA BD A0 67 8D 41
6570: 9A 67 BD A1 67 8D 9B 67 44
6578: AD E1 75 20 C0 72 AD E3 52
6580: 75 8D 98 67 20 63 70 AD 10
6588: EE 75 F0 03 CE EE 75 60 F3
6590: A2 03 BC 6B 61 20 6F 74 9A
6598: 10 0F B9 CE 67 99 C6 67 E9
65A0: B9 CF 67 99 C7 67 4C B5 EC
65A8: 65 B9 CC 67 99 C6 67 B9 15
65B0: CD 67 99 C7 67 CA 10 DA 4D
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65C8: 75 8D E3 75 AD E2 75 18 81
65D0: 6D E6 75 8D E2 75 AD E1 BD
65D8: 75 6D E5 75 8D E1 75 60 0D
65E0: AD D4 75 C9 A0 D0 7C AD F1
65E8: ED 75 C9 20 F0 75 EE ED 6C
65F0: 75 AD ED 75 C9 14 90 0D C3
65F8: E9 14 D0 09 A9 B6 A2 6A 40
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6610: 69 27 90 01 E8 8D C2 6A EA
6618: 8E C3 6A A0 01 20 6B 66 3A
6620: A9 BD A2 6A 20 64 66 A9 35
6628: 59 A2 70 D0 04 A9 5E A2 8B
6630: 70 8D C9 6A 8E CA 6A A0 8D
6638: 02 20 6B 66 A9 C4 A2 6A F1
6640: 20 64 66 A9 20 2C E5 75 90
6648: 10 05 CE E5 75 A9 E0 6D 18
6650: E6 75 8D E6 75 90 03 EE F0
6658: E5 75 18 AD EE 75 69 0A 7D
6660: 8D EE 75 60 85 FA 86 FB 85
6668: 4C A9 71 A9 00 A2 E4 86 69
6670: FE A2 2F 86 FF 91 FE E8 E0
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6680: A9 9A 85 FA A9 6A 85 FB 27
6688: A9 00 8D 9C 6A A9 24 8D 75
6690: 9D 6A A9 00 8D 9E 6A 20 D7
6698: A9 71 A9 50 8D 9E 6A 20 AC
66A0: A9 71 A9 00 8D 9D 6A 20 AB
66A8: A9 71 A9 A0 8D 9E 6A 20 C1
66B0: A9 71 A9 A8 85 FA A9 6A 44
66B8: 85 FB A9 00 8D AA 6A A9 12
66C0: 0D 8D AB 6A A9 54 8D AC F9
66C8: 6A 20 A9 71 AE F3 75 BD 0D
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66D8: 8D D7 75 BD 81 61 8D D8 72
66E0: 75 BD 93 61 8D D9 75 BD DC
66E8: 9C 61 8D DA 75 A9 85 85 9E
66F0: FA A9 6A 85 FB AD D8 75 09
66F8: 8D 87 6A AD D7 75 8D 88 CE
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6708: 71 AD DA 75 8D 87 6A AD BA
6710: D9 75 8D 88 6A A9 A4 8D 34
6718: 89 6A 20 A9 71 A9 A1 85 DF
6720: FA A9 6A 85 FB A9 00 8D 90
6728: A3 6A A9 0E 8D A4 6A A9 F6
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6740: FA A9 6A 85 FB A9 00 8D B0
6748: 74 6A A9 14 8D 75 6A A9 23
6750: A7 8D 76 6A 20 A9 71 18 6E
6758: A9 06 6D 74 6A C9 07 90 8B
6760: 02 E9 07 8D 74 6A A9 02 07
6768: 6D 75 6A 8D 75 6A CE D5 3A
6770: 75 D0 E1 A9 AF 85 FA A9 38
6778: 6A 85 FB 20 A9 71 A9 59 1F
6780: 8D C9 6A A9 70 8D CA 6A 2A
6788: A9 C4 85 FA A9 6A 85 FB BB
6790: 20 A9 71 60 B0 67 00 00 31
6798: 00 00 00 00 F7 75 39 76 E5
67A0: 0E 68 2E 68 4E 68 6E 68 36
67A8: AE 68 CE 68 EE 68 0E 69 E7
67B0: 00 68 00 00 00 00 00 00 99
67B8: DF 77 01 78 8E 68 2E 69 D8
67C0: D0 67 00 00 00 00 00 00 D1
67C8: 7B 76 91 76 52 69 D2 69 D3
67D0: 00 00 00 00 00 00 00 00 9F
67D8: A7 76 C5 76 72 69 F2 69 C1
67E0: F0 67 00 00 00 00 00 00 02
67E8: E3 76 01 77 92 69 12 6A A7
67F0: 94 67 00 00 00 00 00 00 E3
67F8: 1F 77 39 77 B2 69 32 6A DD
6800: C0 67 00 00 00 00 52 6A 1A
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6870: 04 09 2B 6D 00 00 00 00 C1
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6880: 4F 6D 00 00 00 00 00 00 54
6888: 00 00 00 00 00 00 00 08 61
6890: 04 07 BB 6D 00 00 00 00 73
6898: 00 00 00 00 00 00 00 00 69
68A0: D7 6D 00 00 00 00 00 00 B8
68A8: 00 00 00 00 00 00 00 04 7D
68B0: 04 0B 23 6B 00 00 00 00 61
68B8: 00 00 00 00 00 00 00 00 89
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68C8: 00 00 00 00 00 00 01 03 9E
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68D8: 00 00 00 00 00 00 00 00 A9
68E0: 0B 6C 00 00 00 00 00 00 52
68E8: 00 00 00 00 00 00 0D 00 D3
68F0: 04 0F B3 6C 00 00 00 00 C4
68F8: 00 00 00 00 00 00 00 00 C9
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6910: 04 09 73 6D 00 00 00 00 6C
6918: 00 00 00 00 00 00 00 00 EA
6920: 97 6D 00 00 00 00 00 00 1A
6928: 00 00 00 00 00 00 00 08 03
6930: 04 07 F3 6D 00 00 00 00 1C
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69E8: 00 00 00 00 00 00 00 00 BB
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6A08: 00 00 00 00 00 00 00 00 DC
6A10: 00 00 07 03 01 15 98 6F F2
6A18: 00 00 00 00 00 00 00 00 EC
6A20: 00 00 00 00 63 78 00 00 F1
6A28: 00 00 00 00 00 00 00 00 FC
6A30: 00 00 0E 08 01 0C AD 6F 4A
6A38: 00 00 00 00 00 00 00 00 0D
6A40: 00 00 00 00 63 78 00 00 12
6A48: 00 00 00 00 00 00 00 00 1D
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6A58: 00 00 00 00 00 00 00 00 2D
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6A68: 00 00 00 00 00 00 00 00 3D
6A70: 00 00 04 08 00 00 00 2B 71
6A78: 6E 00 00 00 00 00 00 00 84
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6A88: 00 00 8D 6E 00 00 00 00 F5
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6AA8: 01 0B 00 00 00 B9 6F 06 8C
6AB0: 05 00 0E BB 04 70 01 05 6E
6AB8: 00 14 BB 22 70 01 05 00 BD
6AC0: 15 BB 2C 70 01 05 00 16 CD
6AC8: BB 59 70 00 E0 80 00 00 E8
6AD0: F0 81 00 00 FC 86 80 00 81
6AD8: BE 8C 80 BC E7 8F 80 F0 7B
6AE0: C7 85 80 BC EF 9E 80 E6 B8
6AE8: BC B7 80 FA F7 AD 80 E6 28
6AF0: 9E B3 80 BC 80 9E 80 00 5D
6AF8: F0 80 00 00 F8 83 00 00 3C
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6B10: FF BF 80 FF FF FF 80 FF E7
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6B20: 80 BF 80 00 83 80 00 C0 16
6B28: 87 80 00 B0 9F 80 00 98 85
6B30: BE 80 00 F8 F3 9E 80 D0 02
6B38: F1 87 80 BC FB 9E 80 F6 18
6B40: 9E B3 80 DA F6 AF 80 E6 6F
6B48: BC B3 80 BC 80 9E 80 C0 86
6B50: 87 80 00 E0 8F 80 00 F8 90
6B58: BF 80 00 FC FF 80 00 FC FD
6B60: FF BF 80 F8 FF 8F 80 FE 05
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6B78: 80 BF 80 00 B0 80 00 00 17
6B80: F8 83 80 00 BE 86 80 00 D5
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6B90: B7 B7 80 9E BF AD 80 F8 D9
6B98: B6 B3 80 CC 9D 9E 80 B4 B1
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6BB0: FC 87 80 00 FF 8F 80 C0 F7
6BB8: FF 87 80 E0 FF BF 80 FE 8E
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6BC8: FF FF 80 FE BF BF 80 FE 9C
6BD0: 83 00 00 FE 83 00 00 FC 72
6BD8: 81 00 00 00 86 80 00 E0 87
6BE0: 8F 80 00 B0 BE 80 00 E0 83
6BE8: F7 80 00 BC E3 81 80 F6 C4
6BF0: F6 9F 80 DA FE BC 80 E6 BB
6BF8: B6 8F 80 BC DC 99 80 00 39
6C00: C0 96 80 00 C0 99 80 00 5C
6C08: 80 8F 80 00 8F 80 00 F0 84
6C10: 9F 80 00 F8 FF 80 00 F0 5B
6C18: FF 81 00 FE FF 83 80 FF 50
6C20: FF BF 80 FF FF FF 80 FF F9
6C28: FF 9F 80 FE FE BF 80 00 E0
6C30: E0 BF 80 00 E0 BF 80 00 80
6C38: C0 9F 80 00 E0 83 80 00 7F
6C40: B0 86 80 00 D6 85 80 00 F0
6C48: B7 86 80 CC ED 83 80 9E 98
6C50: 9E 80 00 DE FF 87 80 FC A2
6C58: 9C 8C 80 8C B8 8E 80 9C 19
6C60: E6 8B 80 B8 FF BD 80 F0 14
6C68: FB EE 80 E0 E1 DA 80 00 94
6C70: E0 E6 80 00 C0 BD 80 00 81
6C78: F0 87 80 00 F8 8F 80 00 C2
6C80: FF 8F 80 C0 FF 8F 80 FE 97
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6C90: FF 87 80 FE FF 9F 80 9E 69
6C98: FC 9F 80 BE FF 9F 80 FC 50
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6CA8: F3 FF 81 00 F0 FF 81 00 36
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6CB8: 8C 80 00 A0 EB 80 00 E0 44
6CC0: EC 89 80 C0 B7 B3 80 00 1C
6CC8: F8 F8 80 E0 FF FB 80 B0 1C
6CD0: B8 BE 80 F0 9C B0 80 D0 4E
6CD8: E7 B8 80 BC FF 9D 80 F6 1E
6CE0: DE 8F 80 DA 8E 8F 80 E6 65
6CE8: 8E 80 00 BC 8B 80 00 E0 34
6CF0: 8F 80 00 F0 9F 80 00 F0 B0
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6D20: CF 9F 80 FF 8F 80 00 FE 58
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6D40: FF B3 80 F8 FF 9E 80 98 BB
6D48: 8F 83 80 B0 80 9E 80 FE 65
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6D60: FF FF 80 F8 FF FF 80 FC D8
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6D78: 80 B3 80 BC 9C AD 80 E6 DF
6D80: B6 B7 80 FA E3 9E 80 E6 E5
6D88: FF 85 80 BC FF 8F 80 E0 C0
6D90: F8 8C 80 BC 80 86 80 00 06
6D98: 00 BF 80 00 C0 FF 80 FE 79
6DA0: FE FF 80 FF FF FF 80 FF 0C
6DA8: FF BF 80 FF FF 8F 80 FE C1
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6DB8: 80 8F 80 8C 80 00 00 9E 33
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6E40: 80 9B 80 E8 FF 8B 80 B8 CA
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6EE8: C0 C0 F0 F0 F0 F0 F0 FC AD
6EF0: FC FC FC FC FC FC F0 E0 99
6EF8: E0 E0 81 85 85 8D 87 83 FB
6F00: 83 81 81 81 81 81 81 81 DF
6F08: 80 80 81 81 81 83 83 86 37
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6F20: 81 83 83 83 87 87 8F 8E 51
6F28: C0 C0 C0 D0 D0 F0 F0 E0 C9
6F30: C0 C0 C0 80 C0 C0 C0 80 CA
6F38: 80 C0 C0 C0 E0 E0 B0 90 28
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6F50: 83 81 81 81 A0 A0 E0 E0 C3
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6F60: C0 C0 F0 F0 F0 F0 E0 F0 FA
6F68: F0 FC FC FC F0 E0 E0 E0 1C
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6FA8: C0 E0 E0 B0 90 81 83 83 5C
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6FB8: 81 9C 9C 9C 9C 9C 9C 9C 0A
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6FC8: D5 AA D5 AA D5 AA D5 AA 52
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6FF0: D5 AA D5 AA D5 AA D5 AA 7A
6FF8: D5 AA D5 AA D5 AA D5 AA 82
7000: D5 AA D5 AA 15 2A 54 28 FD
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7010: 15 2A 54 28 11 02 10 02 C5
7018: 04 08 10 22 15 02 54 28 A2
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7028: 22 22 22 2A 08 08 08 08 02
7030: 08 2A 20 2A 02 2A 2A 20 73
7038: 2A 20 2A 02 22 2A 20 20 B5
7040: 2A 02 2A 20 2A 02 02 2A 85
7048: 22 2A 2A 22 20 20 20 2A 18
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7058: 20 54 44 44 44 54 54 04 4B
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7068: 8D CC 75 AD C9 75 85 EE EA
7070: AD CA 75 85 EF A5 EE 05 DA
7078: EF F0 11 A0 05 B1 EE F0 77
7080: 03 20 C3 70 A2 EE 20 43 BE
7088: 74 4C 75 70 20 9C 70 AD 6E
7090: CB 75 8D C7 75 AD CC 75 54
7098: 8D C8 75 60 20 5E 74 AD 38
70A0: C7 75 85 CE AD C8 75 85 61
70A8: CF A5 CE 05 CF F0 0B 20 7D
70B0: 07 72 A2 CE 20 43 74 4C 36
70B8: A9 70 A9 00 8D C7 75 8D C3
70C0: C8 75 60 A0 06 B1 EE 85 D3
70C8: FA C8 B1 EE 85 FB A0 08 E3
70D0: A5 E6 C9 20 F0 02 A0 0A 54
70D8: B1 EE 85 1C C8 B1 EE 85 31
70E0: 1D A0 00 AD CB 75 91 1C C6
70E8: C8 AD CC 75 91 1C A5 1C EE
70F0: 8D CB 75 A5 1D 8D CC 75 C2
70F8: A0 03 B1 EE AA 88 B1 EE D9
7100: A0 00 18 71 FA C9 07 90 EA
7108: 05 E9 07 E8 B0 F7 8D CF A7
7110: 75 8A 8D CE 75 A0 02 91 B2
7118: 1C A0 04 B1 EE 18 A0 01 E6
7120: 71 FA 8D D0 75 A0 03 91 FE
7128: 1C AD CF 75 0A 69 04 A8 7C
7130: B1 FA 85 FC C8 B1 FA 85 B3
7138: FD 98 69 0D A8 B1 FA 85 C5
7140: 1A C8 B1 FA 85 1B A0 02 24
7148: B1 FA 8D D1 75 A0 04 91 59
7150: 1C 88 B1 FA 8D D3 75 A0 90
7158: 05 91 1C 18 A5 1C 69 06 9D
7160: 85 1C 90 02 E6 1D 20 DB 07
7168: 73 AC D1 75 88 B1 FE 91 5C
7170: 1C 31 1A 51 FE 11 FC 91 CD
7178: FE 88 10 F1 A5 FC 18 6D DC
7180: D1 75 85 FC 90 02 E6 FD 82
7188: A5 1A 18 6D D1 75 85 1A 28
7190: 90 02 E6 1B A5 1C 18 6D 06
7198: D1 75 85 1C 90 02 E6 1D AB
71A0: EE D0 75 CE D3 75 D0 BE 9F
71A8: 60 A0 00 B1 FA 8D D1 75 26
71B0: C8 B1 FA 8D D3 75 C8 B1 54
71B8: FA 0A 69 05 A8 B1 FA 85 A0
71C0: FC C8 B1 FA 85 FD A0 03 A2
71C8: B1 FA 8D CE 75 C8 B1 FA 0F
71D0: 8D D0 75 20 DB 73 A5 FE 56
71D8: 8D ED 71 A5 FF 49 60 8D F9
71E0: EE 71 AC D1 75 88 B1 FE 7A
71E8: 11 FC 91 FE 99 FF FF 88 0B
71F0: 10 F4 A5 FC 18 6D D1 75 2D
71F8: 85 FC 90 02 E6 FD EE D0 ED
7200: 75 CE D3 75 D0 CD 60 A0 44
7208: 02 B1 CE 8D CE 75 C8 B1 9C
7210: CE 8D D0 75 C8 B1 CE 8D 69
7218: D1 75 C8 B1 CE 8D D3 75 41
7220: 98 38 65 CE 85 1C A5 CF B0
7228: 69 00 85 1D 20 DB 73 AC 48
7230: D1 75 88 B1 1C 91 FE 88 35
7238: 10 F9 18 A5 1C 6D D1 75 B0
7240: 85 1C 90 02 E6 1D EE D0 7B
7248: 75 CE D3 75 D0 DE 60 AD DD
7250: E6 75 AE E5 75 10 03 20 4C
7258: B2 72 8E A2 72 8D 9C 72 A4
7260: A9 00 85 FC 85 FD 85 FE C8
7268: A2 04 20 98 72 20 AB 72 0B
7270: 20 AB 72 20 AB 72 20 AB B3
7278: 72 20 98 72 CA D0 EB A5 EF
7280: FE 29 FC C9 FC D0 06 E6 89
7288: FD D0 02 E6 FC A5 FC 8D 55
7290: E7 75 A5 FD 8D E8 75 60 B6

7298: 18 A5 FD 69 00 85 FD A5 01
72A0: FC 69 00 6A 85 FC 66 FD EF
72A8: 66 FE 60 46 FC 66 FD 66 D4
72B0: FE 60 49 FF 38 69 00 48 06
72B8: 8A 49 FF 69 00 AA 68 60 A7
72C0: 8D CE 72 A9 00 85 E3 A2 89
72C8: 04 4A 66 E3 18 69 00 6A 1E
72D0: 66 E3 4A 66 E3 CA D0 F1 6F
72D8: AA A5 E3 2A 2A 2A 2A 29 13
72E0: 07 C9 07 D0 03 A9 00 E8 51
72E8: A0 02 91 EE 8A C8 91 EE 49
72F0: 60 A0 02 B1 FA 8D D1 75 B0
72F8: C8 B1 FA 8D D2 75 2D D1 7F
7300: 75 C9 FF F0 2B A9 04 18 43
7308: 65 FA 85 CE A9 00 65 FB 12
7310: 85 CF 20 63 73 A5 CE 18 CF
7318: 69 0E 85 CE 90 02 E6 CF FE
7320: 20 63 73 18 A5 FA 69 20 EB
7328: 85 FA 90 C5 E6 FB D0 C1 89
7330: 60 A0 00 B1 FA 8D D1 75 B1
7338: C8 B1 FA 8D D2 75 2D D1 C0
7340: 75 C9 FF F0 1D A9 05 18 15
7348: 65 FA 85 CE A9 00 65 FB 52
7350: 85 CF 20 63 73 18 A5 FA 6A
7358: 69 13 85 FA 90 D3 E6 FB B6
7360: D0 CF 60 A9 01 8D CF 75 9D
7368: AD CF 75 0A A8 A5 EC 91 B0
7370: CE C8 A5 ED 91 CE A0 00 8D
7378: B1 CE 85 FC C8 B1 CE 85 9C
7380: FD AD D2 75 8D D3 75 A0 CA
7388: 00 8C CD 75 A9 00 85 1E 1A
7390: B1 FC 0A 08 AE CF 75 0A FA
7398: 26 1E CA D0 FA 28 6A 0D DA
73A0: CD 75 91 EC A5 1E 8D CD 5B
73A8: 75 C8 CC D1 75 D0 DD 18 F5
73B0: A5 FC 6D D1 75 85 FC 90 C0
73B8: 02 E6 FD 18 A5 EC 6D D1 29
73C0: 75 85 EC 90 02 E6 ED CE C0
73C8: D3 75 D0 BB AC CF 75 C8 25
73D0: 8C CF 75 C0 07 F0 03 4C FA
73D8: 68 73 60 AD D0 75 29 3F A5
73E0: A8 B9 03 74 05 E6 85 FF 01
73E8: AD D0 75 29 08 F0 02 A9 CD
73F0: 80 18 2C D0 75 70 04 10 36
73F8: 04 69 28 69 28 6D CE 75 E1
7400: 85 FE 60 00 04 08 0C 10 DF
7408: 14 18 1C 00 04 08 0C 10 EC
7410: 14 18 1C 01 05 09 0D 11 14
7418: 15 19 1D 01 05 09 0D 11 FC
7420: 15 19 1D 02 06 0A 0E 12 24
7428: 16 1A 1E 02 06 0A 0E 12 0D
7430: 16 1A 1E 03 07 0B 0F 13 34
7438: 17 1B 1F 03 07 0B 0F 13 1D
7440: 17 1B 1F B5 00 8D 53 74 0C
7448: B5 01 8D 54 74 8E 56 74 42
7450: A2 01 BD FF FF 95 FF CA A3
7458: 10 F8 AE 56 74 60 A2 00 2D
7460: A5 E6 C9 20 F0 01 E8 BC 2B
7468: 54 C0 49 60 85 E6 60 A5 09
7470: 4E 0A 0A 38 65 4E 85 4E 85
7478: 60 A9 2A A2 75 20 EE 74 E9
7480: A9 3C A2 75 20 EE 74 A9 48
7488: 4E A2 75 20 EE 74 A9 60 EE
7490: A2 75 20 EE 74 AD F1 75 CE
7498: 38 AC F2 75 F0 0E A0 B2 32
74A0: 8C 98 07 E9 2C B0 05 69 0D
74A8: 64 CE 98 07 EE 98 07 E9 CC
74B0: 64 B0 F9 CE 99 07 69 0A E9
74B8: 90 F9 69 AF 8D 9A 07 AD 23
74C0: F6 75 38 EE 41 04 E9 0A 70
74C8: B0 F9 69 BA 8D 42 04 AD 8C
74D0: F5 75 18 69 B0 8D C2 04 F0
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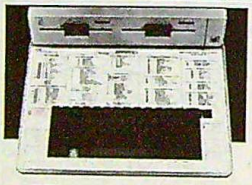

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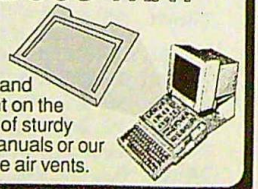

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74D8: 60 A9 76 A2 75 20 EE 74 D3
74E0: A9 82 A2 75 4C EE 74 A9 9B
74E8: A7 A2 75 4C EE 74 85 FE 15
74F0: 86 FF A0 00 B1 FE 85 25 EA
74F8: 20 22 FC C8 B1 FE 85 24 5F
7500: C8 B1 FE F0 06 20 ED FD 35
7508: 4C 00 75 60 AD D6 75 0A 8B
7510: 6D D6 75 38 ED F4 75 8D 55
7518: 1D 75 0A 0A 69 FF 6D F1 E8
7520: 75 8D F1 75 90 03 EE F2 20
7528: 75 60 07 0C D3 C3 CF D2 A7
7530: C5 BA A0 A0 A0 A0 A0 A0 34
7538: AF BA B0 00 08 0C C3 C1 79
7540: D2 D3 A0 CA D5 CD D0 C5 97
7548: C4 BA A0 AF B0 00 09 0C F6
7550: C2 C9 CB C5 D3 A0 CC C5 65
7558: C6 D4 BA A0 A0 A0 B0 00 26
7560: 17 09 D0 D2 C5 D3 D3 A0 26
7568: C1 A0 CB C5 D9 A0 D4 CF FC
7570: A0 D0 CC C1 D9 00 10 0F 93
7578: C7 C1 CD C5 A0 CF D6 C5 85
7580: D2 00 17 03 D1 A0 D4 CF 72
7588: A0 D1 D5 C9 D4 AC A0 C1 EB
7590: CE D9 A0 CF D4 C8 C5 D2 92
7598: A0 D4 CF A0 D0 CC C1 D9 24
75A0: A0 C1 C7 C1 C9 CE 00 11 FB
75A8: 05 C3 CF CE D3 C9 C4 C5 03
75B0: D2 A0 D9 CF D5 D2 D3 C5 CC
75B8: CC C6 A0 CB C9 CE C7 A0 46
75C0: C2 C9 CB C5 D2 A1 00 00 72
```
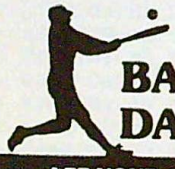

aa



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MemCopy

Jose M. Arevalo

Manipulate double hi-res graphics from BASIC, instantly display screens, and do even more with "MemCopy," an impressive utility that lets you address more than 64K of memory. For Apple IIc and IIe (Extended 80-column card required) computers using either DOS 3.3 or ProDOS.

The Apple IIc comes with 128 kilobytes (K) of RAM (Random Access Memory), and the Apple IIe can easily be expanded from 64K to 128K by plugging an Extended 80-column card into the auxiliary connector. But the microprocessors found in both computers can only address 64K. That's why you've heard that memory in Apple II computers is in *64K banks*.

The first 64K is called the *main memory*, while the second 64K is called the *auxiliary memory*. To address the extra memory, programs must use a special technique known as *bank switching*. In fact, your computer uses this technique to display 80-column text and double-hi-res graphics. In both double-hi-res and 80-column text, half of each screen's data resides in main memory and the other half in auxiliary memory. ProDOS can use the extra 64K memory bank as an electronic disk drive (RAMdisk). But neither DOS 3.3 nor Applesoft BASIC offers any method of accessing the auxiliary memory.

Until now. "MemCopy" lets you copy parts of memory from auxiliary to main and back again. And it does this from BASIC.

Entering MemCopy

MemCopy isn't long, but to insure that you enter it correctly, you must use "Apple MLX," a machine language entry program found elsewhere in this issue.

Load and run Apple MLX, then answer the two prompts with the following values:

```
STARTING ADDRESS?  0300
ENDING ADDRESS?    0347
```

Press E to select (E)NTER DATA, type **0300** as an answer to the FROM ADDRESS prompt, then enter the numbers you see listed in Program 1 at the end of this article. When you're finished, press S to choose (S)AVE DATA and type in a filename (such as *MEMCOPY*). The program is saved to disk.

To run the program, simply type

BRUN MEMCOPY (substitute the filename you used when you saved it from MLX)

You don't need to activate the 80-column card (Apple IIe only) to use the routine.

Copying Memory

When you BRUN MEMCOPY, it sets the Applesoft ampersand command (&) vector so that you can easily use the routine.

The command structure for MemCopy is:

&param1,param2,param3,param4

Param1 represents the starting address of the section of memory that you want to copy (the source).

Param2 is the ending address of the source block.

Param3 is the starting address of the destination block.

Note: The values of the three address parameters can't be lower than 512 ($200 hexadecimal) or higher than 49151 ($BFFF).

Param4 is the direction of the copy. It can be any number in the range 0–255. Use 0 to copy from main memory to auxiliary; any other number copies from auxiliary to main.

Programming Examples

Let's see how MemCopy works. BRUN MEMCOPY. If the 80-column card (Apple IIe only) is active, turn it off by pressing Escape-Control-Q. Fill the text screen with whatever you want—put a catalog of the disk on the screen, for instance.

In immediate command mode, type **&1024,1024+1023,2048,0** and press Return. You've just copied the contents of the text screen to a section of auxiliary memory. Type **HOME** and press Return. To recall what you've stored in the auxiliary memory, type **&2048,2048+1023,1024,1** and press Return. Your previous screen is restored almost instantly.

Note that the 1024 address in the example is the address of the text screen (which is 1024 bytes long and fixed in main memory). However, the 2048 address is the address in auxiliary memory which will store the text screen for later retrieval (that number is rather arbitrary). If you want, you can repeat the above experiment, changing 2048 to any other address in the allowed range. Make sure that you change the 2048 in both commands.

This routine can be easily used to display help screens and instructions. You can use a program like "Help Screen Editor" (February 1986 issue of COMPUTE! magazine) to create such screens. After you've created the help screens and saved them to disk, you can use a technique similar to what's shown above to store your screens in auxiliary memory. Of course, you can store more than one screen in auxiliary memory.

To display a screen, first store the text screen that's currently in use. Next, copy the help screen from auxiliary memory to main memory. After using the help screen, copy the original text screen back from auxiliary memory to main memory (remember, the screen must be at address 1024).

Picture Switching

As another demonstration of MemCopy's abilities, type in and run Program 2. Make sure it's on the same disk as MemCopy.

You'll also need two hi-res pictures on that same disk. You can create such pictures with commercial drawing programs like *Dazzle Draw*, or with another program in this issue, "Picture Maker."

Program 2 BRUNs MemCopy and asks for the picture filenames. Once both are loaded, you can quickly switch from one to the other (via this short BASIC program). Notice how fast MemCopy works.

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Program 1: MemCopy

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
0300: A9 4C 8D F5 03 A9 10 8D 6B
0308: F6 03 A9 03 8D F7 03 60 62
0310: 20 67 DD 20 52 E7 84 3C 35
0318: 85 3D 20 BE DE 20 67 DD 44
0320: 20 52 E7 84 3E 85 3F 20 B6
0328: BE DE 20 67 DD 20 52 E7 BB
0330: 84 42 85 43 20 BE DE 20 C7
0338: F8 E6 18 8A D0 01 38 20 3B
0340: 11 C3 60 00 00 00 00 00 CB
```

Program 2: Picture Switching Demonstration

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
54 100 TEXT : HOME
F2 110 M(1) = 8192:M(2) = 16384
E8 120 FOR I = 1 TO 2
BD 130 PRINT "ENTER NAME OF PICTURE ";I;"
       = ";: INPUT "";NA$
81 140 PRINT CHR$ (4);"BLOAD ";NA$;",A8192
       "
6C 150 & 8192,8192 + 8191,M(I),0
E9 160 NEXT I
EF 170 HGR : VTAB 22: PRINT "PRESS 1 TO VI
       EW PICTURE 1": PRINT "PRESS 2 TO VI
       EW PICTURE 2"
96 180 PRINT "PRESS 3 TO QUIT     -> ";
82 190 GET A$: IF A$ < "1" OR A$ > "3" THE
       N 190
88 200 A = VAL (A$): IF A = 3 THEN END
F1 210 & M(A),M(A) + 8191,8192,1
98 220 GOTO 190
```

aa

Picture Maker

Jenny Schmidt

Create intricate high-resolution pictures quickly and easily with "Picture Maker." Completely menu-driven and packed with features, Picture Maker lets you draw lines, rectangles, arcs, circles, and polygons, and then fill any screen area from a palette of 26 shades and patterns. For all Apple II–series computers, including the Apple IIGS, using either DOS 3.3 or ProDOS.

Drawing hi-res pictures is a snap with "Picture Maker," a simple-to-use program that's as fast as it is impressive in its list of features. Using machine language for drawing speed, the program puts a palette of 26 colors and patterns at your fingertips, making it easy to create dazzling combinations. You can even save pictures to disk, and then load them in later for changes or display.

Two Parts

Picture Maker actually comes in two parts. Program 1 (PIC.MAKER) is written in BASIC; Program 2 (FILL) is a machine language program.

Type in Program 1 using "Apple Automatic Proofreader," an error-checking utility you'll find elsewhere in this issue. Once you've entered the program, save it as *PIC.MAKER*.

Note: As listed, Program 1 works fine under DOS 3.3. If you want to use Picture Maker with ProDOS, though, you need to make some minor changes. Substitute the following two lines for those you find in the listing at the end of this article:

```
DE 750 TEXT : HOME : END
D4 760 TEXT : HOME : PRINT : PRINT CHR$ (4
       );"CAT,D";DD: GET A$: PRINT A$: POK
       E - 16304,0: GOTO 90
```

Next, type in Program 2. This machine language program is listed in COMPUTE! Publications' MLX format for easy entry. Before you type in Program 2, you'll need a copy of "Apple MLX," also found in this issue. Enter Apple MLX and save a copy to disk (you'll need it to enter other programs in this magazine). Before you run MLX, though, type in this line in immediate mode (without a line number):

```
POKE 3072,0: POKE 104,12: NEW
```

Now load and run MLX. *If you enter Program 2 in more than one sitting, make sure you type in the above line before each session.*

MLX asks for two addresses. The proper values for Picture Maker are:

```
STARTING ADDRESS?  0800
ENDING ADDRESS?    0B8B
```

An options menu appears next. Press E to enter the program, then type the address at which you'd like to start typing. If you're just beginning to enter Program 2, you'd type in **0800.** Enter Program 2. When you're through, save it to the same disk as PIC.MAKER. Make sure you name Program 2 as *FILL*, since that is the name Program 1 expects to find.

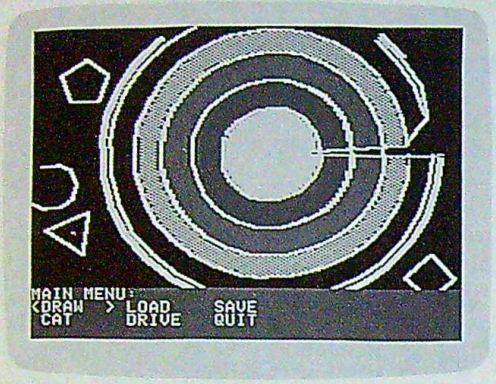
Pen Ready

To use Picture Maker, type **RUN PIC.MAKER.** After a brief pause, you'll see the main menu near the bottom of the screen.

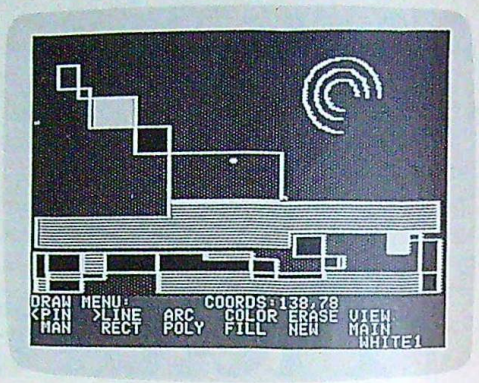
```
<DRAW> LOAD    SAVE
 CAT   DRIVE   QUIT
```

Make selections from the menu by moving the brackets with the left and right arrows and pressing Return at the feature you want.

Let's start by drawing. Select DRAW. This sends you to the DRAW menu.



Creating artwork like this—with filled concentric circles—is easy with "Picture Maker."



The drawing tools at your disposal make it simple to draw complex hi-res screens like this.

```
DRAW MENU                    COORDS:138,78
<PIN>  LINE   ARC   COLOR  ERASE  VIEW
 MAN   RECT   POLY  FILL   NEW    MAIN
                                  WHITE1
```

You'll also see a cursor in the middle of the screen. Move the cursor up, left, right, and down with the I, J, K, and M keys, respectively. Pressing the I key once, for instance, moves the cursor up one pixel.

You can move the cursor in larger increments—something you'll certainly want to do on any Apple besides the IIGS—by pressing keys 1–9. The cursor moves the same number of pixels as the number key last pressed. Press 5, and the cursor jumps in units of five pixels.

Draw A Line

Let's start by drawing a line. Notice the coordinates of the cursor displayed in the upper right part of the menu.

Move the cursor to the starting point of your line. Select PIN by moving the brackets there and pressing Return. This "pins" the beginning of the line. Now move the cursor—a line extends from the pinning point to the cursor. It even "rubber bands" as you move the cursor here and there.

The coordinates of the line are now displayed in the upper right portion of the menu. Move the cursor until you have the line you want, then select LINE with the brackets and press Return. You've drawn your first line. You can add more lines by moving the cursor, selecting PIN, moving the cursor, and selecting LINE.

If you pin the cursor in the wrong place, you can free it by selecting PIN again. The PIN option acts as a *toggle* (off or on) between pinned and unpinned conditions.

Color

Change the current drawing color by selecting COLOR. The current color is displayed in the lower right portion of the menu. Keep pressing Return while the brackets surround COLOR until the shade you want appears.

Rectangles, Circles, Arcs, And Polygons

Rectangles, circles, arcs, and polygons are all drawn with the same procedure as are lines. First pin the cursor by choosing PIN, then move the cursor to a point on the shape to be drawn. Select the option to draw it.

Rectangles. To draw a rectangle, pin the cursor at the point you want the upper left corner of the rectangle to appear. Move the cursor to the lower right corner of the rectangle. The line you see is the diagonal of the rectangle. Select RECT and your rectangle is drawn.

Circles. If you want to draw a circle, move the cursor to the position for the circle's center. Pin the cursor. Now move the cursor to a point on the circumference of the circle. The line you see is the radius of the circle. Choose ARC—you'll have to supply the number of degrees to move along the circle. Since you want a complete circle, enter 360 (entering 180 would give you a semicircle).

Arcs are drawn the same way, except that you enter a different value for the number of degrees. For example, a value of 90 draws a quarter circle. Positive values yield arcs drawn in a clockwise direction. Negative values cause arcs to be drawn counterclockwise.

Polygons. To draw a polygon, move the cursor to the center of the yet-to-be-drawn polygon and pin the cursor. Move the cursor to a corner of the polygon and select POLY. You'll have to enter the number of sides in the poly-

gon. Press the appropriate number key and your polygon is drawn.

Fill

To fill an area of the screen, move the cursor to the desired position. The cursor doesn't have to be pinned. Choose FILL—a new screen appears displaying a palette of 26 colors and patterns. Use the left and right arrow keys to move the box to the color you want; then press the Return key.

View

If you want to see the portion of the screen obscured by the menu, choose VIEW. When you want to see the menu again, press Return.

Auto

Sometimes, especially when drawing lines, it's more convenient to pin the cursor automatically on the end of the last object drawn instead of pinning manually.

To use this option, move the brackets to MAN and press Return. The selection changes to AUTO. Now the cursor pins itself after each object is drawn.

The AUTO mode is especially nice when you're drawing outlines. After you have drawn the first line, change to AUTO, and then move the brackets to LINE. To finish the outline, all you need do is move the cursor and select LINE repeatedly until you've completed the shape.

To return to manual mode, select AUTO.

Erase

The ERASE option lets you clean up any drawing mistakes. Choose ERASE and the selection is displayed in inverse to remind you it's in effect.

With ERASE on, the cursor erases whatever it passes over. You can change the size of the cursor by pressing keys 1–9. The larger the cursor, the more you erase (everything is erased within the box of an enlarged cursor).

Exit the ERASE mode by selecting it again. Choosing any other option while ERASE is in effect also drops you out of the mode.

New

NEW clears the screen. You're asked to confirm your selection before the entire screen is erased.

Main

The last option on the menu is MAIN. Selecting it returns you to the main menu.

Back At The Main Menu

At some point, you'll probably want to save your work. Choose SAVE from the main menu, and then enter a filename. Your work is saved as a binary file using that filename.

LOAD loads a binary picture file with the filename you specify. In both SAVE and LOAD, you can see the current disk's catalog by typing a question mark (?) and pressing Return.

The other options on the bottom line of the main menu relate to the disk drive. CAT displays the disk catalog and DRIVE lets you change the disk drive you want to access.

QUIT stops the program and returns to BASIC.

A Bit Technical

You may be curious about how the FILL routine manages to color in such irregular areas.

The routine first plots a line to the left from the input point. The line continues until it comes to an occupied point; then it stops and draws a line from the input point going right. As each point is plotted, the program checks above and below for empty space. If an empty region is found, a coordinate pair from that region is stored on a stack. When lines have been drawn left and right, the top coordinate pair is pulled from the stack, and the process begins again. The routine returns to the user when the stack is empty.

Short Description Of Program 1, Picture Maker

Line Numbers	Function
30–140	Initialize values
160–170	Draw color palette on page 2
190–340	Main menu
350–650	Draw menu
670–690	Pin option
700–760	Line option
770–800	Auto/manual option
810–870	Rectangle option
880–920	Color option
930–950	View option
960–1000	Main option
1010–1080	Arc option
1090–1160	Poly option
1170–1340	Fill option
1350–1400	Load option
1410–1460	Save option
1470–1490	Quit option
1500–1510	Cat option
1520–1540	Drive option
1550–1580	Erase option
1590–1620	New option
1630–1670	Arc/poly routine
1690–1880	Error handler

Program 1: Picture Maker

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
55 10 IF PEEK (104) < > 96 THEN POKE 103,1
      : POKE 104,96: POKE 24576,0: PRINT C
      HR$ (4);"RUN PIC.MAKER"
45 15 PRINT CHR$ (4);"BLOAD FILL"
71 20 ONERR GOTO 915
B3 25 SCALE= 1: ROT= 0
10 30 DIM CL$(7)
46 35 REM POKE SHAPE TABLE AND ERROR ROUTI
      NE
87 40 DATA 1,0,4,0,58,36,45,54,7,0,104,168
      ,104,166,223,154,72,152,72,96,"BLACK
      1","GREEN","VIOLET","WHITE1","BLACK2
      ","ORANGE","BLUE","WHITE2"
15 45 FOR W = 0 TO 19: READ I: POKE 768 +
      W,I: NEXT W: FOR W = 0 TO 7: READ CL
      $(W): NEXT W
DF 50 POKE 232,0: POKE 233,3
8A 55 SZ = 1:V = 0:AX = 45:AY = 75:DD = 1:
      CC = 3
CA 60 DEF FN HI(AD) = INT (AD / 256): DEF
      FN LO(AD) = AD - INT (AD / 256) * 25
      6
DE 65 XS = 235:YS = 249:XF = 237:YF = 250:
      DR = 2622:FI = 2083:IN = 2048:ER = 2
      915:HU = 206: POKE 230,64: POKE 28,0
      : CALL 62454: CALL IN
3F 70 REM DRAW FILL PALETTE
7C 75 FOR Q = 1 TO 2: FOR W = 1 TO 13: HCO
      LOR= 3: HPLOT 25 + W * 15,50 + Q * 2
      0 TO 35 + W * 15,50 + Q * 20: HPLOT
      TO 35 + W * 15,60 + Q * 20: HPLOT TO
       25 + W * 15,60 + Q * 20: HPLOT TO 2
      5 + W * 15,50 + Q * 20
F2 80 POKE HU,(W - 1) + (Q - 1) * 13: POKE
       XF,(30 + W * 15) / 2: POKE YF,55 +
      Q * 20: CALL FI: NEXT W,Q: HGR : CAL
      L IN
DE 85 REM MAIN MENU
AF 90 HOME : HTAB 1: VTAB 21: PRINT "MAIN
      MENU:": PRINT " DRAW";: HTAB 9: PRIN
      T " LOAD";: HTAB 17: PRINT " SAVE";
9A 95 VTAB 23: HTAB 1: PRINT " CAT";: HTAB
       9: PRINT " DRIVE";: HTAB 17: PRINT
      " QUIT";
29 100 BX = 1:BY = 22
20 105 POKE - 16368,0
8B 110 HTAB BX: VTAB BY: PRINT "<";: HTAB
      BX + 7: PRINT ">";
42 115 IF PEEK ( - 16384) < 128 THEN 115
55 120 KY = PEEK ( - 16384)
24 125 POKE - 16368,0
DB 130 IF KY < > 149 THEN 145
58 135 HTAB BX: VTAB BY: PRINT " ";: HTAB
      BX + 7: VTAB BY: PRINT " ";:BX = BX
       + 8: IF BX > 17 THEN BX = 1:BY = B
      Y + 1: IF BY > 23 THEN BY = 22
93 140 GOTO 110
C2 145 IF KY < > 136 THEN 160
44 150 HTAB BX: VTAB BY: PRINT " ";: HTAB
      BX + 7: VTAB BY: PRINT " ";:BX = BX
       - 8: IF BX < 0 THEN BX = 17:BY = B
      Y - 1: IF BY < 22 THEN BY = 23
A9 155 GOTO 110
DB 160 IF KY = 141 THEN ON (BY - 22) * 3 +
       (BX - 1) / 8 + 1 GOTO 175,685,715,
      760,770,745
AB 165 GOTO 110
A9 170 REM DRAW MENU
9A 175 BX = 1:BY = 22:JX = 138:JY = 78:HX
      = JX:HY = JY:PN = 0: ROT= 0: SCALE=
       1
E7 180 HOME : VTAB 21: PRINT "DRAW MENU:":
       HTAB 2: PRINT "PIN";: HTAB 8: PRIN
      T "LINE";: HTAB 14: PRINT "ARC";: H
      TAB 20: PRINT "COLOR";: HTAB 26: PR
      INT "ERASE";: HTAB 32: PRINT "VIEW"
      ;
3E 185 VTAB 23: HTAB 2: PRINT "MAN";: HTAB
       8: PRINT "RECT";: HTAB 14: PRINT "
      POLY";: HTAB 20: PRINT "FILL";: HTA
      B 26: PRINT "NEW";: HTAB 32: PRINT
      "MAIN";
ED 190 IF AM THEN VTAB 23: HTAB 2: PRINT "
      AUTO";
7B 195 VTAB 24: HTAB 33: PRINT CL$(CC);
0D 200 POKE - 16368,0
9A 205 HTAB BX: VTAB BY: PRINT "<";: HTAB
      BX + 6: PRINT ">";
44 210 XDRAW 1 AT JX,JY
41 215 IF PN = 0 THEN VTAB 21: HTAB 18: PR
      INT "                    ";: VTAB
       21: HTAB 18: PRINT "COORDS:";JX;",
      ";JY;: GOTO 230: REM 22 SPACES
2D 220 IF (KY = 201 OR KY = 202 OR KY = 20
      3 OR KY = 205) AND PN = 1 AND (HX <
       > JX OR HY < > JY) THEN POKE XS, F
      N LO(HX): POKE XS + 1, FN HI(HX): P
      OKE YS,HY: POKE XF, FN LO(JX): POKE
       XF + 1, FN HI(JX): POKE YF,JY: CAL
      L DR: ROT= 0: SCALE=
BC 225 VTAB 21: HTAB 18: PRINT "
                  ";: VTAB 21: HTAB 18: P
      RINT "COORDS:";HX;",";HY;",";JX;","
      ;JY;: REM 22 SPACES
15 230 IF PEEK ( - 16384) < 128 THEN 230
5C 235 XDRAW 1 AT JX,JY
5A 240 KY = PEEK ( - 16384)
29 245 POKE - 16368,0
85 250 IF KY > 176 AND KY < 186 THEN SZ =
      KY - 176: IF EF THEN SCALE= SZ
E0 255 IF KY = 149 AND NOT V THEN HTAB BX:
       VTAB BY: PRINT " ";: HTAB BX + 6:
      VTAB BY: PRINT " ";:BX = BX + 6: IF
       BX > 32 THEN BX = 1:BY = BY + 1: I
      F BY = 24 THEN BY = 22
64 260 IF KY = 136 AND NOT V THEN HTAB BX:
       VTAB BY: PRINT " ";: HTAB BX + 6:
      VTAB BY: PRINT " ";:BX = BX - 6: IF
       BX < 0 THEN BX = 31:BY = BY - 1: I
      F BY < 22 THEN BY = 23
DJ 265 IF KY = 141 THEN ON (BY - 22) * 6 +
       (BX - 1) / 6 + 1 GOSUB 330,350,505
      ,440,785,465,385,405,550,595,805,48
      0
34 270 IF KY < > 201 AND KY < > 202 AND KY
       < > 203 AND KY < > 205 THEN 205
C1 275 IF PN AND (HX < > JX OR HY < > JY)
      THEN POKE XS, FN LO(HX): POKE XS +
      1, FN HI(HX): POKE YS,HY: POKE XF,
      FN LO(JX): POKE XF + 1, FN HI(JX):
      POKE YF,JY: CALL DR: ROT= 0: SCALE=
       1: IF EF THEN SCALE= SZ
44 280 REM ERASE MODE?
07 285 IF NOT EF THEN 300
09 290 Q1 = JX - SZ + 1:Q2 = JX + SZ - 1:W
      1 = JY - SZ + 1:W2 = JY + SZ - 1:Q1
       = Q1 * (Q1 > - 1):Q2 = 279 * (Q2 >
       279) + Q2 * (Q2 < 280):W1 = W1 * (
      W1 > - 1):W2 = 191 * (W2 > 191) + W
      2 * (W2 < 192)
D9 295 POKE 235,Q1 / 2: POKE 237,Q2 / 2: P
      OKE 249,W1: POKE 250,W2: CALL ER: R
      OT= 0: SCALE= SZ: HCOLOR= 0: FOR I
      = Q1 TO Q2: HPLOT I,W1 TO I,W2: NEX
      T I
26 300 IF KY = 201 THEN JY = JY - SZ: IF J
      Y < 0 THEN JY = 191 + JY
```

```
1E 305 IF KY = 205 THEN JY = JY + SZ: IF J
       Y > 191 THEN JY = JY - 191
32 310 IF KY = 202 THEN JX = JX - SZ: IF J
       X < 0 THEN JX = 278 + JX
9D 315 IF KY = 203 THEN JX = JX + SZ: IF J
       X > 278 THEN JX = JX - 278
1B 320 GOTO 205
58 325 REM PIN OPTION
7C 330 IF PN = 1 AND (JX < > HX OR JY < >
       HY) THEN POKE XS, FN LO(HX): POKE X
       S + 1, FN HI(HX): POKE YS,HY: POKE
       XF, FN LO(JX): POKE XF + 1, FN HI(J
       X): POKE YF,JY: CALL DR: ROT= 0: SC
       ALE= 1:PN = 0: RETURN
9E 335 PN = 1:HX = JX:HY = JY: IF EF THEN
       GOSUB 795
1B 340 RETURN
BA 345 REM LINE OPTION
DB 350 IF EF THEN GOSUB 795: RETURN
E2 355 IF PN = 0 THEN RETURN
1F 360 IF AM = 0 THEN PN = 0
C9 365 POKE XS, FN LO(HX): POKE XS + 1, FN
        HI(HX): POKE YS,HY: POKE XF, FN LO
       (JX): POKE XF + 1, FN HI(JX): POKE
       YF,JY: CALL DR: ROT= 0: SCALE= 1
6E 370 HCOLOR= CC: HPLOT HX,HY TO JX,JY: H
       PLOT HX + 1,HY TO JX + 1,JY: IF AM
       = 1 THEN HX = JX:HY = JY:
35 375 RETURN
7E 380 REM AUTO/MANUAL OPTION
A9 385 IF EF THEN GOSUB 795
F9 390 IF AM THEN VTAB 23: HTAB 2: PRINT "
          ";: HTAB 2: PRINT "MAN";:AM = 0
       : RETURN : REM 4 SPACES
   395 IF NOT AM THEN VTAB 23: HTAB 2: PRI
       NT "    ";: HTAB 2: PRINT "AUTO";:A
       M = 1: RETURN
   400 REM RECTANGLE OPTION
   405 IF EF THEN GOSUB 795: RETURN
   410 IF PN = 0 THEN RETURN
   415 IF AM = 0 THEN PN = 0
   420 POKE XS, FN LO(HX): POKE XS + 1, FN
        HI(HX): POKE YS,HY: POKE XF, FN LO
       (JX): POKE XF + 1, FN HI(JX): POKE
       YF,JY: CALL DR: ROT= 0: SCALE= 1
 4 425 HCOLOR= CC: HPLOT HX,HY TO JX,HY: H
       PLOT TO JX,JY: HPLOT TO HX,JY: HPLO
       T TO HX,HY: HPLOT HX + 1,HY TO JX +
        1,HY: HPLOT TO JX + 1,JY: HPLOT TO
        HX + 1,JY: HPLOT TO HX + 1,HY: IF
       AM = 1 THEN HX = JX:HY = JY:
1A 430 RETURN
7F 435 REM COLOR OPTION
8E 440 IF EF THEN GOSUB 795
9C 445 VTAB 24: HTAB 33: PRINT "      ";:
       REM 6 SPACES
DD 450 CC = CC + 1: IF CC > 7 THEN CC = 0
D8 455 VTAB 24: HTAB 33: PRINT CL$(CC);: R
       ETURN
49 460 REM VIEW OPTION
86 465 IF V = 0 THEN V = 1: POKE - 16302,0
       : RETURN
E3 470 V = 0: POKE - 16301,0: RETURN
0B 475 REM MAIN OPTION
8E 480 POP : POKE - 16301,0
AA 485 IF EF THEN GOSUB 795
68 490 IF PN THEN PN = 0: IF HX < > JX OR
       HY < > JY THEN POKE XS, FN LO(HX):
       POKE XS + 1, FN HI(HX): POKE YS,HY:
        POKE XF, FN LO(JX): POKE XF + 1, F
       N HI(JX): POKE YF,JY: CALL DR: ROT=
        0: SCALE= 1
56 495 GOTO 90
F7 500 REM ARC OPTION
E7 505 IF EF THEN GOSUB 795: RETURN
C8 510 IF PN = 0 THEN RETURN
2B 515 IF AM = 0 THEN PN = 0
0F 520 HOME : VTAB 22: INPUT "ENTER ARC LE
       NGTH (-360 TO +360):";A$:AC = VAL (
       A$): IF AC = 0 OR ABS (AC) > 360 TH
       EN POP : GOTO 180
C3 525 POKE XS, FN LO(HX): POKE XS + 1, FN
        HI(HX): POKE YS,HY: POKE XF, FN LO
       (JX): POKE XF + 1, FN HI(JX): POKE
       YF,JY: CALL DR: ROT= 0: SCALE= 1
4B 530 X1 = JX:Y1 = JY:CX = HX:CY = HY:AN
       = SGN (AC) * .2:AC = ABS (AC) / 360
       : GOSUB 825
26 535 IF AM THEN POKE XS, FN LO(HX): POKE
        XS + 1, FN HI(HX): POKE YS,HY: POK
       E XF, FN LO(JX): POKE XF + 1, FN HI
       (JX): POKE YF,JY: CALL DR: ROT= 0:
       SCALE= 1
F9 540 POP : GOTO 180
E6 545 REM POLY OPTION
DD 550 IF EF THEN GOSUB 795: RETURN
E4 555 IF PN = 0 THEN RETURN
21 560 IF AM = 0 THEN PN = 0
A0 565 HOME : VTAB 22: INPUT "ENTER NUMBER
        OF SIDES (3 TO 10): ";A$:AN = VAL
       (A$): IF AN < 3 OR AN > 10 THEN 565
B9 570 POKE XS, FN LO(HX): POKE XS + 1, FN
        HI(HX): POKE YS,HY: POKE XF, FN LO
       (JX): POKE XF + 1, FN HI(JX): POKE
       YF,JY: CALL DR: ROT= 0: SCALE= 1
73 575 X1 = JX:Y1 = JY:CX = HX:CY = HY:AN
       = 6.2832 / AN:AC = 1: GOSUB 825
1C 580 IF AM THEN POKE XS, FN LO(HX): POKE
        XS + 1, FN HI(HX): POKE YS,HY: POK
       E XF, FN LO(JX): POKE XF + 1, FN HI
       (JX): POKE YF,JY: CALL DR: ROT= 0:
       SCALE= 1
16 585 POP : GOTO 180
3D 590 REM FILL OPTION
AD 595 IF EF THEN GOSUB 795
4C 600 IF PN THEN PN = 0: POKE XS, FN LO(H
       X): POKE XS + 1, FN HI(HX): POKE YS
       ,HY: POKE XF, FN LO(JX): POKE XF +
       1, FN HI(JX): POKE YF,JY: CALL DR:
       ROT= 0: SCALE= 1
8A 605 SCALE= 7: POKE 230,64: POKE - 16302
       ,0: POKE - 16299,0
BD 610 XDRAW 1 AT AX,AY
27 615 POKE - 16368,0
1B 620 IF PEEK ( - 16384) < 128 THEN 620
21 625 KY = PEEK ( - 16384): IF KY < > 136
        AND KY < > 149 AND KY < > 141 THEN
        615
C6 630 IF KY < > 136 THEN 645
33 635 XDRAW 1 AT AX,AY:AX = AX - 15: IF A
       X < 45 THEN AX = 225:AY = AY - 20:
       IF AY < 75 THEN AY = 95
1B 640 GOTO 610
E8 645 IF KY < > 149 THEN 660
09 650 XDRAW 1 AT AX,AY:AX = AX + 15: IF A
       X > 225 THEN AX = 45:AY = AY + 20:
       IF AY > 95 THEN AY = 75
31 655 GOTO 610
15 660 XDRAW 1 AT AX,AY: SCALE= 1
D6 665 POKE 230,32: POKE - 16300,0
4D 670 POKE HU,(AX - 45) / 15 + (AY - 75)
       * 13 / 20: POKE XF,JX / 2: POKE YF,
       JY: CALL FI: ROT= 0: SCALE= 1: POKE
        - 16301,0
F7 675 POKE - 16368,0: RETURN
A5 680 REM LOAD OPTION
46 685 TEXT : HOME : VTAB 12: INPUT "ENTER
        FILE NAME (?=CATALOG, <RET> TO
       CANCEL) :  ";A$: PRINT
10 690 IF A$ = "" THEN POKE - 16304,0: GOT
       O 90
```

```
66 695 IF A$ = "?" OR A$ = "/" THEN PRINT
       CHR$ (4);"CATALOG": GET A$: PRINT A
       $: GOTO 685
A0 700 INPUT "LOADING WILL ERASE CURRENT P
       ICTURE.  DO  YOU WANT TO CONTINUE? "
       ;B$: IF LEFT$ (B$,1) = "N" OR LEFT$
        (B$,1) = CHR$ ( ASC ("N") + 32) TH
       EN POKE - 16304,0: GOTO 90
92 705 PRINT CHR$ (4);"BLOAD";A$;",A$2000"
       ;",D";DD: POKE - 16304,0: GOTO 90
6A 710 REM SAVE OPTION
70 715 TEXT : HOME
27 720 VTAB 12: INPUT "ENTER FILE NAME (?=
       CATALOG, <RET> TO    CANCEL) :  ";A
       $: PRINT
17 725 IF A$ = "" THEN POKE - 16304,0: GOT
       O 90
62 730 IF A$ = "?" OR A$ = "/" THEN PRINT
       CHR$ (4);"CATALOG,D";DD: GET A$: PR
       INT A$: GOTO 715
9E 735 PRINT CHR$ (4);"BSAVE";A$;",A$2000,
       L$2000";",D";DD: POKE - 16304,0: GO
       TO 90
0B 740 REM QUIT OPTION
59 745 HOME : VTAB 22: INPUT "DO YOU WANT
       TO CONTINUE?";A$: IF A$ = "" OR LEF
       T$ (A$,1) = "Y" OR LEFT$ (A$,1) = C
       HR$ (121) THEN 90
1B 750 TEXT : HOME : PRINT CHR$ (4);"FP"
3C 755 REM CATALOG OPTION
62 760 TEXT : HOME : PRINT : PRINT CHR$ (4
       );"CATALOG,D";DD: GET A$: PRINT A$:
        POKE - 16304,0: GOTO 90
21 765 REM DRIVE OPTION
E6 770 TEXT : HOME : VTAB 12: INPUT "ENTER
        DRIVE NUMBER (1 OR 2) : ";A$:DD =
       VAL (A$): IF DD < > 1 AND DD < > 2
       THEN 770
0C 775 POKE - 16304,0: GOTO 90
43 780 REM ERASE OPTION
9C 785 SZ = 1: IF PN THEN GOSUB 330: IF PN
        THEN PN = 0
22 790 IF NOT EF THEN EF = 1: INVERSE : VT
       AB 22: HTAB 26: PRINT "ERASE";: NOR
       MAL : RETURN
C5 795 SCALE= 1:EF = 0: VTAB 22: HTAB 26:
       PRINT "ERASE";: RETURN
CB 800 REM NEW OPTION
9C 805 IF EF THEN GOSUB 785
AE 810 HOME : VTAB 22: INPUT "NEW WILL ERA
       SE DRAWING-- DO YOU WANT TO CONTINU
       E?";A$: IF LEFT$ (A$,1) = "N" OR LE
       FT$ (A$,1) = CHR$ ( ASC ("N") + 32)
        THEN POP : GOTO 180
82 815 HGR : CALL IN: POP : GOTO 180
54 820 REM ARC/POLY
DA 825 Y1 = Y1 / .86:CY = CY / .86:A1 = AB
       S ( INT (AC * 6.283 / AN)):CA = COS
        (AN):SA = SIN (AN):X1 = X1 - CX:Y1
        = Y1 - CY: HCOLOR= CC
1B 830 FOR I = 0 TO A1:XT = X1 * CA - Y1 *
        SA:YT = Y1 * CA + X1 * SA:X8 = X1
       + CX:X9 = XT + CX:Y8 = (Y1 + CY) *
       .86:Y9 = (YT + CY) * .86
0D 835 IF X8 < 0 AND X9 < 0 THEN 900
26 840 IF X8 < 0 THEN Y8 = Y9 - (Y9 - Y8)
       * X9 / (X9 - X8):X8 = 0
11 845 IF X9 < 0 THEN Y9 = Y8 - (Y8 - Y9)
       * X8 / (X8 - X9):X9 = 0
2D 850 IF Y8 < 0 AND Y9 < 0 THEN 900
77 855 IF Y8 < 0 THEN X8 = X9 - (X9 - X8)
       * Y9 / (Y9 - Y8):Y8 = 0
3C 860 IF Y9 < 0 THEN X9 = X8 - (X8 - X9)
       * Y8 / (Y8 - Y9):Y9 = 0
F1 865 IF X8 > 278 AND X9 > 278 THEN 900
C7 870 IF X8 > 278 THEN Y8 = Y9 + (Y8 - Y9
       ) * (278 - X9) / (X8 - X9):X8 = 278
03 875 IF X9 > 278 THEN Y9 = Y8 + (Y9 - Y8
       ) * (278 - X8) / (X9 - X8):X9 = 278
F6 880 IF Y8 > 191 AND Y9 > 191 THEN 900
6E 885 IF Y8 > 191 THEN X8 = X9 + (X8 - X9
       ) * (191 - Y9) / (Y8 - Y9):Y8 = 191
83 890 IF Y9 > 191 THEN X9 = X8 + (X9 - X8
       ) * (191 - Y8) / (Y9 - Y8):Y9 = 191
7D 895 HPLOT X8,Y8 TO X9,Y9: HPLOT X8 + 1,
       Y8 TO X9 + 1,Y9
3B 900 X1 = XT:Y1 = YT: NEXT I: RETURN
9E 905 REM
E7 910 REM ERROR ROUTINE
31 915 HOME : VTAB 12: ON PEEK (222) GOTO
       920,925,930,935,940,945,950,955,960
       ,965,970,975,980,985,990,995
AD 920 PRINT "ERROR #"; PEEK (222): END
C1 925 PRINT "ERROR #"; PEEK (222): END
AF 930 PRINT "ERROR #"; PEEK (222): END
0F 935 PRINT "DISK IS WRITE PROTECTED": GO
       TO 1000
62 940 PRINT "FILE IS NOT ON DISK": PRINT
       CHR$ (4);"DELETE";A$: GOTO 1000
18 945 PRINT "FILE IS NOT ON DISK": GOTO 1
       000
B3 950 PRINT "ERROR #"; PEEK (222): END
48 955 PRINT "I/O ERROR": GOTO 1000
CC 960 PRINT "DISK FULL": GOTO 1000
33 965 PRINT "FILE IS LOCKED": GOTO 1000
B4 970 PRINT "INVALID FILE NAME": GOTO 100
       0
CB 975 PRINT "ERROR #"; PEEK (222): END
B9 980 PRINT "ERROR #"; PEEK (222): END
CD 985 PRINT "ERROR #"; PEEK (222): END
BB 990 PRINT "ERROR #"; PEEK (222): END
CC 995 PRINT "INVALID FILE NAME": GOTO 100
       0
20 1000 INPUT "PRESS RETURN TO CONTINUE";A
       $
5D 1005 POKE - 16304,0: CALL 778: GOTO 90
```

Program 2: FILL

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
START ADDRESS: 0800
END ADDRESS:   0B8B

0800: A9 00 8D 8C 0B A9 8C 85 FC
0808: 3C A9 8D 85 42 A9 0B 85 FE
0810: 3D A9 0B 85 43 A9 0C 85 41
0818: 3E A9 19 85 3F A0 00 20 C9
0820: 2C FE 60 A9 00 85 09 85 5A
0828: CF A5 ED 85 EB 85 EF A5 9A
0830: FA 85 F9 85 FB 20 E6 09 ED
0838: 20 FD 09 A9 01 85 FC 85 31
0840: FD 90 01 60 A5 EB 85 EF 71
0848: A5 F9 85 FB 20 17 0A BD 49
0850: F6 F6 85 E4 20 41 09 B0 61
0858: 1E 24 09 30 1A 20 C8 09 90
0860: A4 E5 20 5A F4 20 8A F4 18
0868: 20 5A F4 20 F5 08 A5 EB C6
0870: F0 05 C6 EB 4C 44 08 A5 FA
0878: ED C9 8B F0 BB A9 00 85 7C
0880: FC 85 FD A6 FA F0 14 CA 29
0888: 86 FB A5 ED 85 EF 20 41 DB
0890: 09 B0 04 24 09 10 04 A9 4E
0898: 01 85 FC A6 FA E0 BF B0 20
08A0: 14 E8 86 FB A5 ED 85 EF 65
08A8: 20 41 09 B0 04 24 09 10 18
08B0: 04 A9 01 85 FD A6 ED E8 F4
08B8: 86 EB A5 EB 85 EF A5 F9 AB
08C0: 85 FB 20 17 0A BD F6 F6 34
```

```
08C8: 85 E4 20 41 09 B0 04 24 24
08D0: 09 10 03 4C 38 08 20 C8 79
08D8: 09 A4 E5 20 5A F4 20 8A C6
08E0: F4 20 5A F4 A5 EB C9 8B 0A
08E8: D0 03 4C 38 08 20 F5 08 E3
08F0: E6 EB 4C BA 08 A5 EB 85 D8
08F8: EF A6 F9 E0 BF B0 1E E8 DD
0900: 86 FB 20 41 09 B0 04 24 A3
0908: 09 10 07 A9 01 85 FD 4C 84
0910: 1D 09 A5 FD F0 07 A9 00 7E
0918: 85 FD 20 E6 09 A5 F9 F0 A2
0920: 1F A6 F9 CA 86 FB 20 41 FC
0928: 09 B0 04 24 09 10 06 A9 EB
0930: 01 85 FC D0 0B A5 FC F0 AA
0938: 07 A9 00 85 FC 20 E6 09 CF
0940: 60 A5 EF 0A AA A9 00 2A B0
0948: A8 A5 FB 20 11 F4 A9 00 49
0950: 85 09 B1 26 29 7F 25 30 C1
0958: F0 06 A9 80 85 09 D0 14 A7
0960: A5 30 0A 49 80 30 03 A9 9B
0968: 81 C8 31 26 29 7F F0 04 23
0970: A9 80 85 09 A9 00 85 07 18
0978: A5 FB 85 06 06 06 26 07 09
0980: 06 06 26 07 06 06 26 07 E7
0988: 06 06 26 07 A5 FB 0A 90 16
0990: 02 E6 07 18 65 06 90 02 26
0998: E6 07 18 69 8C 85 06 A9 A9
09A0: 0B 65 07 85 07 A5 EF 4A C3
09A8: 66 1D 4A 66 1D 4A 66 1D E0
09B0: A8 46 1D 46 1D 46 1D 46 33
09B8: 1D 46 1D A6 1D B1 06 D0 85
09C0: 02 18 60 4A CA 10 FC 60 7B
09C8: A6 1D 24 09 50 0C A9 FF 90
09D0: 18 2A CA 10 FC 31 06 91 1E
09D8: 06 60 A9 00 38 2A CA 10 4B
09E0: FC 11 06 91 06 60 E6 CF DE
09E8: A5 CF C9 19 90 02 C6 CF 76
09F0: A4 CF A5 EF 99 C5 0A A5 9A
09F8: FB 99 DE 0A 60 A5 CF D0 F5
0A00: 02 38 60 A4 CF B9 C5 0A 74
0A08: 85 ED 85 EB B9 DE 0A 85 AC
0A10: FA 85 F9 C6 CF 18 60 A5 F3
0A18: CE 85 08 06 08 A5 F9 4A 6B
0A20: 90 0E A5 EB 4A 90 02 E6 F2
0A28: 08 A4 08 B9 2D 0B AA 60 51
0A30: A5 EB 4A 90 02 E6 08 A4 C4
0A38: 08 B9 F7 0A AA 60 A6 EB 6E
0A40: A4 EC A5 F9 20 11 F4 A5 0B
0A48: ED 38 E5 EB 48 A5 EE E5 79
0A50: EC 85 D3 B0 0A 68 49 FF 46
0A58: 69 01 48 A9 00 E5 D3 85 C9
0A60: D1 85 D5 68 85 D0 85 D4 4F
0A68: A5 FA 38 E5 F9 B0 04 49 57
0A70: FF 69 01 85 D2 66 D3 A5 D4
0A78: D2 18 65 D0 AA A9 00 65 17
0A80: D1 85 1D A5 D4 38 E5 D2 03
0A88: 85 D4 A5 D5 E9 00 85 D5 D6
0A90: B1 26 45 30 49 80 91 26 48
0A98: CA 8A 49 FF D0 06 C6 1D 27
0AA0: A5 1D 30 20 90 09 A5 D3 9E
0AA8: 0A 20 65 F4 4C 83 0A A5 EF
0AB0: D3 20 D3 F4 A5 D4 18 65 96
0AB8: D0 85 D4 A5 D5 65 D1 85 F8
0AC0: D5 4C 90 0A 60 60 90 0A 35
0AC8: 03 FF FF 00 00 FF FF 00 5E
0AD0: 00 FF FF 00 00 FF FF 00 E4
0AD8: 00 FF FF 00 00 FF 60 90 3E
0AE0: 0A 03 FF FF 00 00 FF FF BA
0AE8: 00 00 FF FF 00 00 FF FF FC
0AF0: 00 00 FF FF 00 00 FF 01 06
0AF8: 01 02 02 03 03 05 05 06 BA
0B00: 06 07 07 01 00 01 02 01 D4
0B08: 03 01 01 01 01 02 00 02 22
0B10: 03 02 02 02 02 03 00 07 AB
0B18: 04 05 04 05 07 05 06 06 A0
0B20: 04 06 07 01 01 02 02 05 C3
0B28: 05 06 06 00 00 01 01 02 0B
0B30: 02 03 03 05 05 06 06 07 0C
0B38: 07 00 01 02 01 03 01 05 2D
0B40: 05 06 06 00 02 03 02 05 40
0B48: 05 06 06 00 03 04 07 04 5D
0B50: 05 07 05 06 05 04 06 07 F6
0B58: 06 03 03 03 03 07 07 07 0C
0B60: 07 00 00 A5 EB 85 EF A9 53
0B68: 40 85 09 A5 F9 85 FB 20 79
0B70: 74 09 20 C8 09 A6 FB E4 53
0B78: FA F0 05 E8 86 FB D0 EF 2D
0B80: A6 EF E4 ED F0 05 E8 86 55
0B88: EF D0 E0 60 FF FF 00 00 EC
```

aa

Correction

Fred D'Ignazio's article "Inventing the Future" in the Fall/Winter 1986 issue of COMPUTE!'s Apple Applications Special inadvertently credited work on "The Turtle Ballet" to the wrong party. Two films, not one, were made at Mitek, an education, research, and development corporation in downtown Vancouver, Canada—not at Simon Fraser University as stated. Though Sinclair, Bell, and Dawson participated, as reported, in the development of the film "The Turtle Ballet," they were not involved in the programming, something done by a Mitek employee. Mitek's production, "Live from Mitek Hall," is the three-minute film that actually was the basis for D'Ignazio's article. D'Ignazio extends his apologies to Mitek for inadvertently omitting their primary role in the project, and would like to credit Grant Lucas and Malcolm Colton of Mitek for creating an excellent production.

Attention Programmers

COMPUTE!'s Apple Applications Special is looking for quality submissions from Apple and Macintosh programmers. If you've got an outstanding game, application, utility, or programming tutorial for the Apple II series or the Macintosh, send it to the Editor, *Apple Applications Special*, 324 W. Wendover Ave., Suite 200, Greensboro, NC 27408.

We are particularly interested in seeing programs that take advantage of the Apple IIGS's graphics and sound capabilities.

All programs must be written in BASIC or assembly language, and should be submitted on disk. Documentation and instructions should also be included in the submission.

Apple SpeedScript 80

The 80-Column Machine Language Word Processor For Apple II

Charles Brannon, Kevin Martin, and Bill Rodrick

COMPUTE!'s Apple Applications Special is proud to present Apple SpeedScript 80, *an 80-column word processor for Apple IIe, IIc, and IIGS computers. Based on* SpeedScript 3.0, *which was first published in the June 1985 issue of COMPUTE! magazine,* Apple SpeedScript 80 *is an impressive word processing application that's easy to learn, and just as easy to use.*

If you already have and use SpeedScript, *you can save yourself retyping time by following the easy instructions which show you how to modify* SpeedScript *for 80 columns.*

Apple SpeedScript 80 *runs on any Apple IIc or IIGS, and on IIe computers with an 80-column card. DOS 3.3 and ProDOS versions are included.*

SpeedScript 80, though compact in size (5.5K), has most of the functions you expect in a full-featured word processor. *SpeedScript* is also very easy to learn and use. You type in everything first; preview and make corrections on the screen; insert and delete words, sentences, and paragraphs; then print out an error-free draft, letting *SpeedScript 80* take care of things like margins, centering, headers, and footers.

Special Typing Instructions

SpeedScript 80 is a long program, but our "Apple MLX" entry system helps you type it right the first time. MLX can detect most typing errors as they happen. (See the Apple MLX instructions and program elsewhere in this issue.) MLX also lets you type *SpeedScript 80* in more than one sitting. Although the program listing is lengthy, we think you'll agree the effort is worthwhile. If you prefer, you can order this issue's companion disk—which includes *SpeedScript 80*—directly from COMPUTE! Publications by using the coupon in the magazine or by calling COMPUTE! Publications toll-free at 1-800-346-6767 (in NY 1-212-887-8525).

To begin entering the data for *SpeedScript 80*, boot up your Apple with a DOS 3.3 or ProDOS startup disk in the drive. Programs entered with MLX must be saved to disk with the same operating system format as the disk from which MLX was loaded. If you will be using the ProDOS operating system, you must enter the data for the DOS 3.3 version of *SpeedScript 80*, listed at the end of this article, then create a ProDOS version by following the instructions found in the section "ProDOS Modifications."

ProDOS users should read the section "ProDOS Modifications," which explains the conversion procedure, before attempting to run the SpeedScript 80 *program.*

Because the machine language data for *SpeedScript 80* resides in the same area of memory where BASIC programs are normally loaded, it's necessary to reconfigure memory before loading MLX to enter *SpeedScript 80*. Otherwise, the *SpeedScript 80* data you enter with MLX will overwrite the MLX program itself as you type. To reconfigure memory, type the following line in direct mode (no line number) and hit Return:

```
POKE 104,32: POKE 8192,0: NEW
```

You must *always* enter this line before loading MLX to enter *SpeedScript 80* data. It is, however, *not* necessary to enter this line before loading the completed *SpeedScript 80* program.

Now load and run MLX. Respond to its prompts as indicated:

```
STARTING ADDRESS? 0800
ENDING ADDRESS?   1E45
```

An options menu appears next. Press E to Enter the program. Now type the address at which you'd like to start typing. If you're just beginning to type the listing, enter 0800. The screen then shows the first prompt, the number 0800 followed by a colon (:). Type in each two-digit number shown in the *SpeedScript 80* listing (Program 1). Some of the digits are letters, because the numbers are in hexadecimal. You don't need to type the spaces between the two-digit numbers shown in the listing, but you can for the sake of readability. MLX doesn't let you type illegal characters.

The last number you enter in each line is a *checksum*. If you type the line correctly, the checksum calculated by MLX should match the checksum number you typed in. If it doesn't match, MLX makes you retype the line. MLX is not foolproof, though. It's quite rare, but it's possible that an error in one number could be offset by an error in another. MLX will help catch your errors, but you still must be careful.

Typing In Multiple Sittings

If you want to stop typing the listing at some point and pick up later, press Return at the address prompt without typing anything. Write down the address where you stopped. The options menu reappears, and you can save your typing at this point. To continue entering data the next time, boot your system, enter the direct-mode line given above to configure memory, and load MLX. Answer the STARTING ADDRESS? and ENDING ADDRESS? questions with the same values you used the first time, 0800 and 1E45. Then select Load from the options menu, and press E to enter data. Give MLX the address number where you previously stopped. Then continue typing as before.

When you finish all typing, MLX returns you to the options menu, where you can save the finished program. Since you'll have quite a bit of effort invested in entering all the data, we recommend that you use the MLX Save option to save copies of *SpeedScript 80* on several different disks before you leave MLX.

MLX has now created a binary file on disk. This version of *SpeedScript 80* will run only with DOS 3.3; ProDOS users should read the section entitled "ProDOS Modifications" for information on converting this version of *SpeedScript 80* into a ProDOS version.

Running *SpeedScript 80*

To run *SpeedScript 80* with DOS 3.3, reboot the machine to clear out memory. Then, from BASIC, type **BRUN *filename***, where *filename* is the name you specified when saving *SpeedScript 80* on disk with MLX. *SpeedScript 80* automatically loads and runs. If you prefer, you can write a short program, something like

```
10 PRINT CHR$(4);"BRUN filename"
```

Save this program as the HELLO file on the disk (use INIT HELLO to format and set up a blank disk). This makes *SpeedScript 80* load and run automatically when you boot up.

To run the ProDOS version, simply reboot the machine with the *SpeedScript 80* startup disk in the drive, and *SpeedScript 80* will load and run automatically. Alternatively, if you already have ProDOS booted, insert the *SpeedScript 80* disk and at a BASIC] prompt, enter

```
-SS.SYSTEM
```

An Empty Page

When you run *SpeedScript 80*, you'll see a blank 80-column screen with a blinking underline cursor. The first line on the screen is in reverse video, white with black letters. *SpeedScript 80* presents all messages on this *command line*. The remaining 20 lines of the screen are used to enter, edit, and display your document.

The clarity of the 80-column display will vary depending on your monitor or television set. If the characters appear fuzzy and a bit unreadable, try adjusting the contrast of the monitor or set while turning up its brightness. This leaves you with a gray background instead of black, but the characters should show up more easily.

The cursor shows where the next character you type will appear on the screen. *SpeedScript 80* lets you move the cursor anywhere within your document, making it simple to find and correct errors.

Entering Text

To begin using *SpeedScript 80*, start typing, just as you would on a typewriter. Hold down the Shift key to type an uppercase letter, and be sure the Caps Lock key is disengaged if you want to type lowercase.

When the cursor reaches the right edge of the screen, it automatically jumps to the beginning of the next line, just as in BASIC. But unlike BASIC, *SpeedScript 80* never splits words

at the right edge of the screen. If a word you're typing won't fit at the end of one line, it's instantly moved to the next line. This feature, called *word-wrap*, helps make your text more readable.

Scrolling And Screen Formatting

When you finish typing on the last screen line, *SpeedScript 80* automatically scrolls the text upward to make room for a new line at the bottom. Imagine the screen as a 20-line window on a long continuous document. The DOS 3.3 version provides room in memory for 27,904 characters, or about 10–15 pages of text. Unfortunately, the DOS 3.3 version cannot make use of memory in excess of 48K. However, the ProDOS version of *SpeedScript 80* does give you access to an additional 10K, or over 10,000 more characters.

To check at any time how much space is available, press **Control-A** (hold down the Control key while pressing the A key). The number appearing in the command line indicates how much *available* room remains for characters of text.

If you're used to a typewriter and this is your first experience with word processing, you'll have to unlearn some habits. For one thing, you don't have to press Return at the end of each line as you do on a typewriter. *SpeedScript 80*'s word-wrap takes care of this automatically. Press Return only when you want to force a carriage return to end a paragraph or limit the length of a line. A *return mark* appears on the screen as a reverse less-than sign (<).

Using The Keyboard

Most features are accessed with Control-key commands—you hold down Control while pressing another key. In this article, Control-key commands are represented as **Control-*x*** (where *x* is the key you press in combination with Control). An example is the Control-A, mentioned above, to check on available memory. Control-E means hold down Control and press E.

Some commands have special options. You may be required to press the Open Apple key (the key to the left of the space bar with a hollow Apple symbol on the face) while pressing another key or Control-key combination. The Open Apple key is abbreviated as **OpAp** in this article. **OpAp-Control-*x*** means to press Open Apple in conjunction with a Control-key combination. Other keys are referenced by name or function. See the "Keyboard Map" figure for a complete quick-reference chart of all keyboard commands. Because *SpeedScript 80* uses almost every key, not all combinations are especially mnemonic. Most keys, though, stand for the name of the function they perform.

Some keys let you move the cursor to different places in the document to make corrections or scroll text into view. You can move the cursor by character, word, sentence, or paragraph. Here's how to control the cursor:

- The ← and → keys (cursor-left and cursor-right) move the cursor a single space in either direction. By holding down the Open Apple key while pressing the appropriate cursor key, you can move the cursor to the beginning of the next (→) or previous (←) word.
- The ↑ and ↓ keys (cursor-up and cursor-down) move the cursor to the beginning of either the previous or next sentence. A sentence is defined as any sequence of characters ending in a period, question mark, exclamation point, or return mark. Hold down the Open Apple key as you press the arrow to move to the beginning of the next (↓) or previous (↑) paragraph. A paragraph is defined as any sequence of characters ending in a return mark.
- Pressing **Control-@** (Control-Shift-2) puts the cursor at the top of the screen. If the cursor is already at the top of the screen, Control-@ moves the cursor to the top of the document. To move quickly to the beginning of the document, press Control-@ twice.
- **Control-Z** moves the cursor to the end of the document, scrolling if necessary. It's easy to remember since Z is at the *end* of the alphabet.

Making Corrections

Sometimes, you'll have to insert characters to make a correction. Use **Control-O** to *open up* a single space. Merely position the cursor at the point where you want to insert a space, and press Control-O.

It can be tedious to use Control-O to open up enough space for a whole sentence or paragraph. For convenience, *SpeedScript 80* has an insert mode that automatically inserts space for each character you type. In this mode, you can't type over characters; everything is inserted at the cursor position. To enter insert mode, press **Control-I.** To cancel insert mode, press Control-I again. To let you know you're in insert mode, the cursor changes from a blinking underline to a blinking reverse underline, which looks like a solid square. The cursor changes back to a blinking underline when you exit insert mode. Because of keyboard decoding redundancy, the Tab key works just like Control-I.

Insert mode is the easiest way to insert text, but it can become too slow when you're inserting near the top of a very long document, because it must move all the text following the

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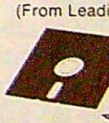

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cursor position. So *SpeedScript 80* has even more ways to insert blocks of text.

One way is to use **Control-T**. It's programmed in *SpeedScript 80* to act as a five-space margin indent. To end one paragraph and start another, press Return twice and press Control-T. A shortcut for this is **Control-]**. This key combination automatically inserts two return marks and then indents the margin. Control-T always inserts; you don't need to be in insert mode. You can also use Control-T to open up more space than Control-O. (You cannot set or clear tab stops in *SpeedScript 80* as you can with some word processors.) No matter how much space you want to insert, each insertion takes the same amount of time. So Control-T can insert five spaces five times faster than pressing Control-O five times.

There's an even better way, though. Press **Control-Q** to *quickly* insert 255 spaces. (It doesn't insert a line; use Return for that.) You can press it several times to open up as much space as you need. Control-Q inserts 255 spaces as fast as Control-O opens up one space. Now just type the text you wanted to insert over the blank space. (You don't want to be in Control-I insert mode when you use this trick; that would defeat its purpose.)

Since Delete is also slow when you're working with large documents (it, too, must move all text following the cursor), you may prefer to use the ← key to backspace when using this method.

After you've finished inserting, there may be some inserted spaces left over that you didn't use. Just press **OpAp-Control-Q**. This instantly deletes all extra spaces between the cursor and the start of following text. It's also useful whenever you need to delete a block of spaces for some reason.

Erasing Text

To erase the character on which the cursor is sitting, press **Control-G** (to *grab* the character). The character highlighted by the cursor is removed, and all following text is moved toward the cursor to fill the empty space.

Press the **Delete** key to delete the character to the left of the cursor. All the following text is moved with the cursor to fill the empty space.

These keys are fine for minor deletions, but it could take all day to delete a whole paragraph using them. So *SpeedScript 80* has two commands that can delete an entire word, sentence, or paragraph at a time. **Control-E** erases text *after* (to the right of) the cursor position (and can also erase all text), and **Control-D** deletes text *preceding* the cursor.

To use the Control-E erase mode, first place the cursor at the beginning of the word, sentence, or paragraph you want to erase. Then press Control-E. The command line shows the message ERASE (S,W,P,A): RETURN TO EXIT. Press S to erase a sentence, W for a word, or P for a paragraph. Each time you press one of these letters, the text is quickly erased. You can keep pressing S, W, or P until you've erased all the text you wish. Then press RETURN to exit the erase mode.

You also use Control-E to erase all text from memory when you want to start a new document. To erase all text, press Control-E; then press the A *(all)* key. A prompt appears: ERASE ALL TEXT: ARE YOU SURE (Y/N). Press Y to perform the irreversible deed. You cannot recover any text erased in this way. Press N or any other key to cancel this function.

The Control-D delete mode works similarly to Control-E, but it deletes only one word, sentence, or paragraph at a time. First, place the cursor after the word, sentence, or paragraph you want to delete. Then press Control-D. Next, press S, W, or P for sentence, word, or paragraph. The text is immediately deleted and you return to editing. You don't need to press Return to exit the Control-D delete mode unless you pressed this key by mistake. *(In general, you can escape from any function in SpeedScript 80 by simply pressing Return.)* Control-D is most convenient when the cursor is already past what you've been typing.

The Text Buffer

When you erase or delete with Control-E and Control-D, the text isn't lost forever (unless you've performed an Erase All). *SpeedScript 80* remembers what you've removed by storing deletions in a separate area of memory called a *buffer*. The buffer is a fail-safe device. If you erase too much or change your mind, just press **Control-^** (Control-Shift-6) to restore the deletion. Be aware, however, that *SpeedScript 80* normally remembers only the last erase or delete you performed. It's not hard to remember this command, since the ^ (caret) symbol is used in paper-and-pencil editing to signify an insertion.

Another, more powerful use of this buffer is to move or copy sections of text. To move some text from one location in your document to another, first erase or delete it with Control-E or Control-D. Then move the cursor to where you want the text to appear and press Control-^. Control-^ instantly inserts the contents of the buffer at the cursor position. If you want to copy some text from one part of your document

to another, just erase or delete it with Control-E or Control-D, restore it at the original position with Control-^, then move the cursor elsewhere, and press Control-^ to restore it again in the new position. You can retrieve the buffer with Control-^ as many times as you like. If there is no room left in memory for inserting the buffer contents, you'll see the message NO ROOM.

Important: The Control-E erase mode lets you erase up to the maximum size of the buffer (2K, or about 2,000 characters). If you try to erase more text than the buffer will hold, you'll get the message BUFFER FULL, and erase mode will be canceled. Each new Control-E removes the previous contents of the buffer. Keep this in mind if there's something in the buffer you'd rather keep. If you don't want the current buffer contents to be erased, hold down the Open Apple key when you press Control-E. **OpAp-Control-E** works just like Control-E, except that it preserves the current buffer contents and adds the newly erased text to the buffer.

If you ever need to erase the contents of the buffer, press **Control-N** *(null buffer)*. As an added safety measure, you'll be asked if you are sure you want to erase the buffer. Press Y to null the buffer and N (or any other key except Y) to cancel the command.

Search And Replace

SpeedScript 80 has a FIND command that searches through your document to find a selected word or phrase. A Replace option lets you automatically change one word to another throughout the document.

OpAp-Control-F *(find)* lets you define a search phrase, or **OpAp-Control-R** *(replace)* lets you define a replace phrase, and **Control-Y** is used for automatic searching and replacing.

Searching is a two-step process. First, you need to tell *SpeedScript 80* what to search for; then you trigger the actual search. Hold down Open Apple and press Control-F. The command line prompts FIND:. Type in what you'd like to search for—the *search phrase*—and then press Return. If you press Return alone without typing anything, the Find command is canceled.

When you're ready to search for the specified phrase, press **Control-F** (without the Open Apple). *SpeedScript 80* looks for the next occurrence of the search phrase *starting from the current cursor position.* If you want to hunt through the entire document, press Control-@ twice to move the cursor to the very top before beginning the search. Each time you press Control-F, *SpeedScript 80* looks for the next occurrence of the search phrase and places the cursor at the start of the phrase. If the search fails, you'll see the message NOT FOUND.

Control-R works together with Control-F. After you've specified the search phrase with OpAp-Control-F, press OpAp-Control-R to specify the replace phrase. (You can press Return alone at the REPLACE WITH: prompt to select a *null* replace phrase. When you hunt and replace, this deletes the located phrase.) To search and replace manually, start by pressing Control-F. After *SpeedScript 80* finds the search phrase, press Control-R if you want to replace the phrase. If you don't want to replace the phrase, don't press Control-R. You're not in a special search-and-replace mode. You're free to continue writing at any time.

Control-Y links Control-F and Control-R together. (Think of the two branches of the Y linking together Find and Replace.) It first asks for a search phrase, then asks for a replace phrase, and finally, automatically searches and replaces throughout the document starting from the current cursor position.

There are a few things to watch out for when you're using search and replace. First, realize that if you search for *the, SpeedScript 80* finds the embedded *the* in words like *therefore* and *heathen.* If you changed all occurrences of *the* to *cow,* these words would become *cowrefore* and *heacown.* If you want to find a single word, be sure to include a space as the first character of the word, since almost all words are preceded by a space. Naturally, if you're replacing, you need to include the space in the replace phrase, too.

SpeedScript 80 also distinguishes between uppercase and lowercase. The word *Meldids* does not match with *meldids. SpeedScript 80* will not find a capitalized word unless you capitalize it in the search phrase. To cover all bases, you will sometimes need to make two passes at replacing a word. Keep these things in mind when using Control-Y, since you don't have a chance to stop a linked find-and-replace.

Storing Your Document

To store your text, press **Control-S**. You'll see the prompt SAVE:. Type in a legal filename and press Return. *SpeedScript 80* defaults to drive 1. If you need to access a second disk drive, precede the filename with **2:**. Once specified, this becomes the default drive for future disk access. To return to drive 1, precede the filename with **1:**.

If the filename you specify coincides with one already on the disk, the existing file will be overwritten by the new one. (You won't be given any warning, so be careful not to accidentally use duplicate filenames.) You can press **Control-C** to display a catalog of the files on

the disk. The catalog pauses when the screen is full, waiting for you to press a key to continue. When the catalog is finished, press Return to return to editing.

Control-S always saves the entire document. The cursor position within the document is not important.

When the save is complete, *SpeedScript 80* reports NO ERRORS if all is well, or it gives a message like DISK FULL if not. Check your DOS or BASIC manual for a list of error messages and their causes.

Loading A Document

To recall a previously saved document, press **Control-L**. Answer the LOAD: prompt with the filename. Again, you can precede the filename with **1:** or **2:** to switch drives as necessary. *SpeedScript 80* loads the file and will display NO ERRORS if no problems are encountered in the load; otherwise, it reports the error.

It's important to position the cursor correctly before loading a file. Documents start loading at the cursor position, so be sure to press Control-@ twice or Control-E and A (Erase All) to move the cursor to the start of text, unless you want to merge two documents. When you press Control-L to load, a flashing asterisk appears to warn you if the cursor is not at the top of the document.

To merge two or more files, simply load the first file, press Control-Z to move the cursor to the end of the document, and then load the file you want to merge. Do not place the cursor somewhere in the middle of your document before loading. A load does not insert the text from disk, but overwrites all text after the cursor position. The last character loaded becomes the new end-of-text pointer, and you cannot access any text that appears ahead of this pointer.

SpeedScript 80 stores documents as binary files, so you cannot read a document in BASIC, load a BASIC program into *SpeedScript 80* for editing, or upload a document file with a modem. However, Programs 2 and 3 (both of which appear after the listing for *SpeedScript 80* itself) are file-conversion programs which allow these functions. They convert *SpeedScript 80* binary document files into ASCII text files. They can also convert an ASCII text file into a *SpeedScript 80* binary file. This lets you convert documents from other word processors or change a *SpeedScript 80* document into a text file suitable for uploading via telecommunications. You can even edit BASIC programs with *SpeedScript 80*. Add the following line to your BASIC program and run it. It creates a text file of your BASIC listing.

```
0 PRINT CHR$(4);"OPEN filename": PRINT
  CHR$(4)"WRITE filename": LIST
```

Use the *SpeedScript 80* "File Converter" (Program 2 for DOS 3.3 or Program 3 for ProDOS) to convert the program text file into a *SpeedScript 80* file. You can then load this file into *SpeedScript 80* for editing. Save the edited file back to disk, run the File Converter program again to convert the *SpeedScript 80* file back to a text file, and then use EXEC *filename* to read the text file back into BASIC. Although this seems rather tedious, you may find it worthwhile when working with long programs. A similar technique can be used to edit files written by other applications.

Note: Delete any print-formatting commands (described below) before using the File Converter program to change a *SpeedScript 80* file into a text file. Otherwise, the embedded commands will not be converted properly, and the text file may not be usable.

Additional Features

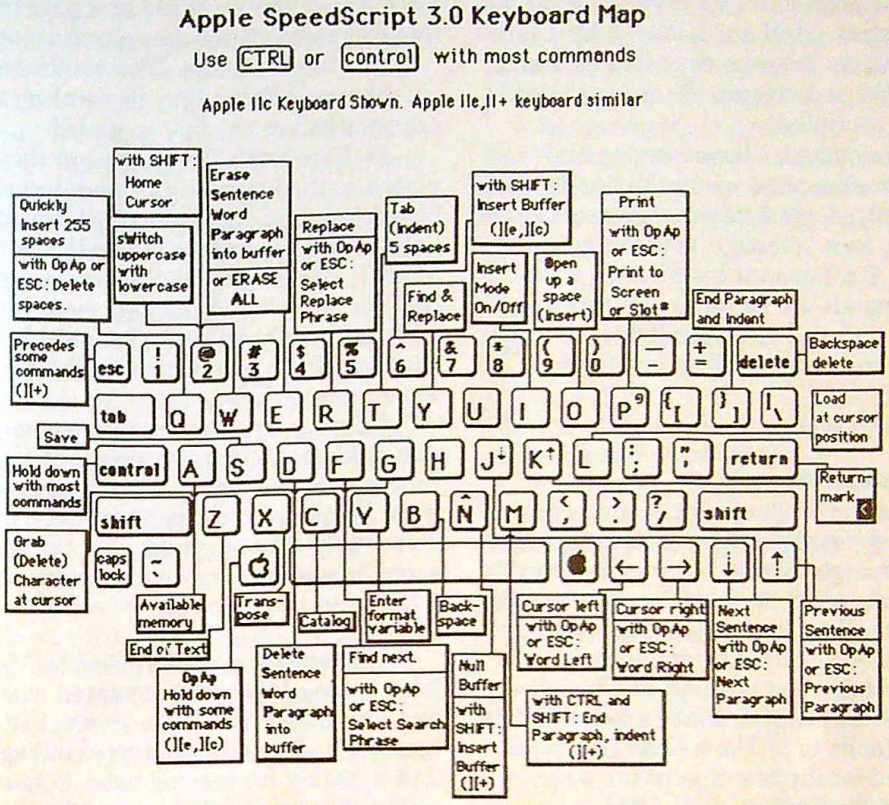
SpeedScript 80 has a few commands that don't do much, but are nice to have. **Control-X** exchanges the character under the cursor with the character to the right of the cursor. Thus, you can fix transposition errors with a single keystroke. **Control-W** (think *sWitch)* changes the character under the cursor from uppercase to lowercase, or vice versa.

Apple *SpeedScript 80* traps the Reset key. Reset and Control-Reset always return you to editing mode. There's no way to exit *SpeedScript 80* once you've run it, short of rebooting.

Printing

If you already think *SpeedScript 80* has plenty of commands, wait until you see what the printing package offers. *SpeedScript 80* supports an array of powerful formatting features. It automatically fits your text between left and right margins that you can specify. You can center a line or block it against the right margin. *SpeedScript 80* skips over the perforation on continuous-form paper, or it waits for you to insert single-sheet paper. A line of text can be printed at the top of each page (a *header*) and/or at the bottom of each page (a *footer*), and can include automatic page numbering, starting with whatever number you like.

SpeedScript 80 can print on different lengths and widths of paper, and single-, double-, or triple- spacing (or any spacing, for that matter) is easy. You can print a document as big as will fit on a disk by linking several files together



during printing. You can print to the screen or to a file instead of to a printer. You can send special codes to the printer to control features like underline, boldface, italics, and double-width typeface (depending on the printer).

But with all this power comes the need to learn additional commands. Fortunately, *SpeedScript 80* sets most of these variables to a *default* state. If you don't change the settings, *SpeedScript 80* assumes a left margin position of 5, a right margin position of 75, no header or footer, single-spacing, and continuous-paper page feeding. You can change these default settings if you want. (See below.)

Before printing, be sure the paper in your printer is adjusted to top-of-form (move the paper perforation just above the printing element). One additional note: Some printers incorporate an automatic skip-over-perforation feature. The printer skips to the next page when it reaches the bottom of a page. Since *SpeedScript 80* already controls paper feeding, you need to turn off this automatic skip-over-perforation feature before running *SpeedScript 80*, or paging won't work properly.

To begin printing, press **Control-P.** If your printer is attached, powered on, and selected (online), *SpeedScript 80* begins printing immediately. To cancel printing, press Control and the Reset key.

If you need to print to an RS-232 printer or to a printer in a slot other than slot 1, press **OpAp-Control-P.** This brings up the prompt PRINT TO: SCREEN, PRINTER? Press S to print to the screen. *SpeedScript 80* automatically prints to the screen, simulating the printer.

If you select P, you'll be asked for the slot number. Output is sent to the slot number you select. It's similar to PR# in BASIC. If you print to slot 6 (the disk drive), you'll cause the system to reboot, so be careful.

Formatting Commands

The print formatting commands are single letters embedded in text, such as L for left margin. To enter a formatting variable, press **Control-V.** You'll see the prompt ENTER FORMAT VARIABLE:. Now press any key. The print formatting commands must be distinguished from normal text, so they appear onscreen in reverse video. All lettered printer commands should be entered without the Shift key. During printing, *SpeedScript 80* treats these characters as printing commands.

There are two kinds of printing commands—Stage 1 and Stage 2. Stage 1

commands usually control such variables as left and right margins. Most are followed by a number, with no space between the command and the number. Stage 1 commands are executed before a line is printed.

Stage 2 commands, like centering and underlining, are executed while the line is being printed. Usually, Stage 1 commands must be on a line of their own, although you can group several Stage 1 commands together on a line. Stage 2 commands are by nature embedded within a line of text. Again, remember to press Control-V to enter the boldface characters shown below.

Stage 1 Commands

L Left margin. Follow with a number from 0 to 255. Use 0 for no margin. Defaults to 5.

R Right margin position, a number from 1 to 255. Defaults to 75. Be sure the right margin value is greater than the left margin value, or *SpeedScript 80* will behave unpredictably.

T Top margin. The position at which the first line of text is printed, relative to the top of the page. Defaults to 5. The header (if any) is always printed on the first line of the page, before the first line of text.

B Bottom margin. The line at which printing stops before continuing to the next page. Standard 8½ × 11–inch paper has 66 lines. Bottom margin defaults to line 58. Don't make the bottom margin greater than the page length.

P Page length. Defaults to 66. If your printer does not print six lines per inch, multiply lines-per-inch by 11 to get the page length. European paper is usually longer than American paper—11⅝ or 12 inches. Try a page length of 69 or 72.

S Spacing. Defaults to single-spacing. Follow with a number from 1 to 255. Use 1 for single-spacing, 2 for double-spacing, and 3 for triple-spacing.

@ Start numbering *at* page number given. Page numbering normally starts with 1.

? Disables printing until selected page number is reached. For example, a value of 3 would start printing the third page of your document. Normally, *SpeedScript 80* starts printing with the first page.

X Sets the page width in columns (think *across*). Defaults to 80. You need to change this for the sake of the centering command if you're printing in double width or condensed type, or if you're using a 40-column or wide-carriage printer.

N Forced paging. Normally, *SpeedScript 80* prints the footer and moves on to the next page only when it has finished a page, but you can force it to continue to the next page by issuing this command. It requires no numbers.

M Margin release. Disables the left margin for the next printed line. Remember that this executes before the line is printed.

W Page wait. This command should be placed at the beginning of your document before any text. With page wait turned on, *SpeedScript 80* prompts you to INSERT NEXT SHEET, PRESS RETURN when each page has been printed. Insert the next sheet, line it up with the printhead, and then press RETURN to continue. Page wait is ignored during disk or screen output.

J Causes *SpeedScript 80* to automatically add a linefeed character after each carriage return sent to the printer. Like **W**, this command must be placed before any text. Use this command only if your printer puts all text on the same line when you try to print your document. (Don't use this command to achieve double-spacing.)

I Information. This works like REM in BASIC. You follow the command with a line of text, up to 255 characters, ending in a return mark. This line will be ignored during printing and is handy for making notes to yourself (such as the filename of the document).

H Header define and enable. The header must be a single line of text (up to 254 characters) ending in a return mark. The header prints on the first line of each page. You can include Stage 2 commands such as centering and page numbering in a header. You can use a header by itself without a footer. The header and footer should be defined at the top of your document, before any text. If you want to prevent the header from printing on the first page, put a return mark by itself at the top of your document before the header definition.

F Footer define and enable. The footer must be a single line of text (up to 254 characters) ending in a return mark. The footer prints two lines prior to the last line of each page. As with the header, you can include Stage 2 printing commands, and you don't need to set the header to use a footer.

G Go to (link) next file. Put this command as the last line in your document. Follow the command with the filename (with no spaces between the **G** and the filename), including the drive number prefix **1:** or **2:** if appropriate. After the text in memory is printed, the link command loads the next file into memory. You can continue linking successive files, but don't include a link in the last file. Before you start printing a linked file, make sure the first of the linked files is in memory. When printing is finished, the last file linked to will be in memory.

Stage 2 Commands

These commands either precede a line of text or are embedded within one.

C Centering. Put this at the beginning of a line you want to center. This centers only one line ending in a return mark. Repeat this command at the beginning of every line you want centered. Centering uses the page-width setting (see above) to center the line properly. To center a double-width line, either set the page width to 40 or pad out the rest of the line with an equal number of spaces. If you use double width, remember that the spaces preceding the centered text will be double-wide spaces.

E Edge right. This works in the same way as centering, but it blocks the line flush with the right margin.

When *SpeedScript 80* encounters this command, it prints the current page number. You usually embed this within a header or footer.

U A simple form of underlining. It works only on printers that recognize CHR$(8) as a backspace and CHR$(95) as an underline character. Underlining works on spaces, too. Use the first **U** to start underlining and another one to turn off underlining.

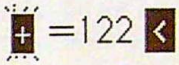
Fonts And Styles

Most dot-matrix printers are capable of more than just printing text at 10 characters per inch. Some printers have several character sets, with italics and foreign language characters. Most can print in double width (40 characters per line) or condensed (132 characters per line), and in either pica or elite. Other features may include programmable characters, programmable tab stops, and graphics modes. Many word processors customize themselves to a particular printer, but for flexibility *SpeedScript 80* was purposely designed not to be printer-specific. Instead, *SpeedScript 80* lets you define your own Stage 2 printing commands.

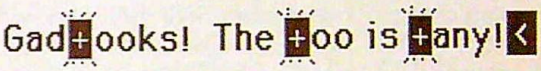
You define a programmable *printkey* by choosing any character that is not already used for other printer commands. The numbers 0–9, most symbols, and some alphabetic characters are available for printkeys. You enter these commands, like printer commands, with Control-V. The printkeys are like variables in BASIC.

To define a printkey, press **Control-V**; then type the key you want to assign as the printkey, then an equal sign (=), and finally the ASCII value to be substituted for the printkey during printing. As a result, whenever *SpeedScript 80* encounters the printkey embedded in text, it prints the character with the ASCII value you previously defined. (If you have trouble passing some printkeys to the printer, try adding 128 to the ASCII value you wish to send. Otherwise, some printer interfaces intercept the printkey.)

For example, to define the + key as the letter *z*, first look up the ASCII value of the letter *z* (in either your printer manual or in the BASIC manual). The ASCII value of *z* is 122, so the definition is



Now, anywhere you want to print the letter *z*, substitute the printkey:



This will appear on paper as

Gadzooks! The zoo is zany!

More practically, here's how you could program italics on an Epson MX-80–compatible printer. You switch on italics by sending an ESC (a character with an ASCII value of 27); then the character 4. You turn off italics by sending ESC 5. So, define * as the escape code (27). Anywhere you want to print a word in italics, bracket it with *4 and *5.

You can similarly define whatever codes your printer uses for features like double width or emphasized mode. For your convenience, four of the printkeys are predefined, though you can change them. The keys 1–4 are defined as character codes 27, 14, 15, and 18, common values for most printers. On most printers, CHR$(27) is the ESC key, CHR$(14) starts double-width printing, CHR$(15) either stops double-width or starts condensed characters, and CHR$(18) usually cancels condensed characters.

Keep one thing in mind about printkeys: *SpeedScript 80* always assumes it is printing to a rather dumb, featureless printer, the least common denominator. *SpeedScript 80* doesn't understand the intent of a printkey; it just sends out its value. So if you make one word within a line double width, it may make the line overflow the specified right margin. There's no way for *SpeedScript 80* to include built-in font and type style codes without being customized for a particular printer, since no set of codes is universal to all printers.

Hints And Tips

It may take you a while to fully master *SpeedScript 80*, but as you do, you'll discover many ways to use the editing and formatting commands. For example, there is a simple way to simulate tab stops, say, for a columnar table. Just type a period at every tab stop position. Erase the line with Control-E; then restore it with Control-^ many times. When you're filling in the table, just use word-left/word-right to jump quickly between the periods. Or you can use the programmable printkeys to embed your printer's own commands for setting and jumping to tab stops.

You don't have to change or define printer commands every time you write. Just save these definitions and load this file for each session. You can create many custom definition files and have them ready to use on disk. You can create customized "fill-in-the-blank" letters. Just type the letter, and everywhere you'll need to insert something, substitute a unique character, such as an * or a Control character. When you're ready to customize the letter, use Find to locate each symbol and insert the specific information. Instead of typing an oft-used word or phrase, substitute a unique character; then use Control-Y to automatically change these characters into the actual word or phrase. You can even use *SpeedScript 80* as a simple filing program. Just type in all your data, flagging each field with a unique character. You can use Find to quickly locate any field.

ProDOS Modifications

The *SpeedScript 80* word processor listed in this issue is for DOS 3.3. To create an enhanced ProDOS version, you need to do a little more than simply enter the program. (If you've bought this issue's companion disk, the ProDOS version is already on it and no conversion is necessary. However, you will need to refer to the instructions below for putting the *SpeedScript 80* SS.SYSTEM file on a disk with the PRODOS file, but *without* the BASIC.SYSTEM file.)

Apple's ProDOS operating system offers a considerable improvement in performance and utility over DOS 3.3, but it also makes things a little more complicated. ProDOS uses and lays out memory differently from DOS 3.3, so many DOS 3.3 machine language programs are not compatible with ProDOS. Also, many DOS 3.3 functions are not supported in the same way by ProDOS. This is enough to keep the original Apple version of *SpeedScript 80* from running with ProDOS, even if you save it on a ProDOS disk.

The solution is "ProDOS Maker," which changes an existing copy of DOS 3.3 *SpeedScript 80* into a program usable with ProDOS. As a bonus, ProDOS *SpeedScript 80* gives you 10K more of text memory to work with.

Making The Conversion

First, type in *SpeedScript 80* using MLX as described above. To prepare for the conversion, type in and save both Programs 4 and 5 below. Program 4 is a BASIC program that makes the changes to *SpeedScript 80*. Program 5 is a binary file that *must* be typed in with the MLX program.

To enter the data from Program 5, load and run the MLX program. Note that, while special preparations are necessary before loading MLX to enter *SpeedScript 80* data, no unusual steps are needed before loading MLX to enter data from Program 5. Apple MLX asks you for the starting and ending addresses of the program you're typing in. Enter the values as indicated:

```
STARTING ADDRESS? 3AF0
ENDING ADDRESS?   3CBF
```

Next, you'll see a menu. Press E to enter data; then enter **3AF0** as the address at which to begin typing. Program 5 is not a long listing, so take your time and be careful. MLX will ask you to retype a line if you make a mistake. When you finish, you return to the MLX menu. Press S to save the file. You must use the name **SPEEDSCRIPT2** for the data from Program 5, since this is the filename which Program 4 looks for.

After you've typed in the programs (you may want to make backup copies of them on another disk for security), follow these step-by-step instructions:

1. If you have an Apple IIe, load and run the "Filer" system utilities program from your ProDOS master disk. For the Apple IIc, boot up the *System Utilities* disk. For the Apple IIGS, boot up the *System* disk, open the folder SYS.UTILS, and run the application SYSUTIL.SYSTEM.
2. If you're using Filer, select option V (Volume Commands) from the main menu; then select option F (Format a Volume) from the Volume Commands menu. If you're using the IIc *System Utilities* disk, select option 6 (Format a Disk). If you're using the IIGS, select Format a Disk from the column Work on Entire Disks.

   Insert a blank disk into the drive and format it for use with ProDOS. Type in SPEED.DATA for the volume name, or just press Return when asked for the volume name.

Modifying An Existing Copy Of *SpeedScript 3.0*

If you already have a copy of *SpeedScript 3.0*—typed in from the June 1985 issue of COMPUTE! or from the book *SpeedScript: The Word Processor for Apple Personal Computers*—you don't have to type in the listing for *SpeedScript 80*. Instead, you can modify, or *patch*, *SpeedScript 3.0*. The result, *SpeedScript 80*, is no larger than your original copy and maintains full command and file compatibility. It doesn't even matter if you have a DOS 3.3 or ProDOS version of *SpeedScript 3.0*—methods for patching both are given here.

Bug Fixes

Before you begin to patch *SpeedScript 3.0*, though, you must make some slight corrections to the program. As originally published in both the magazine and book forms, *SpeedScript 3.0* has two bugs: an underline bug, which prints garbage characters whenever the underline toggle (Control-V, U) is used; and the header bug, which shifts the first header on a page to the right of its proper position. These corrections originally appeared in the article "*SpeedScript 3.0* Revisited" in the December 1985 issue and in the "CAPUTE!" column in the March 1986 issue of COMPUTE!. If you have already made these corrections to your copy of *SpeedScript 3.0*, skip ahead to the section entitled "The Patch."

The following corrections apply only to the DOS 3.3 version of *SpeedScript*. To create a corrected ProDOS version, you must correct the DOS 3.3 version, then follow the directions in the section "ProDOS Modifications" to turn this into a ProDOS version.

The following program fragments should be typed in with "Apple MLX." Before you load Apple MLX, you must reconfigure memory with the following POKEs. These POKEs prevent memory conflicts between MLX and *SpeedScript*.

```
POKE 104,32:POKE 8192,0:NEW
```

These are the same POKEs used to type in *SpeedScript* with Apple MLX, and they must be used every time you wish to edit *SpeedScript* with Apple MLX.

After typing these POKEs and running Apple MLX, enter the starting and ending addresses as indicated:

```
STARTING ADDRESS? 0800
ENDING ADDRESS?   1E45
```

Next, press L to select (L)OAD FILE from the menu, and give the filename of the original *SpeedScript 3.0* file. You *must* load a copy of *SpeedScript 3.0* before making the following patches.

To make the first correction, press E to select (E)NTER DATA, and enter **1C58** for the address. Type in these seven lines:

```
1C58: D0 10 38 AD D7 1E ED 53 45
1C60: 1E 38 ED D6 1E A8 A9 A0 68
1C68: D0 E0 C9 55 D0 0A AD EC C6
1C70: 1E 49 01 8D EC 1E 10 B1 B4
1C78: C9 63 D0 11 8C E5 1E AE 80
1C80: DD 1E AD DE 1E 20 24 ED 7A
1C88: AC E5 1E D0 9C AE E6 00 CE
```

When you've finished this block, press Return on the next line to get back to the main menu. Press E to select (E)NTER DATA; then enter **1DE0** and type in this last line:

```
1DE0: D4 C9 CE C7 AE AE 8D 00 99
```

Press Return on the next line; then press S, for (S)AVE DATA, to save your modified copy of *SpeedScript 3.0*. Now you're ready to patch your corrected version of *SpeedScript* to turn it into *SpeedScript 80*.

The Patch

First, type in Programs 1 and 2 listed below. Program 1 (SS80.MAKER) is a BASIC program and is easily entered using "Apple Automatic Proofreader." As listed, though, SS80.MAKER works only with DOS 3.3.

Note: Take a look at line 100 of Program 1. Change the statement F1$ = "SPEEDSCRIPT" *to reflect the filename you used for* SpeedScript 3.0 *(or change the disk filename to match what's in SS80.MAKER).*

If you're using ProDOS, replace lines 100–110 with the following:

```
8C 100 F1$ = "SS.SYSTEM":F2$ = "SS80.SYSTE
       M"
75 105 FA$ = ",A$2000":FL$ = ",L$1CBF":FT$
       = ",TSYS"
F2 110 B1 = 8242:B2 = 4096
```

These lines inform SS80.MAKER of the source and destination files being used, as well as their load and program start addresses.

ProDOS users also need to add the following three lines to Program 1:

```
93 555 PRINT D$;"CREATE ";F2$;FT$
22 2200 DATA 6964,1,185,20
18 2210 DATA -1,3038
```

Line 555 contains a ProDOS command which must be executed before saving the new file. Line 2200 prevents a call to a routine which would reset the video output to 40 columns before printing a ProDOS error message.

Before you run Program 1, you must enter the data from Program 2 (PATCH.80). This data must be entered using MLX. Load and run Apple MLX; then respond to the prompts as indicated:

```
STARTING ADDRESS? 2000
ENDING ADDRESS?   2171
```

When you see the menu, press E to enter data; then enter **2000** as the address to begin typing. When you've finished (it shouldn't take you long—PATCH.80 is short), use the S command to save the file. *It's important that you name the file* PATCH.80, *since that's what the SS80.MAKER program expects to find.*

Ready To Convert

You're ready to begin the conversion process. First, though, make sure that your disk contains the necessary files.

For DOS 3.3, the files are

SPEEDSCRIPT	*The corrected version of* **SpeedScript 3.0**
SS80.MAKER	*Program 1*
PATCH.80	*The binary file data from Program 2*

For ProDOS, the files are

PRODOS	*The ProDOS operating system*
BASIC.SYSTEM	*The ProDOS BASIC interface*
SS.SYSTEM	*The corrected ProDOS version of* **SpeedScript 3.0**
SS80.MAKER	*Program 1 with ProDOS modifications*
PATCH.80	*The binary file data from Program 2*

Before running SS80.MAKER to convert a DOS 3.3 version of *SpeedScript 3.0*, type this line in direct mode (without a line number):

```
POKE 104,48: POKE 12288,0: NEW
```

This prevents *SpeedScript 3.0* from overwriting SS80.MAKER as it's loaded into memory.

Now, for both versions, type **RUN SS80.MAKER**. As it's performing the conversion, you'll see a series of progress messages. If any of the DATA statements were entered incorrectly, the message *ERROR IN DATA STATEMENTS* appears. If this happens, correct the appropriate line, save the program again, and start over.

When you're prompted to insert a disk to receive the new file, simply hit Return or insert a new disk in the drive before doing so. (It's a good idea to use the same disk the first time through the procedure.)

Your 80-column version of *SpeedScript* is now ready to use. For the DOS 3.3 version, type **BRUN SPEEDSCRIPT80**. For the ProDOS version, type **-SS80.SYSTEM**. After you're satisfied that everything works as it should, you'll probably want to copy the new version to another disk. For ProDOS, the disk with SS.SYSTEM should contain the PRODOS file, but *not* the BASIC.SYSTEM file.

Changes From 3.0

If you've used *SpeedScript 3.0*, you know all there is to know about *SpeedScript 80*. No new functions or features have been added. However, there are a few purely cosmetic changes that you should be aware of.

First, printer format variables now appear on the screen in reverse video, not as flashing characters. The reason for this is that the Apple cannot display flashing characters in 80-column mode. Instead, the IIe displays that part of its character set as reverse characters. The Enhanced IIe, the IIc, and the IIGS have special graphics characters known as MouseText in part of that area of the character set. Since that would have resulted in an odd-looking display, the original REFRESH routine was modified to display all format codes as reverse video. Internally, though, the codes remain unchanged, maintaining file compatibility with the original version.

Secondly, you may notice that refreshing the screen takes a bit longer than in the original version, simply because the REFRESH routine has about twice as much text to write each time it's called. This is really only noticeable when you continuously hold down a key (using autorepeat) such as the right- or left-arrow key. Use the program's advanced cursor commands to avoid this.

To gain a little extra speed and improve readability, the second line and the last two lines are unused. A horizontal line is also drawn at the bottom to give a "window" effect.

Program 1: SS80.MAKER

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
55 50 D$ = CHR$ (4)
81 100 F1$ = "SPEEDSCRIPT":F2$ = "SPEEDSCR
     IPT80"
64 105 FA$ = ",A$800":FL$ = ",L$1645":FT$
     = ""
```

```
F5 110 B1 = 2048:B2 = 8192
F9 120 PRINT "LOADING MLX FILES..."
D6 130 PRINT D$;"BLOAD ";F1$;FA$;FT$
ED 140 PRINT D$;"BLOAD PATCH.80,A";B2
7F 150 PRINT "READING DATA STATEMENTS..."
04 155 C = 0
12 160 READ I: IF I = - 1 THEN 190
38 170 READ L: FOR I = I TO I + L: READ A:
       C = C + A
35 175 POKE I + B1,A: NEXT
A8 180 GOTO 160
59 190 READ CS: IF C < > CS THEN 1000
2F 200 PRINT "PATCHING FROM PATCH FILE..."
ED 210 READ D: IF D = - 1 THEN 500
BB 220 READ S: READ L:D = D + B1:S = S + B
       2
8B 230 FOR I = 0 TO L: POKE (D + I), PEEK
       (S + I): NEXT
15 240 GOTO 210
69 500 PRINT "INSERT DISK TO RECEIVE ";F2$
A6 510 PRINT "PRESS ANY KEY WHEN READY": G
       ET A$
E3 520 PRINT "SAVING ";F2$
99 530 ONERR GOTO 550
CE 540 PRINT D$;"DELETE ";F2$
6A 550 ONERR GOTO 0
C9 560 PRINT D$;"BSAVE ";F2$;FA$;FL$;FT$
E4 600 PRINT "SUCCESSFULLY CONVERTED.": EN
       D
13 1000 PRINT "ERROR IN DATA STATEMENTS":
       END
17 2000 DATA 554,1,132,254
4A 2020 DATA 579,2,234,234,234
49 2040 DATA 643,1,8,8
BD 2060 DATA 3276,5,32,132,254,32,88,252
25 2080 DATA 3310,1,8,8
FD 2100 DATA 4081,2,234,234,234
46 2120 DATA 4189,1,185,20
6E 2140 DATA 4088,1,8,8
43 2200 DATA -1,2833
A1 2300 DATA 0,0,39
D6 2310 DATA 172,40,192
7B 2320 DATA 678,233,37
6C 2330 DATA 2673,271,13
E9 2340 DATA 3168,285,39
38 2350 DATA 3222,325,43
1B 2400 DATA -1
```

Program 2: PATCH.80

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
START ADDRESS: 2000
END ADDRESS:   2171

2000: A9 80 8D 00 03 4C 28 08 88
2008: 20 84 FE 20 00 C3 8D 01 86
2010: C0 8D 0D C0 A0 17 20 BC 20
2018: 0A A9 DF A0 50 20 ED FD AA
2020: 88 D0 FA 4C 90 0A 00 00 A9
2028: A2 01 20 61 14 AD 4F 1E 28
2030: 20 74 14 AD 50 1E 20 7E B4
2038: 14 E8 A0 00 B9 FF FF C8 67
2040: C9 82 F0 1C C9 3C F0 18 1F
2048: C0 50 D0 F0 88 B9 FF FF 51
2050: C9 80 F0 0B 29 3F C9 20 5E
2058: F0 05 88 D0 F0 A0 4F C8 E1
2060: 84 ED 88 86 FE 98 4A B0 77
2068: 0B 84 FD 88 48 38 E9 01 8F
2070: 10 07 30 0B 88 84 FD C8 4C
2078: 48 8D 54 C0 20 97 14 68 C6
2080: A4 FD 8D 55 C0 20 97 14 63
2088: A6 FE A4 ED 18 98 6D C1 0F
2090: 08 20 74 14 AD C2 08 69 9E
2098: 00 20 7E 14 E0 02 D0 03 A5
20A0: 8C 4E 1E C0 50 F0 24 98 B1
20A8: 4A 90 09 69 00 85 FD 38 34
20B0: E9 01 10 02 85 FD A8 A9 67
20B8: A0 8D 54 C0 20 B0 14 A4 D3
20C0: FD C0 28 F0 06 8D 55 C0 16
20C8: 20 B0 14 20 61 14 E8 E0 D7
20D0: 16 F0 03 4C BE 08 AD C1 B0
20D8: 08 8D 59 1E AD C2 08 8D A3
20E0: 5A 1E 8D 54 C0 60 00 00 54
20E8: 00 20 BA 0A 20 80 FE A2 CC
20F0: 50 20 4A F9 20 84 FE 4C A7
20F8: BA 0A 00 00 60 A0 00 A2 41
2100: 00 8E 7B 05 84 25 4C 22 19
2108: FC A9 27 ED 7B 05 60 20 C7
2110: C6 0A EA 8D 57 1E 20 84 66
2118: FE A0 00 A9 5F 60 BD 6D 02
2120: 09 8D A9 14 8D B2 14 BD DD
2128: 84 09 8D A8 14 8D B1 14 79
2130: 60 8D C1 08 8D D2 08 8D 14
2138: 99 14 60 8D C2 08 8D D3 56
2140: 08 8D 9A 14 60 60 AA B9 12
2148: FF FF 10 08 C9 83 B0 06 D0
2150: A5 FF 90 02 29 3F 9D FF 19
2158: FF CA 88 88 10 E9 60 99 69
2160: FF FF C8 C0 28 D0 F8 60 9E
2168: A9 07 85 36 A9 C3 85 37 F3
2170: 60 FF 00 00 FF FF 00 00 E2
```

3. If you're using Filer, select option F (File Commands) from the main menu; then select option C (Copy Files) from the File Commands menu. From the IIc's *System Utilities* menu, simply select option 1 (Copy File). For the IIGS, choose Copy File from the column labeled Work on Individual Files.

   Copy the file named PRODOS from the ProDOS master disk to your newly formatted ProDOS disk.
4. Now copy the DOS 3.3 version of *SpeedScript 80* to the newly formatted disk. Even if you typed in *SpeedScript 80* and saved it on a ProDOS disk, go ahead and copy it to this disk for convenience. Important: Make sure *SpeedScript 80* is saved on the disk with the filename **SPEEDSCRIPT**, since this is the name Program 4 looks for.
5. Copy Program 4 and the file you created from the data in Program 5 (using MLX) onto the same disk with SPEEDSCRIPT. You can name Program 4 anything you like. We used the name PRODOS.MAKER. Be sure that the binary file created from Program 5 is named SPEEDSCRIPT2.
6. Verify that the disk contains the following files:

PRODOS	*The ProDOS operating system*
SPEEDSCRIPT	*The DOS 3.3 version of SpeedScript 80*
PRODOS.MAKER	*Program 4, the ProDOS Maker BASIC program*
SPEEDSCRIPT2	*The ProDOS Maker binary file (from Program 5)*

7. You're now ready to convert the DOS 3.3 version of *SpeedScript 80* to ProDOS. Run Program 4 (PRODOS.MAKER). It reads the file SPEEDSCRIPT, merges it with SPEEDSCRIPT2, makes some modifications, and then permits you to switch disks before it saves a new file called SS.SYSTEM, which is the ProDOS version of *SpeedScript 80*. We recommend leaving the same disk in the drive the first time you perform the conversion process. Later, you can use ProDOS Maker to create additional copies of ProDOS *SpeedScript 80* on other disks, or simply copy the file SS.SYSTEM onto a backup disk with the Copy Files utility. If you want the backups to be *SpeedScript 80* startup disks, make sure each disk contains the PRODOS file and does *not* have the file BASIC.SYSTEM on it. (Otherwise, BASIC.SYSTEM will take priority over SS.SYSTEM, and SS.SYSTEM will not boot up automatically.)
8. Your new ProDOS *SpeedScript 80* disk is now ready to boot up and use. Just insert the disk into the drive and turn on your computer—*SpeedScript 80* automatically loads and runs. To run *SpeedScript 80* after you've already booted up your system from another ProDOS startup disk, just enter **-SS.SYSTEM**. The hyphen (-) is the ProDOS "smart load" command.

Using ProDOS *SpeedScript 80*

The ProDOS version of *SpeedScript 80* varies only slightly in operation from the original DOS 3.3 version. Because ProDOS is stored in the upper 16K of memory, and because BASIC.SYSTEM is not needed for *SpeedScript 80*, you have about 10K more of text memory in ProDOS than you do with DOS 3.3.

All changes in the instructions for using the ProDOS version of *SpeedScript 80* are to support ProDOS filename conventions. Control-C still displays a disk catalog. But the filename convention for Load, Save, and the G (goto file) printkey command has changed. If you boot *SpeedScript 80* off its own startup disk, it remembers the volume name of the disk it was booted from. You don't have to enter a volume name to load, save, or link to a file on that disk. Just enter any legal ProDOS filename. Remember that—unlike DOS 3.3—ProDOS does not allow spaces in filenames. Using spaces in a filename courts disaster.

To access a file on any other disk, though, you'll have to enter the volume name. For example, if you want to load the file named SPROITZ from a disk with the volume name BLANK27, enter /BLANK27/SPROITZ at the LOAD: prompt. Just surround the volume name with slashes. If you have two drives, ProDOS automatically searches for the indicated volume name on both drives.

Program 1: ***SpeedScript 80***

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
START ADDRESS: 0800
END ADDRESS:   1E45

0800: A9 80 8D 00 03 4C 28 08 58
0808: 20 84 FE 20 00 C3 8D 01 56
0810: C0 8D 0D C0 A0 17 20 BC EF
0818: 0A A9 DF A0 50 20 ED FD 7A
0820: 88 D0 FA 4C 90 0A 00 00 79
0828: 20 29 0A 20 9B 09 4C 18 87
0830: 0B A5 06 8D 51 08 A5 08 C6
0838: 8D 52 08 A5 19 8D 54 08 AE
0840: A5 1B 8D 55 08 A6 F9 F0 B0
0848: 20 A9 00 8D 53 1E A0 00 FF
0850: B9 FF FF 99 FF FF C8 CC 35
0858: 53 1E D0 F4 EE 52 08 EE C2
0860: 55 08 E0 00 F0 07 CA D0 43
0868: E0 A5 1D D0 DE 60 A5 F9 C0
0870: AA 05 1D D0 01 60 18 8A 0C
0878: 65 08 8D 99 08 A5 06 8D F8
0880: 98 08 18 8A 65 1B 8D 9C D9
0888: 08 A5 19 8D 9B 08 E8 A4 75
0890: 1D D0 04 F0 0D A0 FF B9 97
0898: FF FF 99 FF FF 88 C0 FF 7F
08A0: D0 F5 CE 99 08 CE 9C 08 C6
08A8: CA D0 EA 60 A2 01 20 61 70
08B0: 14 AD 4F 1E 20 74 14 AD AA
08B8: 50 1E 20 7E 14 E8 A0 00 E9
08C0: B9 FF FF C8 C9 82 F0 1C 90
08C8: C9 3C F0 18 C0 50 D0 F0 46
08D0: 88 B9 FF FF C9 80 F0 0B D0
08D8: 29 3F C9 20 F0 05 88 D0 06
08E0: F0 A0 4F C8 84 ED 88 86 7B
08E8: FE 98 4A B0 0B 84 FD 88 E1
08F0: 48 38 E9 01 10 07 30 0B 88
08F8: 88 84 FD C8 48 8D 54 C0 9C
0900: 20 97 14 68 A4 FD 8D 55 9E
0908: C0 20 97 14 A6 FE A4 ED 1F
0910: 18 98 6D C1 08 20 74 14 DB
0918: AD C2 08 69 00 20 7E 14 DA
0920: E0 02 D0 03 8C 4E 1E C0 08
0928: 50 F0 24 98 4A 90 09 69 BC
0930: 00 85 FD 38 E9 01 10 02 5C
0938: 85 FD A8 A9 A0 8D 54 C0 E0
0940: 20 B0 14 A4 FD C0 28 F0 8F
0948: 06 8D 55 C0 20 B0 14 20 83
0950: 61 14 E8 E0 16 F0 03 4C 0A
0958: BE 08 AD C1 08 8D 59 1E E4
0960: AD C2 08 8D 5A 1E 8D 54 8E
0968: C0 60 00 00 00 04 05 05 12
0970: 06 06 07 07 04 04 05 05 97
0978: 06 06 07 07 04 04 05 05 9F
0980: 06 06 07 07 80 00 80 00 6D
0988: 80 00 80 28 A8 28 A8 28 CC
0990: A8 28 A8 50 D0 50 D0 50 D4
```

```
0998: D0 50 D0 AD 46 1E 85 EB BD
09A0: 8D 4F 1E 8D 55 1E 85 FB 14
09A8: AD 47 1E 85 EC 8D 50 1E DB
09B0: 8D 56 1E 85 FC 38 AD 49 A8
09B8: 1E ED 47 1E AA A9 A0 A0 FD
09C0: FF C6 EC 91 EB C8 E6 EC 78
09C8: 91 EB C8 D0 FB E6 EC CA E4
09D0: D0 F6 91 EB 60 85 ED 84 73
09D8: EE 20 80 FE A0 00 B1 ED C0
09E0: F0 06 20 ED FD C8 D0 F6 7B
09E8: 60 20 F5 09 F0 FB C9 C0 4E
09F0: 90 02 29 DF 60 2C 00 C0 63
09F8: 10 2C AD 00 C0 C9 C0 90 13
0A00: 21 2C 00 03 30 1C 85 E3 C0
0A08: AD 61 C0 0D 44 1E 4D 63 CC
0A10: C0 10 08 A5 E3 09 20 8D F4
0A18: 10 C0 60 A9 00 8D 44 1E E7
0A20: A5 E3 8D 10 C0 60 A9 00 8D
0A28: 60 20 84 FE A9 00 8D 52 AF
0A30: 1E 8D 46 1E 8D 48 1E 8D B8
0A38: 4A 1E 8D 4C 1E 8D F0 1E 96
0A40: 8D 19 1F EA EA EA A9 60 AA
0A48: 8D D5 A6 A9 01 20 5D A2 ED
0A50: A9 22 18 69 01 8D 47 1E 46
0A58: A9 90 8D 49 1E A9 91 8D F3
0A60: 4B 1E A9 99 8D 4D 1E A9 F7
0A68: FF 8D EE 1E 20 78 0E A9 48
0A70: A0 8D F2 03 A9 0A 8D F3 4B
0A78: 03 49 A5 8D F4 03 A9 DF D4
0A80: 85 FF 20 08 08 A9 D1 A0 07
0A88: 1C 20 D5 09 EE 51 1E 60 57
0A90: 20 A6 0A A9 C1 A0 1C 20 23
0A98: D5 09 A9 00 8D 51 1E 60 5D
0AA0: 20 82 0A 4C 18 0B 20 BA 53
0AA8: 0A 20 80 FE A2 50 20 4A AA
0AB0: F9 20 84 FE 4C BA 0A 00 AB
0AB8: 00 60 A0 00 A2 00 8E 7B A6
0AC0: 05 84 25 4C 22 FC A9 27 61
0AC8: ED 7B 05 60 A0 00 B1 FB BD
0AD0: 85 1F A0 00 A5 1F C9 3C FC
0AD8: F0 0B 29 3F C9 20 D0 0A BB
0AE0: A9 80 4C EC 0A A9 82 4C 8A
0AE8: EC 0A A9 81 91 FB 20 AC AC
0AF0: 08 A0 00 A5 1F 91 FB A2 65
0AF8: 12 20 F5 09 D0 19 C8 D0 BA
0B00: F8 CA D0 F5 20 AC 08 A2 25
0B08: 12 20 F5 09 D0 09 C8 D0 8B
0B10: F8 CA D0 F5 4C D2 0A 60 F0
0B18: AD 45 1E 30 12 D0 0B A9 B0
0B20: 00 8D 44 1E CE 45 1E 4C 18
0B28: 2F 0B A9 00 8D 45 1E 20 AB
0B30: CC 0A AA AD 51 1E F0 07 4B
0B38: 8A 48 20 90 0A 68 AA 8A 84
0B40: C9 FF D0 06 20 5A 0F 4C 8A
0B48: 18 0B 8A C9 8D D0 02 A2 71
0B50: 3C 8A 29 7F C9 20 90 48 7C
0B58: 8A 20 B9 0A 48 A0 00 B1 0A
0B60: FB C9 3C F0 05 AD 52 1E 1F
0B68: F0 03 20 BE 10 68 A0 00 0B
0B70: 91 FB 20 AC 08 38 A5 FB 85
0B78: ED 55 1E 85 ED A5 FC ED E4
0B80: 56 1E 05 ED 90 0E A5 FB CC
0B88: 69 00 8D 55 1E A5 FC 69 45
0B90: 00 8D 56 1E E6 FB D0 02 81
0B98: E6 FC 20 1F 0C 4C 18 0B 24
0BA0: 8A 48 20 AC 08 68 AE C7 E3
0BA8: 0B DD C7 0B F0 06 CA D0 6B
0BB0: F8 4C 18 0B CA 8A 0A AA 49
0BB8: A9 0B 48 A9 17 48 BD E6 46
0BC0: 0B 48 BD E5 0B 48 60 1D DB
0BC8: 95 88 8B 8A 82 8F 84 80 C1
0BD0: 89 85 8C 93 83 9E 98 9A 3A
0BD8: 90 96 87 97 8E 86 81 94 6D
0BE0: 91 92 9D 99 9B D4 0C E8 E2
0BE8: 0C 94 0D 08 0E 59 0F BD FD
0BF0: 10 83 0F C8 0F 23 11 E4 6A
0BF8: 11 E3 13 EE 12 CB 14 58 22
0C00: 15 EC 15 78 0D 82 16 BC 63
0C08: 13 74 0F FC 15 65 0E B5 88
0C10: 1A 98 1C 7A 10 64 10 5C 15
0C18: 1B A2 10 94 1A B2 1C 20 A5
0C20: 7D 0C 38 A5 FB ED 4F 1E AF
0C28: A5 FC ED 50 1E B0 20 38 41
0C30: AD 4F 1E ED 46 1E 85 ED 39
0C38: AD 50 1E ED 47 1E 05 ED 88
0C40: F0 0D A5 FB 8D 4F 1E A5 14
0C48: FC 8D 50 1E 20 AC 08 38 2A
0C50: AD 59 1E E5 FB 85 EB AD 33
0C58: 5A 1E E5 FC 85 EC 05 EB 87
0C60: F0 02 B0 18 18 AD 4F 1E 3D
0C68: 6D 4E 1E 8D 4F 1E AD 50 06
0C70: 1E 69 00 8D 50 1E 20 AC B2
0C78: 08 4C 4F 0C 60 38 AD 55 E6
0C80: 1E ED 48 1E 85 ED AD 56 A3
0C88: 1E ED 49 1E 05 ED 90 0C 43
0C90: AD 48 1E 8D 55 1E AD 49 F5
0C98: 1E 8D 56 1E 38 A5 FB ED 0E
0CA0: 46 1E 85 ED A5 FC ED 47 37
0CA8: 1E 05 ED B0 0B AD 46 1E 93
0CB0: 85 FB AD 47 1E 85 FC 60 16
0CB8: 38 A5 FB ED 55 1E 85 ED D0
0CC0: A5 FC ED 56 1E 05 ED B0 9F
0CC8: 01 60 AD 55 1E 85 FB AD 31
0CD0: 56 1E 85 FC 60 AD 61 C0 59
0CD8: 0D 44 1E 4D 63 C0 10 55 B4
0CE0: E6 FB D0 02 E6 FC 4C 1F 88
0CE8: 0C AD 61 C0 0D 44 1E 4D AD
0CF0: 63 C0 10 0B A5 FB D0 02 5E
0CF8: C6 FC C6 FB 4C 1F 0C A5 E8
0D00: FB 85 EB A5 FC 85 EC C6 EF
0D08: EC A0 FF B1 EB C9 A0 F0 94
0D10: 04 C9 3C D0 03 88 D0 F3 03
0D18: B1 EB C9 A0 F0 08 C9 3C C0
0D20: F0 04 88 D0 F3 60 38 98 FB
0D28: 65 EB 85 FB A5 EC 69 00 14
0D30: 85 FC 4C 1F 0C A0 00 B1 5C
0D38: FB C9 A0 F0 08 C9 3C F0 B6
0D40: 04 C8 D0 F3 60 C8 D0 0B BA
0D48: E6 FC A5 FC CD 56 1E 90 2E
0D50: 02 D0 19 B1 FB C9 A0 F0 17
0D58: EC C9 3C F0 E8 18 98 65 30
0D60: FB 85 FB A5 FC 69 00 85 C6
0D68: FC 4C 1F 0C AD 55 1E 85 3D
0D70: FB AD 56 1E 85 FC 4C 1F 78
0D78: 0C A9 00 8D 4F 1E AD 56 80
0D80: 1E 38 E9 04 CD 47 1E B0 AD
0D88: 03 AD 47 1E 8D 50 1E 20 64
0D90: AC 08 4C 6C 0D AD 61 C0 F5
0D98: 0D 44 1E 4D 63 C0 30 03 64
0DA0: 4C 8A 11 A5 FB 85 EB A5 73
0DA8: FC 85 EC C6 EC A0 FF B1 48
0DB0: EB C9 AE F0 0C C9 A1 F0 D3
0DB8: 08 C9 BF F0 04 C9 3C D0 E0
0DC0: 04 88 D0 EB 60 B1 EB C9 43
0DC8: AE F0 1B C9 A1 F0 17 C9 3F
0DD0: BF F0 13 C9 3C F0 0F 88 52
0DD8: D0 EB C6 EC A5 EC CD 46 C0
0DE0: 1E B0 E2 4C FC 0D 84 ED 6A
0DE8: C6 ED C8 F0 0A B1 EB C9 C2
0DF0: A0 F0 F7 88 4C 26 0D A4 D8
0DF8: ED 4C C5 0D AD 46 1E 85 EE
0E00: FB AD 47 1E 85 FC 4C 1F 28
0E08: 0C AD 61 C0 0D 44 1E 4D D0
0E10: 63 C0 30 03 4C 69 11 A0 0F
0E18: 00 B1 FB C9 AE F0 1D C9 F9
0E20: A1 F0 19 C9 BF F0 15 C9 BE
0E28: 3C F0 11 C8 D0 EB E6 FC 4E
0E30: A5 FC CD 56 1E F0 E2 90 88
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0E38: E0 4C 6C 0D C8 D0 0E E6 C2
0E40: FC A5 FC CD 56 1E 90 05 12
0E48: F0 03 4C 6C 0D B1 FB C9 DE
0E50: A0 F0 E9 C9 AE F0 E5 C9 A1
0E58: A1 F0 E1 C9 BF F0 DD C9 A1
0E60: 3C F0 D9 4C 5D 0D 20 A6 DC
0E68: 0A A9 38 A0 1E 20 D5 09 2B
0E70: 20 38 11 F0 03 4C 90 0A 50
0E78: AD 4A 1E 8D CA 1E AD 4B 10
0E80: 1E 8D CB 1E 20 A6 0A A9 C3
0E88: F0 A0 1C 20 D5 09 A9 01 F1
0E90: 8D 51 1E 60 38 A5 FB ED CF
0E98: 46 1E 85 ED A5 FC ED 47 33
0EA0: 1E 05 ED D0 03 68 68 60 C2
0EA8: A5 FB 85 06 A5 FC 85 08 DB
0EB0: 60 38 A5 FB 85 19 49 FF A2
0EB8: 65 06 8D CE 1E A5 FC 85 AE
0EC0: 1B 49 FF 65 08 8D CF 1E 47
0EC8: A5 06 8D D0 1E A5 08 8D 1D
0ED0: D1 1E A5 19 8D D2 1E 85 1D
0ED8: 06 A5 1B 8D D3 1E 85 08 C7
0EE0: 38 AD CF 1E 6D CB 1E CD 05
0EE8: 4D 1E 90 10 20 A6 0A A9 9F
0EF0: FE A0 1C 20 D5 09 A9 01 61
0EF8: 8D 51 1E 60 AD CA 1E 85 54
0F00: 19 AD CB 1E 85 1B AD CE 34
0F08: 1E 85 1D 18 6D CA 1E 8D 1C
0F10: CA 1E AD CF 1E 85 F9 6D 36
0F18: CB 1E 8D CB 1E 20 31 08 ED
0F20: AD D0 1E 85 06 AD D1 1E 0E
0F28: 85 08 AD D2 1E 85 19 AD D4
0F30: D3 1E 85 1B 38 AD 55 1E 63
0F38: E5 19 85 1D AD 56 1E E5 FA
0F40: 1B 85 F9 20 31 08 38 AD 56
0F48: 55 1E ED CE 1E 8D 55 1E 33
0F50: AD 56 1E ED CF 1E 8D 56 E5
0F58: 1E 60 20 94 0E 20 F4 0C D1
0F60: 20 B1 0E 38 AD CA 1E E9 FE
0F68: 01 8D CA 1E AD CB 1E E9 68
0F70: 00 8D CB 1E 60 20 E0 0C 9E
0F78: 20 94 0E 20 F4 0C 20 B1 59
0F80: 0E 4C 63 0F 20 78 0E 20 35
0F88: A6 0A A9 0A A0 1D 20 D5 E1
0F90: 09 20 CC 0A C9 C0 90 02 E9
0F98: 29 DF 48 20 90 0A 68 29 F4
0FA0: 7F C9 57 D0 09 20 94 0E E8
0FA8: 20 FF 0C 4C B1 0E C9 53 C9
0FB0: D0 09 20 94 0E 20 A3 0D 0C
0FB8: 4C B1 0E C9 50 D0 09 20 BF
0FC0: 94 0E 20 8A 11 4C B1 0E 84
0FC8: 60 38 A5 FB ED 4F 1E 85 08
0FD0: ED A5 FC ED 50 1E 05 ED C0
0FD8: F0 0B AD 4F 1E 85 FB AD 89
0FE0: 50 1E 85 FC 60 AD 46 1E 93
0FE8: 85 FB AD 47 1E 85 FC 4C 40
0FF0: 1F 0C A5 FB 85 EB 85 19 16
0FF8: A5 FC 85 EC 85 1B A0 00 82
1000: B1 EB C9 A0 D0 1E C8 D0 98
1008: F7 A5 EC CD 56 1E 90 0F 63
1010: AD 55 1E 85 EB AD 56 1E 59
1018: 85 EC A0 00 4C 24 10 E6 44
1020: EC 4C 00 10 18 98 65 EB A4
1028: 85 06 A9 00 65 EC 85 08 B3
1030: 38 AD 55 1E E5 19 85 1D 20
1038: AD 56 1E E5 1B 85 F9 38 02
1040: A5 06 E5 19 8D CE 1E A5 8C
1048: 08 E5 1B 8D CF 1E 20 31 8A
1050: 08 38 AD 55 1E ED CE 1E F1
1058: 8D 55 1E AD 56 1E ED CF 0A
1060: 1E 8D 56 1E 60 AD 61 C0 DC
1068: 0D 44 1E 4D 63 C0 30 03 3A
1070: 4C F2 0F A9 FF 8D E8 1E 16
1078: 4C 8D 10 A9 05 8D E8 1E 0D
1080: 20 8D 10 B1 FB C9 A0 D0 4A
1088: 01 C8 4C 5D 0D A9 00 8D 57
1090: E9 1E 20 D4 10 A9 A0 AE 95
1098: E8 1E A0 00 91 FB C8 CA A1
10A0: D0 FA 60 20 BE 10 20 BE 2B
10A8: 10 A9 3C A0 00 91 FB C8 D3
10B0: 91 FB 20 AC 08 20 E0 0C F5
10B8: 20 E0 0C 4C 7B 10 A9 01 D7
10C0: 8D E8 1E A9 00 8D E9 1E 68
10C8: 20 D4 10 A9 A0 A0 00 91 E3
10D0: FB 4C 1F 0C 18 AD 55 1E E6
10D8: 6D E8 1E AD 56 1E 6D E9 78
10E0: 1E CD 49 1E 90 05 68 68 60
10E8: 4C 23 11 18 A5 FB 85 06 C9
10F0: 6D E8 1E 85 19 A5 FC 85 FC
10F8: 08 6D E9 1E 85 1B 38 AD 4E
1100: 55 1E E5 06 85 1D AD 56 C3
1108: 1E E5 08 85 F9 20 6E 08 41
1110: 18 AD 55 1E 6D E8 1E 8D 0F
1118: 55 1E AD 56 1E 6D E9 1E 20
1120: 8D 56 1E 60 AD 52 1E 49 A4
1128: 0E 8D 52 1E F0 05 A9 1F EE
1130: 85 FF 60 A9 DF 85 FF 60 31
1138: A9 19 A0 1D 20 D5 09 20 E5
1140: CC 0A C9 C0 90 02 29 DF 4F
1148: C9 D9 60 20 A6 0A A9 30 B4
1150: A0 1D 20 D5 09 20 38 11 B5
1158: F0 03 4C 90 0A A2 FA 9A B1
1160: 20 9B 09 20 82 0A 4C 18 89
1168: 0B A0 00 B1 FB C9 3C F0 C3
1170: 11 C8 D0 F7 E6 FC A5 FC 5A
1178: CD 56 1E 90 EE F0 EC 4C 45
1180: 6C 0D C8 D0 02 E6 FC 4C 34
1188: 5D 0D A5 FB 85 EB A5 FC 35
1190: 85 EC C6 EC A0 FF B1 EB AC
1198: C9 3C F0 11 88 C0 FF D0 F5
11A0: F5 C6 EC A5 EC CD 47 1E B2
11A8: B0 EC 4C FC 0D 38 98 65 97
11B0: EB 85 EB A9 00 65 EC 85 37
11B8: EC 38 A5 EB E5 FB 85 ED EA
11C0: A5 EC E5 FC 05 ED D0 12 11
11C8: 84 ED 18 A5 EB E5 ED 85 5E
11D0: EB A5 EC E9 00 85 EC 4C CA
11D8: 9C 11 A5 EB 85 FB A5 EC 55
11E0: 85 FC 4C 1F 0C AD 61 C0 1B
11E8: 0D 44 1E 4D 63 C0 10 03 7C
11F0: 20 78 0E 20 A6 0A A9 3F F4
11F8: A0 1D 20 D5 09 20 CC 0A 80
1200: C9 C0 90 02 29 DF C9 D7 9F
1208: D0 09 20 3A 12 20 35 0D 07
1210: 4C 49 12 C9 D3 D0 09 20 9F
1218: 3A 12 20 17 0E 4C 49 12 99
1220: C9 D0 D0 09 20 3A 12 20 36
1228: 69 11 4C 49 12 C9 C1 D0 6F
1230: 03 4C 4B 11 20 1F 0C 4C 45
1238: 90 0A A5 FB 85 19 8D C4 0C
1240: 1E A5 FC 85 1B 8D C5 1E 8D
1248: 60 38 A5 FB 85 06 ED C4 04
1250: 1E 8D CE 1E A5 FC 85 08 D6
1258: ED C5 1E 8D CF 1E 20 C8 81
1260: 0E AD C4 1E 85 FB AD C5 AE
1268: 1E 85 FC 20 AC 08 4C FD BA
1270: 11 20 C6 0A EA 8D 57 1E F8
1278: 20 84 FE A0 00 A9 5F 20 3D
1280: ED FD 8C 58 1E 20 F5 09 98
1288: F0 FB AC 58 1E 85 ED A9 CB
1290: 88 20 ED FD A9 20 20 ED 9A
1298: FD A9 88 20 ED FD A5 ED D9
12A0: C9 9B F0 37 C9 8D F0 39 C1
12A8: C9 FF F0 04 C9 88 D0 0F 31
12B0: 88 10 04 C8 4C 7D 12 A9 50
12B8: 88 20 ED FD 4C 7D 12 A5 E8
12C0: ED 29 7F C9 20 90 B6 CC 30
12C8: 57 1E F0 B1 A5 ED 20 B9 38
12D0: 0A 99 83 1E 20 ED FD C8 30
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12D8: 4C 7D 12 20 B3 1C 4C 7D EA
12E0: 12 20 ED FD A9 00 99 83 B7
12E8: 1E 98 20 80 FE A8 60 20 C9
12F0: A6 0A A9 76 A0 1D 20 D5 17
12F8: 09 20 4C 13 AD 46 1E 8D B4
1300: 72 AA AD 47 1E 8D 73 AA EC
1308: AD 55 1E 38 ED 46 1E 8D F3
1310: 6C AA AD 56 1E ED 47 1E 87
1318: 8D 6D AA A9 30 8D 5F AA 71
1320: A9 09 8D 65 AA 20 60 14 10
1328: 20 80 A1 20 96 14 AD C5 DA
1330: B5 D0 03 4C 53 14 20 A6 5C
1338: 0A AE C5 B5 20 02 A7 A9 25
1340: 87 20 F0 FD 60 A9 01 8D 69
1348: 51 1E 60 00 20 71 12 D0 66
1350: 06 20 90 0A 68 68 60 20 F9
1358: 95 A0 A9 00 8D 51 AA 8D 3B
1360: 52 AA 8D 74 AA 8D 66 AA 56
1368: 8D 6C AA 8D 6D AA 8D 63 33
1370: AA 8D 70 AA 8D 71 AA 8D 1D
1378: D3 9C A2 00 A0 01 B9 83 04
1380: 1E C9 BA D0 1F AD 83 1E 61
1388: 38 E9 B0 F0 0D 30 0B C9 73
1390: 03 B0 07 8D 68 AA C8 4C E9
1398: A6 13 68 68 20 A6 0A A2 BC
13A0: 02 4C 3C 13 A0 00 B9 83 8F
13A8: 1E 20 2F 16 C9 E0 90 02 22
13B0: 29 DF 9D 75 AA E8 C8 CC C5
13B8: 58 1E D0 EA 60 20 A6 0A 36
13C0: A9 5F A0 1D 20 D5 09 20 04
13C8: CC 0A C9 C0 90 02 29 DF DB
13D0: 29 3F 09 40 48 AD 52 1E 3C
13D8: F0 03 20 BE 10 20 90 0A 54
13E0: 68 4C 6E 0B 20 A6 0A A5 22
13E8: FB CD 46 1E D0 07 A5 FC 16
13F0: CD 47 1E F0 05 A9 6A 8D D3
13F8: 27 04 A9 86 A0 1D 20 D5 E0
1400: 09 20 4C 13 AD 27 04 C9 4B
1408: 6A F0 03 20 9B 09 A5 FB 4C
1410: 8D 72 AA A5 FC 8D 73 AA FA
1418: A9 32 8D 5F AA A9 01 8D D4
1420: 65 AA 20 60 14 20 80 A1 73
1428: AE 60 AA AC 61 AA AD C5 B6
1430: B5 F0 06 20 96 14 4C 36 06
1438: 13 8E 55 1E 8C 56 1E A5 B9
1440: FB 18 6D 55 1E 8D 55 1E 5F
1448: A5 FC 6D 56 1E 8D 56 1E 87
1450: 20 96 14 20 A6 0A A9 7C DF
1458: A0 1D 20 D5 09 4C 45 13 90
1460: 60 BD 6D 09 8D A9 14 8D 2F
1468: B2 14 BD 84 09 8D A8 14 D2
1470: 8D B1 14 60 8D C1 08 8D 65
1478: D2 08 8D 99 14 60 8D C2 57
1480: 08 8D D3 08 8D 9A 14 60 6A
1488: CD 56 1E D0 E6 CE 56 1E 3B
1490: 60 09 C0 4C 7F 14 60 AA BF
1498: B9 FF FF 10 08 C9 83 B0 BD
14A0: 06 A5 FF 90 02 29 3F 9D 0F
14A8: FF FF CA 88 88 10 E9 60 6B
14B0: 99 FF FF C8 C0 28 D0 F8 73
14B8: 60 A9 07 85 36 A9 C3 85 1A
14C0: 37 60 E6 CE 56 1E 60 29 7B
14C8: 1F 4C B5 14 20 84 FE 20 BC
14D0: 58 FC A9 00 8D D3 9C 20 AE
14D8: 6E A5 A9 8D 20 ED FD A9 0E
14E0: 8C A0 1D 20 D5 09 20 F5 26
14E8: 09 C9 8D D0 F9 4C 08 08 DF
14F0: A2 00 8E C6 1E 8E C7 1E 81
14F8: 8E C8 1E 8E C9 1E 38 B1 30
1500: EB E9 B0 90 2A C9 0A B0 F6
1508: 26 0E C6 1E 2E C7 1E 0E 5E
1510: C6 1E 2E C7 1E 0E C6 1E 3C
1518: 2E C7 1E 0E C6 1E 2E C7 C2
1520: 1E 0D C6 1E 8D C6 1E C8 E3
1528: D0 D4 E6 EC 4C FE 14 F8 1B
1530: AD C6 1E 0D C7 1E F0 1C 2C
1538: 38 AD C6 1E E9 01 8D C6 D9
1540: 1E AD C7 1E E9 00 8D C7 F1
1548: 1E EE C8 1E D0 03 EE C9 72
1550: 1E 4C 30 15 AD C8 1E D8 99
1558: 60 38 AD CA 1E ED 4A 1E 7E
1560: 8D CC 1E AD CB 1E ED 4B 21
1568: 1E 8D CD 1E 0D CC 1E D0 49
1570: 10 20 A6 0A A9 A1 A0 1D 52
1578: 20 D5 09 A9 01 8D 51 1E E2
1580: 60 18 A5 FB 85 06 6D CC 41
1588: 1E 85 19 A5 FC 85 08 6D 1C
1590: CD 1E 85 1B 38 AD 55 1E CC
1598: E5 06 85 1D AD 56 1E E5 A2
15A0: 08 85 F9 18 65 1B CD 49 6D
15A8: 1E 90 10 20 A6 0A A9 99 54
15B0: A0 1D 20 D5 09 A9 01 8D 52
15B8: 51 1E 60 20 6E 08 18 AD 92
15C0: CC 1E 85 1D 6D 55 1E 8D E5
15C8: 55 1E AD CD 1E 85 F9 6D 20
15D0: 56 1E 8D 56 1E A5 FB 85 C9
15D8: 19 A5 FC 85 1B AD 4A 1E 33
15E0: 85 06 AD 4B 1E 85 08 20 F0
15E8: 31 08 4C 1F 0C A0 00 B1 BD
15F0: FB AA C8 B1 FB 88 91 FB 19
15F8: C8 8A 91 FB 60 A0 00 8C 2E
1600: 44 1E B1 FB 2C 00 03 30 63
1608: 12 C9 20 90 09 C9 C0 90 3E
1610: 19 29 1F 4C 2A 16 09 C0 38
1618: 4C 2A 16 C9 C0 90 0B C9 7C
1620: E0 90 05 29 DF 4C 2A 16 AE
1628: 09 20 91 FB 4C E0 0C 2C FC
1630: 00 03 30 0A C9 20 90 07 BA
1638: C9 C0 90 02 09 20 60 09 3E
1640: C0 60 05 4B 42 05 3A 01 D5
1648: 01 01 00 01 00 50 1B 0E CA
1650: 0F 12 8D EF 1E 8A 48 98 7D
1658: 48 38 AD DD 1E ED DF 1E D0
1660: AD DE 1E ED E0 1E 90 06 64
1668: AD EF 1E 20 ED FD 68 A8 0E
1670: 68 AA AD EF 1E 60 20 A6 89
1678: 0A A9 DC A0 1D 4C D5 09 88
1680: 4C EF 17 AD 61 C0 0D 44 F8
1688: 1E 4D 63 C0 10 03 4C D5 8A
1690: 16 20 A6 0A 20 AC 08 A9 B2
1698: B4 A0 1D 20 D5 09 20 E9 E9
16A0: 09 A2 03 8E EA 1E C9 D3 7A
16A8: F0 30 A2 08 8E EA 1E C9 54
16B0: D0 D0 CD 20 A6 0A A9 CF B5
16B8: A0 1D 20 D5 09 20 E9 09 83
16C0: C9 B1 90 0D C9 B8 B0 09 BC
16C8: 38 E9 B0 8D EA 1E 4C DA BD
16D0: 16 20 90 0A 60 A9 01 8D FB
16D8: EA 1E AD EA 1E A8 20 76 B0
16E0: 16 AD EA 1E C9 03 D0 0D CB
16E8: AD 05 C3 18 6D 07 C3 C9 FF
16F0: 50 D0 05 A9 03 20 95 FE 77
16F8: 20 84 FE A2 00 8E D5 1E 64
1700: 8E D4 1E 8E EB 1E 8E EC 39
1708: 1E BD 42 16 9D D6 1E E8 CB
1710: E0 0C D0 F5 A9 FF 8D E4 78
1718: 1E 8D E2 1E A2 04 BD 4D E4
1720: 16 9D 72 1F CA D0 F7 AD 38
1728: 46 1E 85 EB AD 47 1E 85 BC
1730: EC A0 00 8C E3 1E CC E2 D9
1738: 1E F0 06 AD D6 1E 8D E3 7B
1740: 1E B1 EB 30 07 C9 40 90 DA
1748: 03 4C CA 18 C9 3C F0 2C 33
1750: 99 C2 1F C8 EE E3 1E AD 5D
1758: E3 1E CD D7 1E 90 E2 8C BC
1760: 54 1E B1 EB C9 A0 F0 14 FB
1768: CE E3 1E 88 D0 F4 AC 54 4B
1770: 1E 4C 7F 17 C8 B1 EB C9 D0
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1778: A0 F0 01 88 8C 54 1E 98 66
1780: 38 65 EB 85 EB A5 EC 69 33
1788: 00 85 EC A0 00 AD E4 1E 5E
1790: C9 FF D0 03 20 75 18 AD A2
1798: E2 1E F0 03 20 A5 18 38 0E
17A0: 2E E2 1E AD 54 1E 8D 53 C6
17A8: 1E A9 C2 85 D6 A9 1F 85 22
17B0: D7 20 05 1C 20 B6 18 AD EE
17B8: E4 1E CD DA 1E 90 03 20 A1
17C0: 00 18 38 A5 EB ED 55 1E 36
17C8: 85 ED A5 EC ED 56 1E 05 C2
17D0: ED F0 2A 90 28 AD D5 1E 42
17D8: F0 0B A9 00 8D D4 1E 8D 01
17E0: D9 1E 20 00 18 AD EA 1E F2
17E8: C9 03 D0 03 20 E9 09 A9 6B
17F0: 00 EA EA EA A2 FA 9A 20 3C
17F8: 08 08 4C 18 0B 4C 31 17 3B
1800: 38 AD D8 1E ED E4 1E A8 9C
1808: 88 88 F0 0A 30 08 A9 8D DF
1810: 20 52 16 88 D0 F8 AD D5 CB
1818: 1E F0 11 8D 53 1E A9 C2 B7
1820: 85 D6 A9 21 85 D7 20 A5 81
1828: 18 20 05 1C A9 8D 20 52 E4
1830: 16 20 52 16 20 52 16 EE 84
1838: DD 1E D0 03 EE DE 1E AD 06
1840: DC 1E D0 31 AD EA 1E C9 B2
1848: 03 F0 2A 38 AD DD 1E ED 0E
1850: DF 1E AD DE 1E ED E0 1E 24
1858: 90 1B A9 00 20 B9 14 20 FC
1860: A6 0A A9 E8 A0 1D 20 D5 B9
1868: 09 20 E9 09 20 76 16 AD A7
1870: EA 1E 20 95 FE AD D4 1E 71
1878: F0 11 8D 53 1E A9 C2 85 EE
1880: D6 A9 20 85 D7 20 A5 18 85
1888: 20 05 1C A9 8D 20 52 16 CF
1890: AC D9 1E 8C E4 1E 88 88 53
1898: F0 0A 30 08 A9 8D 20 52 60
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18A8: D6 1E 8C E3 1E F0 06 20 7C
18B0: 52 16 88 D0 FA 60 AC DB 3C
18B8: 1E 18 98 6D E4 1E 8D E4 87
18C0: 1E A9 8D 20 52 16 88 D0 EA
18C8: FA 60 8D E6 1E AE 10 19 93
18D0: DD 10 19 F0 09 CA D0 F8 34
18D8: CE E3 1E 4C 09 1A CA 8A C2
18E0: 0A AA 8C E5 1E A9 18 48 C0
18E8: A9 F3 48 BD 22 19 48 BD 93
18F0: 21 19 48 60 38 AD E5 1E 69
18F8: 65 EB 85 EB A5 EC 69 00 F9
1900: 85 EC 4C 31 17 B1 EB C9 ED
1908: 3C F0 01 88 8C E5 1E 60 D5
1910: 10 57 4C 52 54 42 53 4E 6F
1918: 48 46 40 50 7F 58 4D 49 4E
1920: 47 7D 19 86 19 90 19 9A B8
1928: 19 A4 19 AE 19 B8 19 C7 C3
1930: 19 E9 19 63 19 73 19 53 DE
1938: 19 49 19 40 19 02 1A 29 9E
1940: 1A C8 A9 00 8D E2 1E 4C 67
1948: 05 19 C8 20 F0 14 8D E1 33
1950: 1E 4C 05 19 C8 20 F0 14 93
1958: 8D DF 1E AD C9 1E 8D E0 AA
1960: 1E 4C 05 19 C8 20 F0 14 A3
1968: 8D DD 1E AD C9 1E 8D DE 38
1970: 1E 4C 05 19 C8 20 F0 14 B3
1978: 8D D8 1E 4C 05 19 A9 00 10
1980: 8D DC 1E C8 4C 05 19 C8 72
1988: 20 F0 14 8D D6 1E 4C 05 2F
1990: 19 C8 20 F0 14 8D D7 1E 39
1998: 4C 05 19 C8 20 F0 14 8D 5C
19A0: D9 1E 4C 05 19 C8 20 F0 3E
19A8: 14 8D DA 1E 4C 05 19 C8 F6
19B0: 20 F0 14 8D DB 1E 4C 05 7F
19B8: 19 AC E5 1E C8 98 48 20 9A
19C0: 00 18 68 A8 8C E5 1E 60 29
19C8: 20 E2 19 88 8C D4 1E A0 04
19D0: 01 B1 EB 99 C1 20 C8 CC F3
19D8: D4 1E 90 F5 F0 F3 C8 4C A3
19E0: 05 19 C8 B1 EB C9 3C D0 DF
19E8: F9 60 20 E2 19 88 8C D5 3C
19F0: 1E A0 01 B1 EB 99 C1 21 FF
19F8: C8 CC D5 1E 90 F5 F0 F3 91
1A00: 4C 05 19 20 E2 19 4C 05 D9
1A08: 19 C8 B1 EB C9 BD F0 07 1E
1A10: 88 AD E6 1E 4C 4C 17 C8 3D
1A18: 20 F0 14 48 AD E6 1E AA 8F
1A20: 68 9D 42 1F 20 05 19 4C BD
1A28: F4 18 A2 00 C8 B1 EB C9 DF
1A30: 3C F0 0A 20 2F 16 9D 83 92
1A38: 1E E8 4C 2C 1A 8E 58 1E DB
1A40: 20 9B 09 20 57 13 A5 FB DC
1A48: 8D 72 AA A5 FC 8D 73 AA 3F
1A50: A9 32 8D 5F AA A9 01 8D 19
1A58: 65 AA 20 60 14 20 80 A1 B7
1A60: AE 60 AA AC 61 AA AD C5 FA
1A68: B5 F0 0B 20 96 14 A9 00 6F
1A70: 20 95 FE 4C 36 13 8E 55 2F
1A78: 1E 8C 56 1E A5 FB 18 6D 46
1A80: 55 1E 8D 55 1E A5 FC 6D DC
1A88: 56 1E 8D 56 1E 20 96 14 39
1A90: 68 68 4C 27 17 20 C1 1A E5
1A98: AD F0 1E F0 16 20 68 1B CF
1AA0: 20 E7 1A AD EE 1E C9 FF 80
1AA8: F0 09 20 8B 1B 20 AC 08 0F
1AB0: 4C A0 1A 4C 90 0A AD 61 A4
1AB8: C0 0D 44 1E 4D 63 C0 30 A4
1AC0: 26 20 A6 0A A9 08 A0 1E 52
1AC8: 20 D5 09 20 71 12 8D F0 85
1AD0: 1E D0 03 4C 90 0A A0 00 5B
1AD8: B9 83 1E 99 F1 1E C8 CC 8E
1AE0: 58 1E D0 F4 4C 90 0A A5 90
1AE8: FB 85 EB A5 FC 85 EC A9 D5
1AF0: FF 8D EE 1E A0 01 A2 00 96
1AF8: AD F0 1E F0 50 BD F1 1E 8E
1B00: D1 EB F0 05 E0 00 D0 EE 20
1B08: CA C8 D0 0B E6 EC A5 EC C3
1B10: CD 56 1E F0 02 B0 36 E8 BD
1B18: EC F0 1E D0 E0 18 98 65 CF
1B20: EB 85 ED A5 EC 69 00 85 58
1B28: EE AD 55 1E C5 ED AD 56 65
1B30: 1E E5 EE 90 18 38 A5 ED B0
1B38: ED F0 1E 85 FB 8D ED 1E CD
1B40: A5 EE E9 00 85 FC 8D EE 6C
1B48: 1E 20 1F 0C 60 20 A6 0A 15
1B50: A9 0E A0 1E 20 D5 09 A9 E8
1B58: 01 8D 51 1E 60 AD 61 C0 BB
1B60: 0D 44 1E 4D 63 C0 30 23 68
1B68: 20 A6 0A A9 18 A0 1E 20 D3
1B70: D5 09 20 71 12 8D 19 1F 07
1B78: F0 0E A0 00 B9 83 1E 99 70
1B80: 1A 1F C8 CC 58 1E D0 F4 43
1B88: 4C 90 0A 38 A5 FB 85 19 0F
1B90: ED ED 1E 85 ED A5 FC 85 DA
1B98: 1B ED EE 1E 05 ED D0 62 7B
1BA0: A9 FF 8D EE 1E 18 AD F0 E9
1BA8: 1E 65 FB 85 06 A9 00 65 5B
1BB0: FC 85 08 38 AD 55 1E E5 30
1BB8: 19 85 1D AD 56 1E E5 1B 6D
1BC0: 85 F9 20 31 08 38 AD 55 21
1BC8: 1E ED F0 1E 8D 55 1E AD 35
1BD0: 56 1E E9 00 8D 56 1E AD A6
1BD8: 19 1F F0 26 8D E8 1E A9 D9
1BE0: 00 8D E9 1E 20 D4 10 A0 AE
1BE8: 00 B9 1A 1F 91 FB C8 CC 9D
1BF0: 19 1F D0 F5 18 A5 FB 6D B1
1BF8: 19 1F 85 FB A5 FC 69 00 E7
1C00: 85 FC 4C 1F 0C A0 00 CC 65
1C08: 53 1E F0 21 B1 D6 30 04 EE
1C10: C9 40 B0 1A 20 2F 16 20 FE
```

```
1C18: 52 16 AD EC 1E F0 0A A9 F5
1C20: 88 20 52 16 A9 DF 20 52 AF
1C28: 16 C8 4C 07 1C 60 8C E5 F8
1C30: 1E 8D E6 1E 20 2F 16 C9 4D
1C38: 43 D0 1B 38 AD E1 1E ED 4C
1C40: 53 1E 4A 38 ED D6 1E A8 26
1C48: A9 A0 20 52 16 88 D0 FA 16
1C50: AC E5 1E 4C 29 1C C9 45 73
1C58: D0 10 38 AD D7 1E ED 53 45
1C60: 1E 38 ED D6 1E A8 A9 A0 68
1C68: D0 E0 C9 55 D0 0A AD EC C6
1C70: 1E 49 01 8D EC 1E 10 B1 B4
1C78: C9 63 D0 11 8C E5 1E AE 80
1C80: DD 1E AD DE 1E 20 24 ED 7A
1C88: AC E5 1E D0 9C AE E6 1E EC
1C90: BD 42 1F 20 52 16 4C 29 CA
1C98: 1C 20 A6 0A 38 AD 48 1E 83
1CA0: ED 55 1E AA AD 49 1E ED 50
1CA8: 56 1E 20 24 ED A9 01 8D 7F
1CB0: 51 1E 60 AD 44 1E 49 80 AD
1CB8: 8D 44 1E A9 01 8D 45 1E 0E
1CC0: 60 D3 D0 C5 C5 C4 D3 C3 41
1CC8: D2 C9 D0 D4 A0 B3 AE B0 26
1CD0: 00 88 88 88 88 A0 C2 D9 EA
1CD8: A0 C3 AE A0 C2 D2 C1 CE E5
1CE0: CE CF CE A0 A6 A0 CB AE 56
1CE8: A0 CD C1 D2 D4 C9 CE 00 B5
1CF0: C2 D5 C6 C6 C5 D2 A0 CE CE
1CF8: D5 CC CC C5 C4 00 C2 D5 C6
1D00: C6 C6 C5 D2 A0 C6 D5 CC CD
1D08: CC 00 C4 C5 CC C5 D4 C5 8A
1D10: A0 A8 D3 AC D7 AC D0 A9 C6
1D18: 00 BA A0 C1 D2 C5 A0 D9 F9
1D20: CF D5 A0 D3 D5 D2 C5 BF 4E
1D28: A0 A8 D9 AF CE A9 BA 00 A5
1D30: C5 D2 C1 D3 C5 A0 C1 CC 78
1D38: CC A0 D4 C5 D8 D4 00 C5 D7
1D40: D2 C1 D3 C5 A0 A8 D3 AC 27
1D48: D7 AC D0 AC C1 A9 BA A0 49
1D50: D2 C5 D4 D5 D2 CE A0 D4 45
1D58: CF A0 C5 D8 C9 D4 00 C5 50
1D60: CE D4 C5 D2 A0 C6 CF D2 AF
1D68: CD C1 D4 A0 D6 C1 D2 C9 CB
1D70: C1 C2 CC C5 BA 00 D3 C1 71
1D78: D6 C5 BA 00 CE CF A0 C5 A3
1D80: D2 D2 CF D2 D3 00 CC CF 08
1D88: C1 C4 BA 00 D0 D2 C5 D3 5D
1D90: D3 A0 D2 C5 D4 D5 D2 CE 06
1D98: 00 CE CF A0 D2 CF CF CD CD
1DA0: 00 CE CF A0 D4 C5 D8 D4 D6
1DA8: A0 C9 CE A0 C2 D5 C6 C6 4B
1DB0: C5 D2 AE 00 D0 D2 C9 CE 8C
1DB8: D4 A0 D4 CF BA A0 D3 C3 E0
1DC0: D2 C5 C5 CE AC A0 D0 D2 D7
1DC8: C9 CE D4 C5 D2 BF 00 D3 FB
1DD0: CC CF D4 A0 CE D5 CD C2 36
1DD8: C5 D2 BF 00 D0 D2 C9 CE D6
1DE0: D4 C9 CE C7 AE AE 8D 00 99
1DE8: C9 CE D3 C5 D2 D4 A0 CE 8C
1DF0: C5 D8 D4 A0 D3 C8 C5 C5 FB
1DF8: D4 AC A0 D0 D2 C5 D3 D3 13
1E00: A0 D2 C5 D4 D5 D2 CE 00 DE
1E08: C6 C9 CE C4 BA 00 CE CF 83
1E10: D4 A0 C6 CF D5 CE C4 00 28
1E18: D2 C5 D0 CC C1 C3 C5 A0 5F
1E20: D7 C9 D4 C8 BA 00 CC CF 21
1E28: D7 C5 D2 C3 C1 D3 C5 A0 E1
1E30: DB D9 AF CE DD BF 60 00 62
1E38: CE D5 CC CC A0 C2 D5 C6 3A
1E40: C6 C5 D2 00 00 FF 00 00 AB
```

Program 2: *SpeedScript 80* File Converter For DOS 3.3

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
E9 5 HIMEM: 8191
4A 10 HOME
52 20 D$ = CHR$ (4)
3F 30 PRINT D$;"MAXFILES1"
25 40 PRINT "DO YOU WANT TO:"
A6 50 PRINT " (1) MAKE A SPEEDSCRIPT FILE
      INTO A TEXT      FILE"
AE 60 PRINT " (2) MAKE A TEXT FILE INTO A
      SPEEDSCRIPT      FILE"
67 70 GET A$:A = VAL (A$)
47 80 IF A < > 1 AND A < > 2 THEN 70
65 90 ON A GOTO 100,200
53 100 PRINT "ENTER SPEEDSCRIPT FILE NAME"
      : INPUT ":";A$
89 110 PRINT "ENTER TEXT FILE NAME TO CREA
      TE": INPUT ":";B$
7E 120 PRINT D$;"BLOAD ";A$;",A$2000"
A8 125 L = PEEK (43616) + PEEK (43617) * 2
      56 + 8192
33 130 PRINT D$;"OPEN ";B$
A1 131 PRINT D$;"DELETE ";B$
3B 132 PRINT D$;"OPEN ";B$
0A 140 PRINT D$;"WRITE ";B$
5A 150 FOR I = 8192 TO L - 1
E5 155 B = PEEK (I)
11 160 IF B = 60 THEN B = 141
DF 170 PRINT CHR$ (B);
09 180 NEXT
F2 190 PRINT
27 195 PRINT D$;"CLOSE ";B$
B3 196 END
6D 200 PRINT "ENTER TEXT FILE NAME": INPUT
       ":";B$
06 210 INPUT "ENTER SPEEDSCRIPT FILE NAME
      TO CREATE   :";A$
32 220 PRINT D$;"OPEN ";B$
FC 230 PRINT D$;"READ ";B$
49 235 L = 0
A8 240 ONERR GOTO 270
C6 250 GET C$:A = ASC (C$ + CHR$ (0)) + 12
      8: IF A = 141 THEN A = 60
48 260 POKE 8192 + L,A:L = L + 1: GOTO 250
04 270 POKE 216,0
F1 280 PRINT
14 290 PRINT D$;"CLOSE ";B$
0C 295 PRINT D$;"BSAVE ";A$;",A8192,L";L - 1
B4 296 END
```

Program 3: *SpeedScript 80* File Converter For ProDOS

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
4A 10 HOME
52 20 D$ = CHR$ (4)
25 40 PRINT "DO YOU WANT TO:"
A6 50 PRINT " (1) MAKE A SPEEDSCRIPT FILE
      INTO A TEXT      FILE"
AE 60 PRINT " (2) MAKE A TEXT FILE INTO A
      SPEEDSCRIPT      FILE"
67 70 GET A$:A = VAL (A$)
47 80 IF A < > 1 AND A < > 2 THEN 70
65 90 ON A GOTO 100,200
53 100 PRINT "ENTER SPEEDSCRIPT FILE NAME"
      : INPUT ":";A$
89 110 PRINT "ENTER TEXT FILE NAME TO CREA
      TE": INPUT ":";B$
7E 120 PRINT D$;"BLOAD ";A$;",A$2000"
A4 125 L = PEEK (48859) + PEEK (48860) * 2
      56 + 8192
5A 150 FOR I = 8192 TO L - 1
```

```
39 160 IF PEEK (I) = 60 THEN POKE I,141
09 180 NEXT
C9 190 PRINT D$;"CREATE ";B$;",TTXT"
F5 195 PRINT D$;"BSAVE ";B$;",A$2000,E";L
      - 1;",TTXT"
B3 196 END
6D 200 PRINT "ENTER TEXT FILE NAME": INPUT
       ":";B$
06 210 INPUT "ENTER SPEEDSCRIPT FILE NAME
      TO CREATE   :";A$
25 220 PRINT CHR$ (4);"BLOAD ";B$;",A$2000
      ,TTXT"
93 230 L = PEEK (48859) + PEEK (48860) * 2
      56 + 8192
59 240 FOR I = 8192 TO L - 1
1A 245 IF PEEK (I) = 141 THEN POKE I,60
06 260 NEXT
4A 295 PRINT D$;"BSAVE ";A$;",A8192,E";L - 1
B4 296 END
```

Program 4: ProDOS Maker

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
52 100 D$ = CHR$ (4)
BE 110 PRINT "LOADING MLX FILES"
09 120 PRINT D$;"BLOAD SPEEDSCRIPT,A$2032"
13 130 PRINT D$;"BLOAD SPEEDSCRIPT2,A$3AF0
      "
2F 140 PRINT "READING DATA STATEMENTS"
E4 150 FOR I = 632 TO 641: POKE I + 8192,2
      34: NEXT
A3 160 C = 0: READ I: IF I = - 1 THEN 190
1D 170 READ L: FOR I = I TO I + L: READ A:
      C = C + A: POKE I + 8192,A: NEXT :
      READ CS: IF C < > CS THEN 310
A0 180 GOTO 160
F7 190 C = 0
9E 200 READ I: IF I = - 1 THEN 220
B2 210 READ A:C = C + A: POKE I + 8192,A:
      GOTO 200
1C 220 READ CS: IF C < > CS THEN 310
F7 230 PRINT "INSERT DISK TO RECEIVE SS.SY
      STEM": PRINT "  PRESS ANY KEY WHEN
      READY": GET A$
66 240 PRINT "SAVING SS.SYSTEM"
AA 250 ONERR GOTO 270
DB 260 PRINT D$;"DELETE SS.SYSTEM"
6B 270 ONERR GOTO 0
C8 280 PRINT D$;"CREATE SS.SYSTEM,TSYS"
7E 290 PRINT D$"BSAVE SS.SYSTEM,A$2000,L$1
      CBF,TSYS"
0A 300 PRINT "SUCCESSFULLY CONVERTED. BOOT
       DISK TO RUN": END
B5 310 PRINT "ERROR IN DATA STATEMENTS": E
      ND
7E 320 DATA 0,49
78 330 DATA 160,0,185,0,32,153
6F 340 DATA 0,144,200,208,247,76
E0 350 DATA 14,144,169,32,133,251
5F 360 DATA 169,50,133,250,169,8
ED 370 DATA 133,253,169,0,133,252
0E 380 DATA 177,250,145,252,200,208
8D 390 DATA 249,230,251,230,253,165
DB 400 DATA 253,201,37,208,239,76
FF 410 DATA 0,8,7499
35 420 DATA 2862,5
62 430 DATA 32,194,34,76,83,20
AF 440 DATA 439
BE 450 DATA 3136,5
31 460 DATA 32,82,35,76,57,20
24 470 DATA 302
51 480 DATA 4728,5
6E 490 DATA 32,82,35,76,118,26
2B 500 DATA 369
B1 510 DATA -1
85 520 DATA 643,36,651,175,656,176
17 530 DATA 661,184,2953,76,2954,158
32 540 DATA 2955,35,3332,76,3333,184
50 550 DATA 3334,35
5B 560 DATA -1,1135
```

Program 5: MLX Data For SPEEDSCRIPT2 File

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
START ADDRESS: 3AF0
END ADDRESS:   3CBF

3AF0: 45 32 31 03 20 00 BF C1 2D
3AF8: 54 24 20 60 14 20 00 BF 8B
3B00: C0 57 24 B0 55 20 00 BF 27
3B08: C8 63 24 B0 4D AD 68 24 61
3B10: 8D 6A 24 8D 6F 24 8D 77 E3
3B18: 24 AD 55 1E 38 ED 46 1E BC
3B20: 8D 6B 24 8D 72 24 AD 56 6B
3B28: 1E ED 47 1E 8D 6C 24 8D E7
3B30: 73 24 AD 46 1E 8D 70 24 AF
3B38: AD 47 1E 8D 71 24 20 00 50
3B40: BF D0 69 24 B0 14 20 00 50
3B48: BF CB 6E 24 B0 0C 20 00 97
3B50: BF CC 76 24 B0 04 20 96 57
3B58: 14 60 8D AB 1E 20 96 14 10
3B60: A9 00 8D 77 24 20 95 FE A0
3B68: 20 00 BF CC 76 24 20 A6 DE
3B70: 0A A9 85 A0 24 20 D5 09 67
3B78: AD AB 1E 20 DA FD A2 FA 85
3B80: 9A 4C 18 0B 20 60 14 20 D5
3B88: 00 BF C8 63 24 B0 CB AD 67
3B90: 68 24 8D 79 24 8D 7E 24 06
3B98: 8D 77 24 20 00 BF D1 78 55
3BA0: 24 B0 B7 AD 7A 24 8D 81 28
3BA8: 24 AD 7B 24 8D 82 24 A5 B2
3BB0: FB 8D 7F 24 A5 FC 8D 80 77
3BB8: 24 20 00 BF CA 7D 24 B0 8A
3BC0: 99 20 00 BF CC 76 24 B0 41
3BC8: 91 AE 7A 24 AC 7B 24 60 41
3BD0: A0 00 B9 83 1E 29 7F 99 35
3BD8: AC 1E C8 CC 58 1E D0 F2 E2
3BE0: 8C AB 1E 60 8D AB 1E 4C F5
3BE8: 2E 23 20 00 BF C5 46 24 09
3BF0: B0 F2 A0 00 AD 00 BE 29 A4
3BF8: 0F 8D AB 1E B9 01 BE 99 9A
3C00: AD 1E C8 CC AB 1E D0 F4 29
3C08: C8 8C AB 1E A9 2F 8D AC 31
3C10: 1E 20 00 BF C8 63 24 B0 68
3C18: CB A9 AF 20 ED FD 20 00 80
3C20: BF CA 4A 24 B0 BE A9 B9 44
3C28: 85 D7 A9 04 85 D6 A0 00 97
3C30: B1 D6 C9 00 D0 08 C8 B1 5A
3C38: D6 F0 34 4C 29 24 8D E5 7E
3C40: 1E 29 0F AA E8 8E 58 1E EE
3C48: C8 B1 D6 09 80 20 ED FD 5B
3C50: C8 CC 58 1E D0 F3 A9 8D 84
3C58: 20 ED FD A9 27 18 65 D6 F1
3C60: 85 D6 A5 D7 69 00 85 D7 B1
3C68: C9 BB F0 B2 4C FC 23 20 BA
3C70: 00 BF CC 52 24 4C DA 14 B3
3C78: 02 60 00 BE 04 01 00 B9 D3
3C80: 00 02 00 00 01 01 01 AB 33
3C88: 1E 07 AB 1E C3 06 00 00 5F
3C90: 01 00 00 00 00 03 AB 1E 0B
3C98: 00 BB 00 02 00 00 00 00 20
3CA0: 04 00 00 00 00 00 00 00 1B
3CA8: 01 00 02 00 00 00 00 04 E5
3CB0: 00 00 00 00 00 00 00 C5 EE
3CB8: D2 D2 CF D2 A0 A3 00 00 0A
```

Reviews

The Toy Shop

Karen G. McCullough

Every once in a while, someone finds another way to use personal computers. A few years ago it was the electronic spreadsheet; more recently it was desktop publishing. Now it's building things in your home. One of the first programs in this newest genre is *The Toy Shop*, from Brøderbund Software, which lets you make toys with your Apple II or Macintosh computer.

The idea of creating toys may at first seem unworkable (designing them, sure, but not actually *making* them). You've probably heard about CAD (Computer Aided Design) systems, but you don't expect to find them on 128K personal computers. And its sister acronym, CAM (Computer Aided Manufacturing), is definitely a factory phenomenon. Is it possible that Brøderbund has brought CAD/CAM to the home computer? Not quite, but *The Toy Shop* comes closer than anyone but the designers would have thought possible.

An Entire Hobby Store

In brief, *The Toy Shop* prints a toy's components on standard-sized paper. You adhere the printed pieces to heavy cardstock (included), cut them out, and assemble the three-dimensional toy much like the plastic models you get at hobby stores. There are 20 different toys in all, from a fairly simple flying propeller to an elaborate, fabulously detailed, moving carousel. It's a nice assortment, and includes an antique car and truck, a mechanical bank, medieval catapult, and a zoetrope—a wider variety of toys than you'll find in most hobby shops.

But building the toys is only part of the fun. You can also customize and personalize them before printing. Customizing involves choosing paint patterns, decals, and text to go in various places on the model. On the balancing jet, for instance, you can choose paint patterns for the base, pedestal, stripe, fuselage and fins, decals for the pedestal, and text on the base plaque.

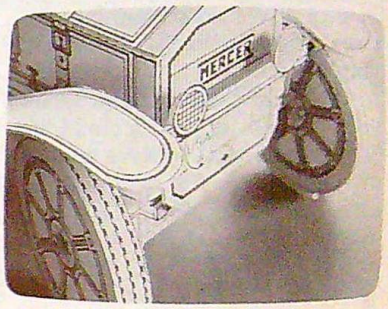
The procedure for decorating and printing is intuitive and remarkably painless. It's clear that thought went into the design and implementation of the user interface. The manual explains the program functions in a clear, well organized fashion, but it isn't really needed. I sat down and whipped out a model (rather neatly customized) without cracking the manual.

In the Apple II version, everything you do (except for actually creating your own paint patterns or decals) involves moving the cursor over a set of menu choices until the one you want is highlighted. In some cases you use the space bar to turn certain features on or off (entering text messages, telling the program to use underline or bold face, and so on). Adequate directions are always available on the screen, and pressing Escape always takes you back to the previous step.

Browse Through The Shop

The first menu offers you the choices of browsing toys, choosing by name, setup, and quit. *Browsing* lets you look at each toy in turn. *Choosing by name*, the option you'll use most frequently, lets you begin work on a toy by picking its name from a list.

Setup configures the program to your hardware—on the Apple II version that means choosing your printer, interface card, slot number, and number of disk drives. *The Toy Shop* works with most of the best-known dot-matrix printers and interface cards, but check the list on the back of the package before you buy.



The detail seen on this antique automobile is typical of the results you'll get when you customize, print, and build any of the 20 models found in The Toy Shop.

When you choose a toy, you can print it immediately by using the pre-set paints, decals, and text. Or if you prefer, you can customize any or all of these elements. Some of the models have areas which are filled with a pattern, something *The Toy Shop* calls *paints*. More than 30 patterns are available, and, if you're the creative kind, you can design your own or alter an existing one. If you really like your design you can save it to a disk and load it again later.

Decals are pictures or graphic designs that decorate some of the models. For any spaces on the model that can use decals, the preset option is displayed when that area is highlighted. Changing a decal is easy—highlight the area you want to modify and press Return, then make your selection from a screen.

As with the paint patterns, you can create your own decals or edit existing ones. Designs are drawn using either keyboard or joystick on the Apple II and using the mouse on the Macintosh. And you can save them to disk and load them again later. Graphics can also be loaded from *The Print*

Reviews

Shop or any disks containing pictures created with *The Print Shop*'s graphics editor.

As a final personalizing option, you can add text and a credit line. Most of the models have a plaque or nameplate—you can print your own name or a friend's, a title, or a greeting in your choice of font and type styles.

Ready To Print

Now that you've got the toy exactly the way you want it, you're ready to either print it or save it to print later. An *align paper* option helps you get the paper positioned precisely in the printer, important because the toy may not work properly if parts are printed over perforations. Once the paper is aligned and you're sure the set up is correct, you're ready to print.

You can make as many copies of a toy as you want (refill packs of cardstock and supplies are available), and if you make a mistake you don't have to reprint the entire toy—the program lets you choose which page or pages you want to reprint.

The toys are detailed and often have a lot of pieces crammed on a page, so printing can take a long time. Add frequent disk access to this and you have a wait—the more complicated designs may take up to 30 minutes to print.

Unfortunately, the review copy of the program we used had a bug which caused the printer to slip out of graphics and into text mode while printing some toys. This happened only on older Apple II+s; the program worked perfectly on an Apple IIe. The odds are good that the problem will be fixed by the time you read this.

End A Into Slot B

The fun isn't finished when the toy is printed. You still have to put it all together. Pieces are applied to the self-adhesive cardstock and then cut out with scissors and a hobby knife. If you don't already own a graphic arts knife, you should get one. You'll find it extremely helpful for most of these projects.

Unfortunately, the manual—which has been so clear to this point—now gets murky. You have to read several pages of general instructions, then go to the specific directions for your toy. Page flipping begins here. The somewhat terse instructions constantly refer you back to the construction diagram (which is often on another page), and also occasionally require you to go back and reread some of the general instructions. You can get the job done, but you may find yourself short of fingers and sporting slightly less hair than when you began the project.

There's no call for despair, however. Remember, if you make a mistake you can always print out another copy—what other put-together toy do you know that gives you unlimited spare parts? And besides, I managed to make one of the easier toys without much difficulty. I didn't even glue my fingers together.

By the way, as improbable, even impossible as it looks, the balancing jet really does sit happily on the point of a pin.

The Toy Shop
Brøderbund Software
17 Paul Dr.
San Rafael, CA 94903-2101
Apple II+, IIe, IIc, IIGS, version $59.95
Macintosh, Macintosh Plus version $64.95

Disk Express

Gregg Keizer, Editor

Some utilities are like gifts from friends you thought had joined the Peace Corps and moved to Mali—they're an unexpected pleasure and find a home in your (or your computer's) heart.

Disk Express from ALSoft is such a utility for the Macintosh. It does several things—all related to optomizing your floppy and hard disks—and it does them well. Nothing earth shattering, perhaps, but definitely unpretentious.

You need something like *Disk Express* if you begin to notice that applications are starting slowly, documents seemingly take forever to open, database sorting makes you drowsy, or word processor search and replace begins to feel like it's heading into the next geologic age. All these symptoms mean that your files are *fragmented*.

Fragmentation

As data is written to new disk—whether it's a floppy or a hard disk, the procedure is the same—data is placed in a logical pattern that makes the most efficient use of the disk. Data may not be in contigious *blocks*, or sections of the disk, but it's written in such a way that the disk drive can read it at the fastest possible speed. But that's only when you have a new, little-used disk.

As time goes by, and you read and write from and to the disk, new data for an application or document is simply placed at the next available block. That may not be in a location on the disk that makes best use of the drive. The disk drive head may have to search much longer to find these new sections, slowing down functions such as opening, closing, and sorting files. Little pieces of your applications and documents are lit-

erally scattered across the disk.

Even worse—because you're using the applications or documents day after day—the problem may go unnoticed. You may not be able to remember how quickly *MacWrite* started when you first copied it to your new hard disk.

Putting The Pieces Back Together

Disk Express takes these fragmented files and puts them back together again in a consecutive pattern. With files reorganized, your disk drive head doesn't have to move as far; read and write times are faster.

Start *Disk Express* from a floppy disk (not from a copy you've placed on your hard disk, since that may crash the Macintosh) and you'll see a Finder-like screen. Double-click on a disk icon, or, if you're using a hard disk which allows you to separate the disk into *partitions* or *volumes*, double-click on the volume icon, and you'll see a screen like Figure 1.

Look at the bottom half of the window and you'll notice that *Disk Express* indicates how much room is free on the disk or volume, how much is used, how many files are present, and how big the DeskTop file is. (The DeskTop file keeps track of the icons, folders, and comments for the disk—all the information that creates the desktop environment.) Click on *More Info* to see how much, if any, of the files are fragmented, how much must be moved to optimize the disk, and how much must be moved to optimize with priority (more on that soon).

Look, Squeeze, Fix, and Erase

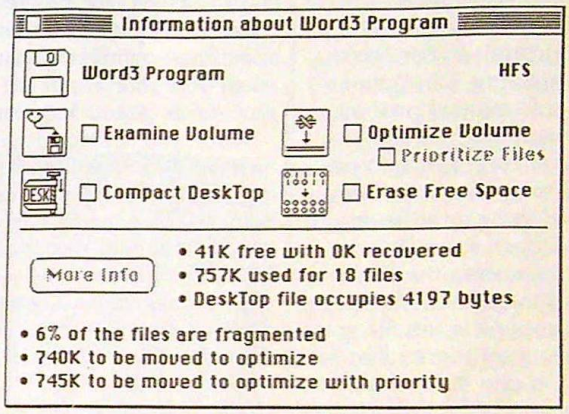
You can examine a disk or volume to verify that it's readable and that its directory is undamaged. If an error is found, you'll see a message telling you the disk or volume may be damaged or copy protected. The icons in the window beside the remaining *Disk Express* functions then turn into tiny portraits of the Grim Reaper.

Don't use Disk Express *on a damaged volume or one that's copy protected.*

(Note, however, that modifying applications on copy protected disks with something like FWB's *Hard Disk Utility*—which means you can install the application on your hard disk and use it without a master disk—presents no problem to *Disk Express*.)

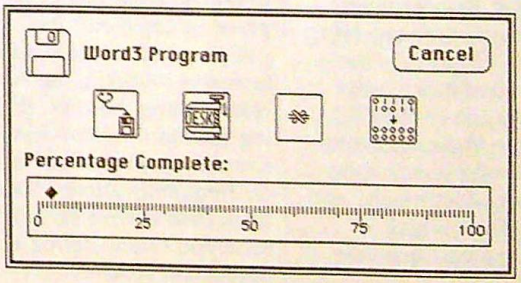
You can also compact the DeskTop file, which over time can

Figure 1: *Disk Express* Window



Double-clicking on a disk icon from within Disk Express *shows you this window.* More Info *has already been called, and the results appear at the bottom. Note the four operations you can perform with the program.*

Figure 2: Progress In Motion



You can see how much progress has been made in the operation you selected. Here, a volume is being optimized and prioritized.

Reviews

grow unnecessarily large. If you're using a hard disk, DeskTop files of 40K+ aren't uncommon. Though you can eliminate unneeded information in the DeskTop file by pressing Tab-Option-Command, this manual method erases all comments you may have placed in files' Get Info dialog boxes. It may also transform some custom icons into the drab generic Macintosh icons. When *Disk Express* squeezes the DeskTop file, nothing's lost—the only thing that happens is the file gets smaller, freeing up more room for other files. On one 800K floppy disk, for instance, *Disk Express* reduced a 9K DeskTop file to just over 5K. You'll see far more spectacular results with a hard disk.

The most important function of *Disk Express* is optimizing disks or volumes. This takes time, but is well worth it. *Disk Express* looks at each file, collects each piece of it, and then writes it to contiguous blocks. If you want, you can select something called *Prioritize Files*, which puts the files in an order according to how likely they'll change. *MacServe* volumes go first (since they'll change least), then applications, then documents, and finally the DeskTop (which changes each time you use that disk or volume).

The final function of *Disk Express* erases free space that's been made available. When you move files to optomize the disk, the data actually remains in the old position and could conceivably be read by someone with a disk editor. If you're concerned about data security (especially if you're running *Disk Express* on a hard disk in a network environment), you'll want to use this option.

Progress In Motion

Decide what you want *Disk Express* to do to a disk or volume, select Express from a menu, and watch the screen. A scale appears and shows you the progress of the operation (Figure 2). Some things take time—optimizing, especially when you prioritize at the same time, takes quite a long time.

When you're through and your files are back together, try opening a long file. If you're using a hard disk, the increase in performance should be noticeable. It's more difficult to tell when you've optimized a floppy, simply because there was less data on it to begin with.

Results will vary, of course, and depend on the size of your files (longer files tend to become more fragmented), how often you changed them (a 50K *Word* document I edited and added to over a month's time opened at least 30 percent faster once I ran *Disk Express*), and the way your hard disk is partitioned (the larger the volume, the more blocks there are to place fragmented files).

Compared to the hard disk alternative—backing up every file, reformatting the disk, then returning files to the hard disk—*Disk Express* is painless and fast. And on frequently altered floppy disk files, *Disk Express* can shorten the time you spend staring at a blank Macintosh screen.

Disk Express
Macintosh 512K, Macintosh 512K Enhanced, Macintosh Plus
ALSoft, Inc.
P.O. Box 927
Spring, TX 77383
$39.95

Animate

Bob Guerra

If you're at all interested in animation, you've probably tried your hand at its most primitive form—drawing a series of sequential pictures on successive pieces of paper, then fanning through them with your thumb.

Fortunately, just as computers can quickly solve complicated mathematical problems that would take hours using pencil and paper, they can also save a great deal of time in creating detailed animation.

In *Animate*, Brøderbund has provided Apple users with a powerful tool that lets you use your computer to create double-hi-res animation.

Dual Utilities

Animate is actually two integrated utilities—*The Graphic Designer* and *The Scene Designer*. Used together, they let you design characters and backgrounds, then combine them into animated scenes complete with sound and text. Both programs use a convenient system of pull-down menus and can be operated with a mouse, Apple graphics tablet, *KoalaPad*, or joystick.

You use *The Graphic Designer* to create animated characters and backgrounds. Although the user's manual suggests you use a separate program (such as Brøderbund's *Dazzle Draw*) to create your backgrounds, the tools available in *Animate*'s Draw/Preview mode are adequate for some applications.

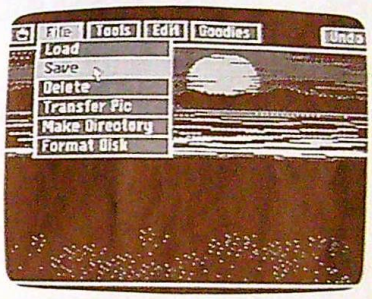
The Graphic Designer's tools include a palette of 16 colors, square and round brushes in three sizes, and a zoom option for close-up work. In addition, sections of the screen may be captured and then flipped horizontally or vertically,

cut from the drawing, pasted in a new location, or simply copied into new locations while the original section is left intact. This is a great timesaver—just as in the classic hand-drawn form of animation, most of the drawings on your worksheet in *Animate* will be very similar from cell to cell.

Unlike Brøderbund's *Fantavision*, another Apple animation program, *Animate* doesn't use *tweening*, a process that automatically generates a number of the frames or *cells* of the animation. Instead, each cell must be drawn individually or modified from the last. With a little imagination and hard work, though, the results can be just as rewarding.

Depending on the size of the character you're creating, you may begin by filling the screen with 18, 42, or 80 standard frames. You can also create your own custom frame and then copy it as many times as needed so that all your frames are uniform. Once you've drawn all the cells for a particular animated sequence, you can preview the character's movement by selecting the order in which the frames will be shown and setting the appropriate speed. If the character doesn't move just right, you can rearrange the order, eliminate unnecessary frames, or even draw entirely new ones, until the movement is exactly as you want it. Up to 255 separate frames can be used in the creation of a single character's animation.

Finally, both the finished character and the worksheet of individual frames that make up the character's animation can be saved as separate files. Having the worksheet on file is useful if you decide to modify the character in any way or if you want to create a similar character using the original as a model. You can even make a color or black-and-white printout of a character's cells in their proper sequence and then use them to make your own flip books and other animation toys. (For a list of some of the printers and interface cards that work with *Animate*, be sure to check the back of the package before you buy it.)



Animate's pull-down menus let you select functions and commands with the mouse, a joystick, or a graphics tablet. Here, a background is saved to disk.

Making A Scene

Once you have all the characters you'll need and a background saved to disk, you can proceed to *The Scene Designer*, where you'll set the paths that your characters will follow. This can be done in one of three ways: 1) By using your mouse, pad, or joystick to manually move them around the background while the computer records the action; 2) by selecting both a starting position and a destination for characters that will move in a straight line; or 3) by selecting a specific screen location for each cell of the character's sequence.

As many as 15 additional characters can easily be added to the scene by selecting the frame where you want the new character introduced and then setting the new path in any of the ways already described. You should be aware, however, that the addition of each new character noticeably slows the movement of all the others.

Unfortunately, the animation is also slowed by the addition of sound. While *Animate*'s sound feature conveniently lets you add simple sound effects and music using a four-octave, onscreen keyboard, the animation stops while the computer plays any music for a particular frame. Therefore, to make music seem to accompany the action in your scene, you must enter only one note for every two or three frames of animation. Better alternatives may be to use music only when the action is stopped, or to limit the audible portion of your scene to short sound effects.

Doodlers And Experts

These problems aside, *Animate* should please both doodlers and serious students of cell animation. It comes with a well-organized manual to guide you through the program step-by-step, and an illustrated booklet called *The Art of Animation* that's full of tips on how to make your animation realistic and lifelike. There's even a "quick start" reference card for those who hate reading all the directions before jumping right in.

The real fun comes when you use *Animate* to create your own characters and background, and then combine these into finished scenes. While the animated cartoons you create may not rival Disney's *Snow White*, you'll have hours of enjoyment making them, and, along with your family and friends, you'll have just as much fun watching.

Animate
Apple IIe (128K required), IIc, or IIGS (in 8-bit mode); one disk drive (two strongly recommended)
Brøderbund Software
17 Paul Drive
San Rafael, CA 94903
$69.95

Reviews

Shanghai

Todd Heimarck, Assistant Editor

You can play Activision's *Shanghai* without even reading the help screen that explains how the game works. That's because there's really just one rule—find two tiles that match and remove them from the playing field. The goal of the game is to clear the screen. Sounds simple, doesn't it? And you may even believe that—until you run into your first deadend and the hair-pulling starts.

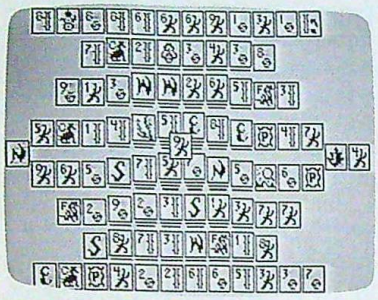
The game uses 144 mah-jongg tiles, divided into 36 groups of 4. There are four North winds, four green dragons, four 9-of-bamboo tiles, and so on. The tiles are shuffled and dealt out in what the game calls a *dragon pattern*. Some pieces can't be seen because they're covered by others. Some tiles, blocked by those to the left and right, can be seen but not played until the neighboring pieces are removed. When the game begins, 35 pieces are open; 109 are blocked.

It sounds easy enough, but most first-time players don't win. (It's difficult for even experienced players to win regularly.) The simplicity of the game masks a subtle depth of strategy. *Shanghai* is one of those rare computer games that rewards patience and thoughtful deliberation. And it's one that's almost viciously addictive.

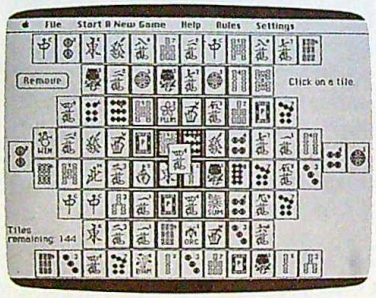
Don't Jump Right In

You may be tempted to jump right in and start matching up tiles. Here's a red dragon; there's another one; click on them to make them disappear. This technique doesn't usually work.

When you lose a game, the problem is orphaned tiles. Say there's a 2 of dots at the right edge of a row. It can't be removed because two of the matching tiles have already been taken from the board and the only 2 of dots left is in the middle of another row. It can't move because it's blocked by a flower. The matching flower is nowhere to be seen, buried somewhere beneath another piece.



In the Apple II version of Shanghai, *stacked tiles are indicated by horizontal bars.*



The increased resolution of the Macintosh makes more tile detail possible. Though there's no three-dimensional look to the game, it's quite easy to pick out stacks of tiles.

When no pairs are open, the game is over, although you can undo previous moves all the way to the beginning of the game if you want to try over.

Another potential disaster is interleaved tiles. The pattern 3-7-3-7, for example, is gridlocked. The 3 on the left is open, but its partner is surrounded by 7's. The 7 on the right is available, but it matches a 7 blocked by 3's. Each tile is part of a set of four, so there should be two other 3's and two 7's elsewhere on the board. But if you previously removed the other 3's and 7's, you're in trouble.

When a tile and all three of its matching pieces are open, it's safe to click them into oblivion. They'll no longer be a factor in the game.

Fast And Slow

Blitzkrieg tactics—frenetically matching tiles without thinking—will surely lead to failure. But excessive caution is also dangerous; indecision brings paralysis. Sometimes you have to take a risk that may or may not pay off. A winning *Shanghai* strategy requires a balanced approach: not too fast and not too slow.

There are options for competing (or cooperating) with a second player, but the main game is just you against the dragon. If you like solitaire games, you'll enjoy *Shanghai*.

Shanghai
Apple IIe, IIc, IIGS; Macintosh 512e, Plus
Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
$39.95 (Apple II)
$44.95 (Macintosh)

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Apple MLX

Machine Language Entry Program

Tim Victor, Editorial Programmer

"Apple MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs on the Apple computer. It runs on the II, II+, IIe, and IIc, with either DOS 3.3 or ProDOS.

A machine language program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost the same as a correct one. To reduce the problems associated with typing in machine language programs, we've presented them as MLX listings which can be entered using the "Apple MLX" editor.

MLX checks your typing on a line-by-line basis. It won't let you enter inappropriate characters, and it won't let you continue if there's a mistake in a line or even if you're trying to enter a line or digit out of sequence. You don't have to know anything about machine language to use it. In other words, MLX makes machine language program entry almost foolproof.

Using MLX

Type in and save MLX to disk (you'll want to use it to enter programs in this and future issues of *COMPUTE!'s Apple Applications Special*, as well as programs in COMPUTE! magazine and Apple-specific books from COMPUTE! Publications). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS. Programs entered with MLX, however, must be saved to a disk formatted with the same operating system as MLX itself.

If you have an Apple IIe or IIc, make sure that the key marked Caps Lock is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the machine language program. These values are given at the beginning of the machine language program listing and in the program's accompanying article. Find them and type them in.

The next thing you'll see is a menu asking you to select a function. The first is (E)nter Data. If you're just starting to type in a program, choose this function. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the Return key and begin entering the data.

Once you're in enter mode, MLX will print the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit Return, MLX recalculates the checksum from the eight bytes and the address. If you enter more than or fewer than nine numbers, or if the checksum doesn't exactly match, MLX erases the line you just entered and prompts you again for the same line.

Invalid Characters Banned

MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. MLX will read two single-digit numbers instead of one two-digit number (F 6 means F *and* 6, not F6).

You can't enter an inappropriate character with MLX. Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake.

MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. MLX will stop you.

Editing Features

MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line you're entering so that you can retype data. Pressing the Ctrl (*Control*) key and the D (*Delete*) key at the same time removes the character under the cursor, shortening the line by one character. Pressing the Ctrl key and the I (*Insert*) key simultaneously puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither Ctrl-D nor Ctrl-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), MLX automatically leaves Enter mode and redisplays the functions menu. If you want to leave Enter mode before then, press the Return key when MLX prompts you with the address of a new line.

Display Data

The second menu choice, (D)isplay Data, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press the D key, MLX asks you for a starting address. Type in the address of the first line that you want to see and hit Return. MLX displays program lines until you press any key or until it reaches the end of the program.

Save and Load

Other menu selections are provided to let you save programs to disk and load them back into the computer. These are (S)ave File and (L)oad File. MLX asks you for the name of the file which contains the program. The first time you save a machine language program, there won't be a file on the disk containing the program. Whatever name you type in will be the name of a new file that's created.

The message DISK ERROR appears during a SAVE or LOAD if a problem is detected. If you're not sure why a disk error has occurred, check the disk drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system that you're using for MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit MLX (by pressing Q), delete an old file or two, and then run MLX again. Your typing should still be safe in memory. If the error message appears during a load, you may have specified a filename that doesn't exist on the disk.

Quit

The (Q)uit menu option has the obvious effect—it stops MLX and enters BASIC. (Of course, you can also press Ctrl-Reset to get out of MLX.)

The Finished Product

When you've finished typing all the data for a machine language program and have saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. You'll almost always load and run an MLX-generated program by typing BRUN *filename* (or sometimes just BLOAD).

An Ounce Of Prevention

By the time you finish typing in the data for a long program, you may have several hours invested in the project. Don't take chances—use the "Apple Automatic Proofreader" to enter MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of

data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk. Don't let a simple typing error in MLX cost you several nights of hard work.

Line 100 of MLX traps all errors to line 610. If MLX is typed in correctly, only disk errors should be encountered. A disk-error message when you're not trying to access the drive—for example, when you first start entering data—indicates a typing error in the MLX program itself. If this occurs, hit Ctrl-Reset to break out of MLX and carefully compare your entry against the printed listing.

Apple MLX: Machine Language Entry Program

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
8F 100 N = 9: HOME : NORMAL : PRINT "APPL
       E MLX": POKE 34,2: ONERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "START ADDR
       ESS";: GOSUB 530: IF A = 0 THEN PR
       INT CHR$ (7): GOTO 110
8C 120 S = A
EJ 130 VTAB 2: HTAB 20: PRINT "END ADDRES
       S  ";: GOSUB 530: IF S > = A OR A
       = 0 THEN PRINT CHR$ (7): GOTO 130
2F 140 E = A
B5 150 PRINT : PRINT "CHOOSE:(E)NTER DATA
       ";: HTAB 22: PRINT "(D)ISPLAY DATA
       ": HTAB 8: PRINT "(L)OAD FILE  (S)
       AVE FILE  (Q)UIT": PRINT
AE 160 GET A$: FOR I = 1 TO 5: IF A$ < >
       MID$ ("EDLSQ",I,1) THEN NEXT : GOT
       O 160
93 170 ON I GOTO 270,220,180,200: POKE 34
       ,0: END
AF 180 INPUT "FILENAME: ";A$: IF A$ < > "
       " THEN PRINT CHR$ (4);"BLOAD";A$;"
       ,A";S
A1 190 GOTO 150
6D 200 INPUT "FILENAME: ";A$: IF A$ < > "
       " THEN PRINT CHR$ (4);"BSAVE";A$;"
       ,A";S;",L";E - S
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN 150
9E 230 FOR B = B TO E STEP 8:L = 4:A = B:
        GOSUB 580: PRINT A$;": ";:L = 2
85 240 FOR F = 0 TO 7:V(F + 1) = PEEK (B
       + F): NEXT : GOSUB 560:V(9) = C
F2 250 FOR F = 1 TO N:A = V(F): GOSUB 580
       : PRINT A$" ";: NEXT : PRINT : IF
       PEEK (49152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN 150
48 280 FOR B = B TO E STEP 8
A6 290 HTAB 1:A = B:L = 4: GOSUB 580: PRI
       NT A$;": ";: CALL 64668:A$ = "":P
       = 0: GOSUB 330: IF L = 0 THEN 150
F9 300 GOSUB 470: IF F < > N THEN PRINT C
       HR$ (7);: GOTO 290
27 310 IF N = 9 THEN GOSUB 560: IF C < >
       V(9) THEN PRINT CHR$ (7);: GOTO 29
       0
72 320 FOR F = 1 TO 8: POKE B + F - 1,V(F
       ): NEXT : PRINT : NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$ = O$:P =
       0: PRINT CHR$ (7);
22 340 L = LEN (A$):O$ = A$:O = P:L$ = ""
       : IF P > 0 THEN L$ = LEFT$ (A$,P)
EJ 350 R$ = "": IF P < L - 1 THEN R$ = RI
       GHT$ (A$,L - P - 1)
55 360 HTAB 7: PRINT L$;: FLASH : IF P <
       L THEN PRINT MID$ (A$,P + 1,1);: N
       ORMAL : PRINT R$;
7B 370 PRINT " ";: NORMAL
E6 380 K = PEEK (49152): IF K < 128 THEN
       380
C1 390 POKE 49168,0:K = K - 128
5B 400 IF K = 13 THEN HTAB 7: PRINT A$;"
       ";: RETURN
8A 410 IF K = 32 OR K > 47 AND K < 58 OR
       K > 64 AND K < 71 THEN A$ = L$ + C
       HR$ (K) + R$:P = P + 1
C1 420 IF K = 4 THEN A$ = L$ + R$
5F 430 IF K = 9 THEN A$ = L$ + " " + MID$
        (A$,P + 1,1) + R$
8A 440 IF K = 8 THEN P = P - (P > 0)
93 450 IF K = 21 THEN P = P + (P < L)
90 460 GOTO 330
37 470 F = 1:D = 0: FOR P = 1 TO LEN (A$)
       :C$ = MID$ (A$,P,1): IF F > N AND
       C$ < > " " THEN RETURN
BB 480 IF C$ < > " " THEN GOSUB 520:V(F)
       = J + 16 * (D = 1) * V(F):D = D +
       1
5F 490 IF D > 0 AND C$ = " " OR D = 2 THE
       N D = 0:F = F + 1
88 500 NEXT : IF D = 0 THEN F = F - 1
17 510 RETURN
B5 520 J = ASC (C$):J = J - 48 - 7 * (J >
        64): RETURN
AB 530 A = 0: INPUT A$:A$ = LEFT$ (A$,4):
        IF LEN (A$) = 0 THEN RETURN
6F 540 FOR P = 1 TO LEN (A$):C$ = MID$ (A
       $,P,1): IF C$ < "0" OR C$ > "9" AN
       D C$ < "A" OR C$ > "Z" THEN A = 0:
        RETURN
2D 550 GOSUB 520:A = A * 16 + J: NEXT : R
       ETURN
28 560 C = INT (B / 256):C = B - 254 * C
       - 255 * (C > 127):C = C - 255 * (C
       > 255)
26 570 FOR F = 1 TO 8:C = C * 2 - 255 * (
       C > 127) + V(F):C = C - 255 * (C >
       255): NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR I = 1 TO
       L:T = INT (A / 16):A$ = MID$ ("012
       3456789ABCDEF",A - 16 * T + 1,1) +
        A$:A = T: NEXT : RETURN
1F 590 PRINT "FROM ADDRESS ";: GOSUB 530:
        IF S > A OR E < A OR A = 0 THEN B
       = 0: RETURN
0D 600 B = S + 8 * INT ((A - S) / 8): RET
       URN
B6 610 PRINT "DISK ERROR": GOTO 150
```

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Apple Automatic Proofreader

Tim Victor, Editorial Programmer

It's easier than ever to enjoy programs for Apple II–series computers. "Apple Automatic Proofreader," an error-checking program for the Apple II, II+, IIe, and IIc, with either DOS 3.3 or ProDOS, alerts you to almost every typing mistake you might make.

"Apple Automatic Proofreader" will help you type in program listings without typing mistakes. It's a short error-checking program that hides itself in memory and attaches to your Apple's operating system. Each time you press Return to enter a program line, this routine displays a two-digit checksum at the top of your screen. If you've typed the line correctly, the checksum on your screen matches the one in the printed listing—it's that simple. You don't have to use the Proofreader to enter listings, but doing so greatly reduces your chance of making a typo.

Getting Started

First, type in the Apple Automatic Proofreader program following this article. The Proofreader can't check itself before it's done, so you'll have to be extra careful to avoid mistakes.

The Proofreader checks which operating system you're running before it hooks up the checksum routine, so you can type it in with either DOS 3.3 or ProDOS. If you want to use the Proofreader with both operating systems, you won't have to retype it. All you need is a utility to copy a file between disks with different formats, such as the one provided on the ProDOS *User's* or *System Utilities* disk.

As soon as you finish typing the Proofreader, save at least two copies. This is very important, because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Now, type RUN and hit Return. The Proofreader clears the screen, loads the machine language routine, displays the message PROOFREADER ACTIVATED, erases the BASIC portion of itself, and ends. If you type LIST and press Return, you'll see that no BASIC program is in memory. The computer is ready for you to type in a new BASIC program.

Entering Programs

Once the Proofreader is activated, you can begin typing in a BASIC program as usual. Every time you finish typing a line and press Return, the Proofreader displays a two-digit checksum number in the upper-left corner of the screen. Compare this checksum with the two-digit checksum printed next to the corresponding line in the program listing. If the numbers match, you can be pretty certain the line was typed correctly. Otherwise, check for your mistake and type the line again.

A common mistake when entering BASIC programs on the Apple occurs when you accidentally press a key while holding down the Control key. This adds an invisible control character to the line you are typing. If you don't find it before you run the program, this stray character may cause a SYNTAX ERROR or other mysterious behavior. Fortunately, the Proofreader detects the presence of these invisible control characters and displays a checksum that doesn't match the one in the listing. So it's always a good idea to retype a line if the checksums don't match, even though you might not see any difference in the lines themselves.

The Proofreader ignores space characters, so you can omit spaces between keywords and still see a matching checksum. Spaces are important only between the quotation marks of PRINT statements or string assignments. The only mistake the Proofreader won't catch is if you accidentally type too many spaces or leave some out. For this reason, be extra careful when you're entering text within quotes.

Before running another BASIC program, it's a good idea to turn off the Proofreader by holding down the Control key while pressing the Reset button. The machine language part of the Proofreader is kept in memory starting at address 768 ($300 hexadecimal). This location is out of BASIC's way, but a lot of other programs use this same place for their machine language subroutines. Disable the Proofreader to avoid conflicts.

How It Works

When the Applesoft BASIC interpreter needs to get a line of input from the keyboard, it calls a machine language routine in the Apple's read-only memory (ROM) called GETLN. GETLN, in turn, calls the operating system to get a single keypress, which it stores in an input buffer. If the Return key was pressed, GETLN ends, leaving one new line for the BASIC interpreter in the input buffer. Otherwise, it repeats the process, asking for another keypress.

The operating system normally gets individual keystrokes from a ROM routine called KEYIN, but the Proofreader changes this. When the Proofreader is installed, the operating system calls the checksum routine instead, and the checksum routine asks KEYIN for a character. If any key other than Return was pressed, the checksum routine just passes it on to the operating system, which gives it to GETLN. But if Return *was* pressed, the checksum routine examines the contents of GETLN's input buffer, which now contains an entire line of input, to calculate the checksum that it displays at the top of the screen.

A common typing mistake is transposition—typing two successive characters in the wrong order, like *PIRNT* instead of *PRINT*. A checksum program that merely adds the codes of the characters in a line can detect only the presence or absence of a character, not transposition errors. Because the Apple Proofreader uses a sophisticated formula to compute checksums, it alerts you to transposed keystrokes.

The Apple Automatic Proofreader detects almost every possible typing mistake, including transpositions, missing or extra characters, accidental control characters, and incorrect line numbers. Typing *COMPUTE!'s Apple Applications Special* programs into your Apple computer has never been easier.

Apple Automatic Proofreader

```
10 C = 0: FOR I = 768 TO 768 + 68: REA
   D A:C = C + A: POKE I,A: NEXT
20 IF C < > 7258 THEN PRINT "ERROR IN
   PROOFREADER DATA STATEMENTS": END
30 IF PEEK (190 * 256) < > 76 THEN POK
   E 56,0: POKE 57,3: CALL 1002: GOTO
   50
40 PRINT CHR$ (4);"IN#A$300"
50 POKE 34,0: HOME : POKE 34,1: VTAB 2
   : PRINT "PROOFREADER INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96
```

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Apple Disk

All Apple II programs in this issue are available on the companion *Apple Applications Disk*. Formatted for both DOS 3.3 and ProDOS, the *Disk* costs $12.95, plus $2.00 shipping and handling, and can be purchased only through COMPUTE! Publications. See page 29 for details.

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Guide To Typing In Programs

BASIC Programs

Computers can be picky. Unlike the English language, which is full of ambiguities, BASIC usually has only one right way of stating something. Every letter, symbol, and number is significant. Type the listing *exactly* as it appears. A common mistake is to substitute the letter *O* for the numeral 0 or a lowercase *l* for the numeral 1. Also, all punctuation must be entered as it appears in the listing. Substituting a comma for a semicolon or omitting a colon can make a big difference. Even blank spaces can be important.

To make things *much* simpler, use the "Apple Automatic Proofreader" to help you enter BASIC programs.

Machine Language Programs

Entering a machine language program is even trickier than typing in a BASIC listing. Normally, you have to use the Apple's built-in monitor to enter each number. You don't know if you've typed it in correctly until you try to run the program.

With our "Apple MLX," however, you can forget all your machine language worries. Just follow the directions in the Apple MLX article in this issue.

DOS 3.3 And ProDOS

Unless otherwise mentioned in the program's documentation, it doesn't matter whether you have DOS 3.3 or ProDOS. You can enter the programs with either DOS active in your Apple. Of course, you can only run a typed-in program with the DOS system it was entered with.

Uppercase

You'll notice that all the program listings are entirely in uppercase. If you have an Apple IIe or IIc, however, which allows both uppercase and lowercase, you can change text which appears in PRINT statements if you want.

A Quick Review

1. Type in the program a line at a time, in order. Press Return at the end of each line. Use the left arrow to correct mistakes.
2. If you're entering a BASIC program and using the Apple Automatic Proofreader, make sure the line's *checksum* matches the number/letter combination which appears in the upper left corner of your screen.
3. When you're finished, save a copy of your program to disk by typing **SAVE** *filename*. Do this *before* you run the program for the first time.
4. Run the program by typing **RUN** *filename*.

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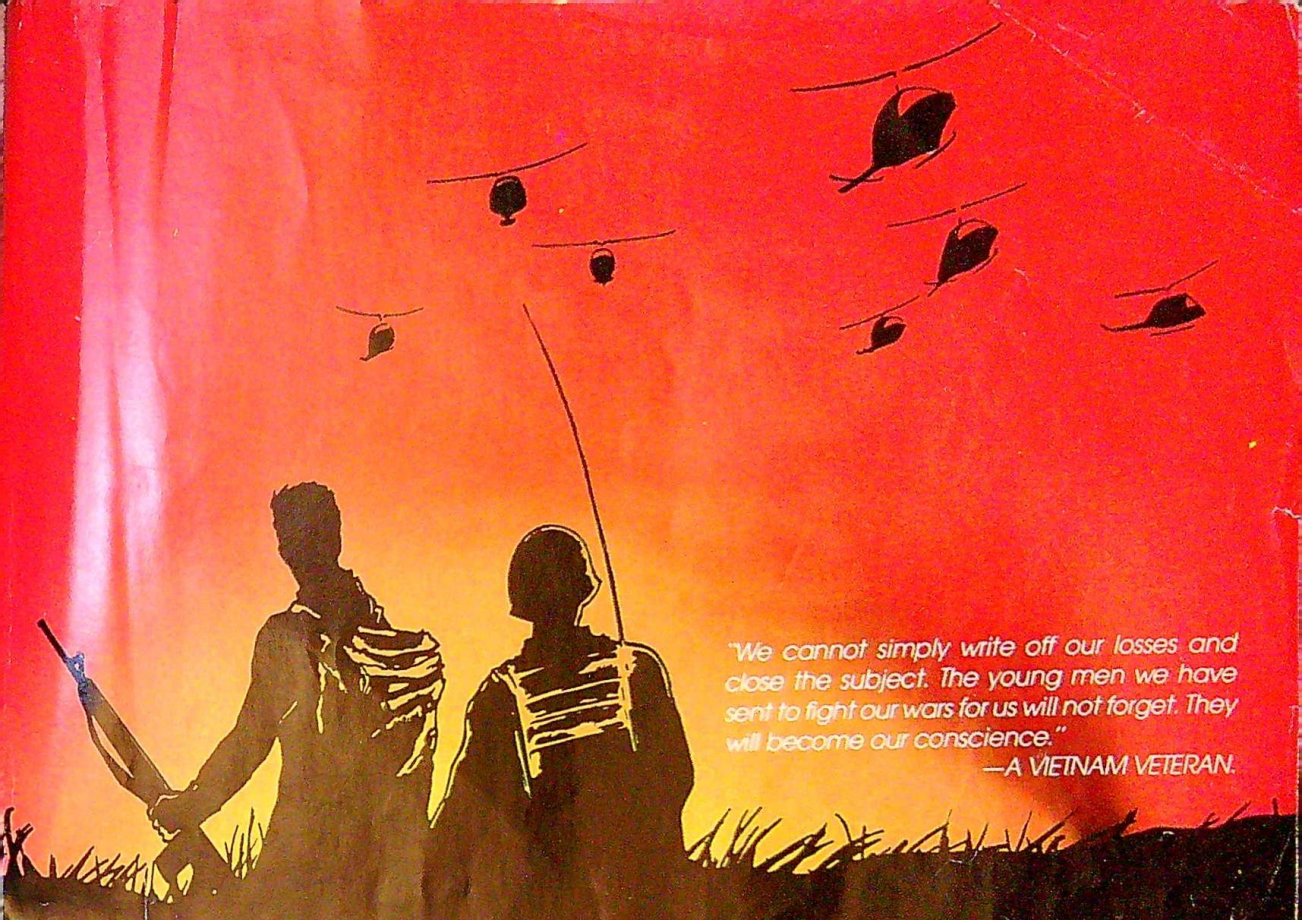

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