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Welcome to the new COMPUTE!'s Apple Applications!

This is the first bimonthly issue of Apple Applications. Previously a newsstand-only magazine that appeared twice a year, Apple Applications has proven so successful at delivering the information and programs Apple users want and need, we're now turning it out six times a year and offering subscriptions for the very first time.

In all modesty, we think this is a unique publication—one that mixes Apple II and Macintosh coverage, combines features with the highest quality ready-to-type-in software, and offers informative applications publications and accurate hardware and software product reviews. By all indications—more than a quarter million people have bought the magazine—you like the flavorful blend that's made Apple Applications what it is. We're only going to make it better.

Apple Applications is expanding as we turn it into a bimonthly. Regular columns like “Apple News and Notes,” “Reader’s Feedback,” “Tips, Tricks, and Tidbits,” and Dan Gutman’s game column, “Just for Fun,” debut in this issue.

We're also continuing to offer impressive Apple II programs. Each of the seven programs in this issue is a winner. Try the fast-paced arcade game “Vulcan Mines,” an all-machine language game that lets you create the game boards. “ProDesk” is a superb program launcher and file maintenance program. “The Clipper” is a sophisticated graphics system that makes it possible to create custom clip art from any hi-res picture and lets you paste clipplings together to make new computer art.

We publish applications for the home, school, and even the office. And we publish more full-featured programs than any other magazine. Among our past efforts have been a fast and easy-to-use 80-column word processor, animation packages, a disk editor, programming utilities, and educational games and programs. We'll continue to publish the best Apple type-in software in every issue.

That's why Apple Applications is sponsoring a $10,000 programming contest (see page 38 for details). With six possible prize winners, ranging from a First Prize of $5,000 to three Honorable Mentions of $500 each, it's the largest programming contest ever sponsored by an Apple magazine. Even if you don't win a prize in the contest, your program could be bought for publication, with generous payments headed your way. If you program, or you know someone else who does, get in touch with us.

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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AppleWorks, Where Are You?
The Apple IIGS is an innovative computer that runs most of the existing Apple IIe and IIc software. But most people who buy an Apple IIGS (and the numbers are increasing) usually don’t want to run II/c software—they want to run IIGS-specific programs that make use of the machine’s terrific sound and graphics.

But the fact remains that AppleWorks is the best selling Apple program ever. It’s the reason thousands of people bought Apple IIc and Ile computers.

A IIGS version of AppleWorks, or an integrated package like AppleWorks, could galvanize the machine’s sales. The IIGS’s speed, one of its strong points, and its easy-to-add memory make it a perfect computer for large and sophisticated applications.

Yet many developers have taken the IIGS’s Macintosh-like appearance too much to heart. Frequently, the result is programs which, though colorful and complete with pull-down menus and zooming windows, suffer from slow speeds. Graphics manipulation, whether in a drawing program or in a graphics-intensive environment like a Mac-style desktop or window, needs high processing speeds. Without such quickness, redrawn screens slow to a crawl and typing fails as well.

If to compensate, the IIGS has a lot of memory—more than twice what’s found in an IIe or IIc. Adding memory to the IIGS is both easy and inexpensive. And large amounts of memory means the machine can run large programs.

The Apple IIGS needs a program like Microsoft Works for the Macintosh—an integrated package of word processor, spreadsheet, database, telecommunications, and graphics. This hypothetical GSWorks doesn’t need color; writing, calculating, filing, charting, and telecommunicating don’t require color. GSWorks should be fast—scrolling through a word processing document or across a huge spreadsheet should be at least as fast as in AppleWorks.

Multiple windows should be supported; you should be able to open at least four at any one time. Pull-down menus and mouse support are needed, but the interface should not be bogged down with countless fonts or unnecessary graphics. In all, GSWorks should look clean and run fast.

GSWorks could be the program that opens the doors to acceptability and a significant installed base. Without GSWorks (or something like it), the IIGS may well languish. That would be a shame.

GREGG KEIZER
Editor
From the crow's nest, your topman bellows, "Enemy ship ahoy!" You immediately order battle sails, your guns loaded and prepared to fire. You change your course in anticipation of your enemy's next move. Now, the wind is in your favor, and so is lady luck. Before the enemy captain can bring the ship about, you level a broadside amidship; crushing her main mast, taking sails and rigging down with it. She's dead in the water, gunports blocked by the fallen mast and sails. Your next broadside explodes into her hull, ravaging her decks; then another until finally, she strikes her colors. The prize is yours.

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Information On A Card

HyperCard, announced in August and shipped with every new Macintosh as of September, may make Macintosh the personal computer of choice. Not really system software, not really an application, HyperCard is touted as a personal toolkit for developing the ways to create and use information. Its name derives from the way it treats information and accesses that information. Much like the touted hypertext concept, HyperCard lets people locate information in a nonlinear fashion, by dynamically linking one idea with another. And its index-card look is something most people can get comfortable with in a matter of moments.

Here's how HyperCard works. Information is stored on cards, screens which can include such things as graphics, buttons to send the user to other cards, and fields for entering and editing text. While working within an address-filer application of HyperCard, for instance, you can enter and delete names, addresses, and phone numbers. You can search for any name, sort the cards, even turn to another kind of card—a list of things to do, perhaps.

The HyperCard package includes four 800K disks, about three megabytes of files altogether. Sample stacks, the term given to the collections of cards HyperCard uses, include such things as address files, to-do lists, and phone lists. Announced stacks from developers range from one that's a partial adaptation of The Whole Earth Catalog to one that offers thousands of facts for international travelers—such as currency exchange rates, schedules, and climate.
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:

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- 5 year hassle free warranty (Apple has a 90 day warranty)
- Made in USA

gsRAM for More AppleWorks Power

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

Turn Your IIgs into a Giant

Simply plug gsRAM into the IIgs memory expansion slot and you’ve got up to 8 MEG 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®.

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High Expectations

Apple is expecting great things from HyperCard. With its HyperTalk scripting language (essentially a programming language) it should be easy for users to create new stacks of their own. Customizing cards and entire stacks is also relatively easy, though it takes time. But as with most other computer applications, many HyperCard users will probably leave their purchased stacks alone and use them as is.

HyperCard is fun to play with, but at the moment, its usefulness is less than revolutionary. One reason is its memory requirements. HyperCard requires a full megabyte of memory. In itself, that's not shocking; all Macintosh computers now sold come with that much RAM. But many Macintosh owners are comfortable only when using more than one application at a time. Switcher and desk accessories are the two most common examples of that philosophy.

Yet HyperCard demands the full attention of a one-megabyte Macintosh. And since it's an application, users must first quit whatever program is active—for instance, a word processor—before running HyperCard. Look for HyperCard to reach its stride when Macintosh memory is at the two-megabyte point.

With the amount of information a stack can contain (the upper limit is 32K per card, which means that a stack could hold megabytes of data), HyperCard doesn't seem practical on a floppy disk–based Macintosh.

HyperCard has one glitch. What the program calls the Home card (a central stack that lets you call other stacks and cards) is a necessary part of HyperCard. Without it, stacks can't be accessed. In fact, HyperCard won't run without the Home card. But a new Home card cannot be created without HyperCard. Corrupt the Home card, and you're stuck.

ROM and CD-ROM

The talk is that at some point HyperCard may become part of the Macintosh's ROM. That would certainly solve the memory problem. And it would make HyperCard's ultimate application, CD-ROM, a reality. CD-ROM links a compact disc player, much like the popular audio players, to a computer. Huge quantities of information can be stored on just one small compact disc.

HyperCard seems tailor-made for accessing enormous amounts of information. First of all, the card-style interface can be immediately understood by almost anyone, from school children to power users. More importantly, the ability to link information and then let the user access that information in a nonsequential fashion is perfect for CD-ROM, which allows for relatively fast random access. And by allowing for graphics, video, and audio, HyperCard is properly positioned to act as an interface for these aspects of future CD-ROM.

One piece of announced stackware—the phrase being coined for HyperCard applications—provides such an interface, not for CD-ROM, but for a laser videodisc. The National Gallery of Art Laserguide will work with The National Gallery of Art videodisc and let users design their own tour of the museum's works. Sort for all Renoirs, for instance, set the speed of the tour, and sit back and watch the masterpieces slide by. Or select any painting or sculpture and read detailed notes about its artist, subject, or school.

And What Do They Think?

Some developers are bound to be less than enthusiastic about HyperCard. It will obviously cut into the market of such products as hypertext applications like Guide as well as simple file managers traditionally used for the kinds of information processing that HyperCard is good at.

Others, though, can only be ecstatic. With the proper basic information, the smallest programming shop should be able to turn out stackware. Expect a number of the early efforts to show up as shareware or freeware on bulletin boards or commercial database services like CompuServe, Delphi, and GENie. Both GENie and CompuServe had HyperCard-dedicated areas in their Macintosh forums within days of the product's announcement. Stackware available for downloading in late August ranged from note-taking cards to program launchers to one showing every chemical element.

Look for even more sophisticated stacks in the months to come, both from shareware and commercial programmers.

II On II

Software publishers aren't climbing over each other to release hot new products for the Apple IIgs. Many publishers have canceled or postponed their plans for Apple IIgs software and instead are cautiously introducing programs for the Apple Iic and Ile. It's even more revealing that many of the products for the Apple IIgs are simply versions of software which first appeared on the Apple Ile and Iic—versions that incorporate color and use the mouse interface.

Not that the Apple IIgs isn't an exciting computer or that it's not selling. The fact remains that there is software for the Apple IIgs which accomplishes tasks never before possible with an Apple II computer. But the Apple IIgs is in a strange position, something software publishers feel in their pocketbooks. Its technology is far beyond the other Apple II computers, but because of limitations in resolution and speed, it's not quite a Macintosh.

Businesses are cautious enough about unproven products that the slightly more expensive Macintosh Plus is more attractive than the Apple IIgs (the Mac Plus can now be found for several hundred dollars more than an Apple IIgs). On the other hand, thousands of business, educational, and home users are perfectly happy with their Ile and Iic computers. They have a computer with an unmatched track record at an affordable price. (One user traded in his Macintosh for an Apple Iic because he realized that he wasn't doing desktop publishing, he wasn't creating artistic graphics, and he wasn't linking his
computer to three synthesizers and a MIDI controller box. He was doing simple database and spreadsheet work for sales and occasionally typed out a letter or report.

There are lots of computer applications, such as AppleWorks and memory expansion, that don't require anything but an Apple IIe or IIc and existing products. So effective is the basic Apple II software that the hottest product on the Apple IIGS is AppleWorks. No mouse interface, no pull-down menus, no color, no graphics. Just AppleWorks from the IIe and IIc world.

The AppleWorks Umbrella
When you look at the AppleWorks add-on industry, you find all the competition and excitement that was supposed to be part of the II GS. AppleWorks has become a frontier for software developers. That's exciting for Apple users.

Take Beagle Bros. Here's a company that gained a following of hackers and programmers because of its utility tools for the old Apple II and Apple II+ computers. Now, seven years later, the company is introducing a line of products which enhance AppleWorks, but demand no reduction in speed, control, or ease of use. Beagle is making big waves, as evidenced by the attention they attracted at AppleFest in San Francisco.

Their products are based on the theory that it's better to stay inside AppleWorks than to leave it. There are nearly one million AppleWorks users who might agree. Beagle Bros.' new Time Out line enhances AppleWorks itself, giving you graphing, spelling correction, desktop accessories, and other tools. These new powers appear within the application, as if AppleWorks always had them. Their Power Fonts program prints files with Macintosh-like fonts on the ImageWriter (and over 50 other printers), without leaving AppleWorks. The results are as good or better than a Mac.

To get this kind of AppleWorks compatibility, Beagle had to play with the AppleWorks program code and change it—a process known as patching. Apple makes this kind of information available to developers. Nondevelopers can get the information from the AppleWorks programmer himself, Bob Lissner. Lissner started a bulletin board service that users can call and download AppleWorks programming data. With all this patching going on, AppleWorks has become much like an umbrella, under which other software is written. Soon, the best software on the Apple II computer line will require AppleWorks.

Passport, Please
Apple introduced a product, originally called Passport, which converts data to and from MacWrite format and (you guessed it) AppleWorks. Not only does the program let the Macintosh read a ProDOS-formatted disk (amazing in itself), but it also translates AppleWorks files to the Macintosh—and Macintosh text files to AppleWorks. Another breath of life into the Apple II. Now businesses that already use the Macintosh for desktop publishing and other Mac-specific applications can use an inexpensive Apple II for their second, third, and fourth computer.

Passport was originally available through the Apple Programmers and Developers Association (APDA)—contact the A.F.P.L.E. Co-op at 290 SW 43rd St., Renton, WA 98055 for membership information), but will be shipped with every Macintosh in the future. Apple is not shipping Passport with Apple II computers. That's strange, for the program is most valuable as a translator from the Macintosh to AppleWorks—not the other way around.

Other Apple II developments: Look for someone to introduce a LaserWriter interface for the Apple II soon.

Christopher Van Buren
The Sky's The Limit

Apple has dollars in its pockets. Over $600 million, to be exact, according to the company's just-released third-quarter report. That money comes from an increase in both sales and income over the same quarter last year. With jumps over last year of 42 and 65 percent, respectively, net sales rose to $637 million, resulting in a net income of $53 million.

According to the report, close to half of that sales amount came from new products—those introduced in the last 12 months. (Three new computers have been released in that time—the Apple IIGS, the Macintosh SE, and the Macintosh II; the Mac II could not have had a major impact on sales, however, due to its low level of production in the third quarter.) International sales accounted for 32 percent of all revenues, ascribed to brisk Macintosh overseas sales.

Apple is cash-rich, according to the report, which lists cash and temporary investments at nearly $624 million. But that's down $78 million from last quarter because of a continued policy of repurchasing Apple common stock and a large increase in inventories to $191 million. The huge inventories (up 55 percent over last quarter and up 90 percent over the same quarter last year) indicate that Apple believes it will sell more computers this fall and into the Christmas season, traditionally the strongest selling season.

What's Apple doing with all this cash? Perhaps nothing. The company has built up this enormous cash reserve over several years, and hasn't devoted large chunks of it to any one project or purchase. On the other hand, with that much money, almost anything's possible. Some of it could be used to buy software companies and their products for Claris, the new software arm of Apple. Already, Apple's strategic investment group has invested in four firms, ranging from Sybase, maker of a relational database product, to Forethought, developer of PowerPoint, the desktop presentation package.

Another way to spend this money may be research and development, where $48 million was spent last quarter; R & D's funds could be increased dramatically to search for and create Apple products for the 1990s and beyond.

Online Art

CompuServe's forums contain hundreds of Apple II and Macintosh programs for its subscribers to download. One particular dazzling program for the Apple IIGs, a program that's just part of an ambitious graphics project CompuServe has embarked upon, is SuperHiRes Converter.

Want to view an Amiga-created Deluxe Paint II picture—on your IIGs? Or take a look at an Atari ST graphic made with DEGAS Elite? What about sneaking a peek at the hundreds of digitized pictures Macintosh owners have been making for years with Thunderscan and MacPaint?

CompuServe's GIF (Graphics Interchange Format) project—a proprietary picture format and accompanying conversion utilities for computers ranging from the IBM and Macintosh II to the Atari ST, Amiga, and Apple IIGs—is partially complete. With the proper utility programs, all available on CompuServe in the PICS forum, you can view a large number of computer works of art created on a wide variety of computer systems.

The Apple IIGs program can be found in Data Library 1 of the PICS forum as SHRCNV.BNY. Download and convert the file from its Binary II format (look for a file called BLU.EXE in DL10 of the Apple II area of MAUG, the Apple/Macintosh-specific forum of CompuServe: BLU is necessary to convert SuperHiRes Converter) into a runnable application.

Pictures can be found in PICS and in some of the machine-specific forums on CompuServe. Look for any files marked with the .GIF extension.

SuperHiRes Converter works in native mode, that is, as a IIGs program complete with menus, resizable windows, and mouse support. Documentation is virtually unnecessary, as most people can figure out how things work with just a little experimentation.

SuperHiRes Converter works wonderfully, and, in short, tests here, it successfully converted pictures originally created on an Atari ST with DEGAS and on a Commodore 64 with FlexiDraw. The results were stunning. Colors and shading seemed true to the original; in one case, in fact, the picture seemed brighter on the IIGs than on the original computer.

At this writing, SuperHiRes Converter only displays pictures; its Save feature, required before Apple IIGs artists can upload their own artistic endeavors, was not working. But by the time you read this, the GIF project should be complete, and Apple IIGs owners will be able to add their work to the growing gallery of online art.

Originally drawn on an Atari ST with DEGAS, "Bubble Bumpers" was electronically transferred to an Apple IIGs and converted with SuperHiRes Converter, the GIF-specific utility found on CompuServe.
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Making II GS Music

Rick Parfitt

The Apple II GS holds the promise of sophisticated sound and music capabilities. Has that promise been kept? The author, a designer of music software, says the answer is a resounding "yes."

Your computer sits in front of you. As you type a letter, your fingers begin tapping out a beat, a rhythm for a song. The computer has helped you process words for years—but why stop there?

If only there were a way to capture those taps and transform them into a rhythm for a song you’ve been wanting to write. The computer could play back the captured rhythm, or even become a musical instrument itself.

Enter the Apple II GS, a unique computer, capable of playing 32 different instruments simultaneously. In addition, the II GS offers 16-color graphics and a mouse for input. With the right software, this machine can compose, record, and play music.

The sound capabilities of the II GS are impressive and extensive. In fact, the II GS contains a computer within the computer. Inside every II GS is a special processor for turning digital information into sound. This processor, or special purpose sound computer, can control up to 32 different oscillators. Each oscillator can play a different note or sound like a different instrument. Apple licensed the processor from Ensoniq, a popular manufacturer of music synthesizers. Ensoniq’s Mirage electric keyboard has internal hardware similar to the II GS, but sells for $1,700.

Sound created by the II GS is normally heard on the internal speaker, but for better sound quality, an audio output jack is provided. The sound quality is enhanced when the audio output is connected to a home stereo system. An add-on card is even available from MDIdeas to give the II GS stereo output. The stereo card can be used to individually direct the output of each sound oscillator to either the left or right stereo channel.

There are several ways to write your own music software for the II GS. Unfortunately, the current version of Applesoft BASIC doesn’t address the computer's firmware (the instructions written permanently into its ROM) for using the sound hardware. Still, there’s hope. Rumors are circulating about a new ProDOS-16 BASIC—a BASIC able to access such things as the sound hardware. Until then, you'll have to write music programs in C, Pascal, or machine language, or any other language which permits direct ROM access.

The II GS comes with a sophisticated set of software called the Toolbox. Inside the Toolbox is Tool25, the note synthesizer. With this tool, and any II GS standard sound file, you can write an elementary program to play notes. Simple subroutine calls are made to the NoteOn and NoteOff routines. The note synthesizer interface simulates a typical MIDI synthesizer (MIDI is a universal interface for linking computers and musical instruments—see sidebar for a more complete description of MIDI). The Apple II GS Technical Reference Manual contains a full description on how to load and call the note synthesizer.
Music Software
For The Computer

Today, there’s a wide range of music software available for personal computers. You can edit and compose music using standard musical notation, record a live performance directly into the computer using the MIDI interface, and design and create your own sounds.

With one category of software, note editors, the computer becomes a composition tool, helping people write musical scores. Many of these composition programs can even play the composition and print the results. Music Construction Set, from Electronic Arts, and The Music Studio, from Activision, are music composition programs available for the Apple IIgs.

Another category of music software, sequencers, turn the computer into a sophisticated tape recorder that includes editing capabilities. An electronic keyboard is attached to the computer through a MIDI interface. The keyboard is then played and the notes are recorded by the computer. Recorded sections of the music are called sequences, which can either be spliced together or individually edited. Examples of this type of software are Master Tracks and MIDI 8 Plus, both from Passport Designs. These packages, previously available for the eight-bit Apple II line (Apple IIe, IIc), have been upgraded to work with the Apple IIgs.

MIDI

MIDI (Musical Instrument Digital Interface) was adopted as an international standard in 1984 by several electronic musical instrument makers. The MIDI standard allows different instruments, computers, and device controllers to communicate with one another over a common interface. Using MIDI, a computer can record input from a MIDI instrument and send output to a MIDI instrument. With the right software, an Apple IIgs, and a MIDI interface, you could write a symphony and play it back via synthesizers.

A MIDI keyboard connects to your computer just like a printer or other peripheral. Hook a MIDI keyboard to your computer, and suddenly all the precision and data-handling ability of the computer is at your disposal. The power of MIDI comes from both its simplicity and universal acceptance.

Any MIDI adapter box compatible with the Macintosh, such as Passport’s MIDI interface, can be used on the Apple IIgs. A MIDI keyboard, an adapter box, and two inexpensive cables are the only hardware required to use MIDI on your new Apple.

Sending information over MIDI is like sending information to a printer. Like the letters of the alphabet, piano keys of a MIDI keyboard are mapped to a set of numbers. Any key on the keyboard can be turned on or off from software by a simple sequence of three bytes. The first byte is the key on command; the second byte is the key number (60 for middle C, 61 for C-sharp, and so on); and the third byte is the volume at which to play the note. Sending a zero volume turns a note off. With a computer and MIDI, complicated (even humanly impossible) music is now often surprisingly easy for anyone to create.

One advantage of using a computer to record MIDI data is that the playback speed can be different than the recording speed without affecting the pitch of the notes. It’s simple to record a piece slowly and then increase the speed on playback. A great variety of other modifications to a piece are also quite easy with sequencers: inversions, various kinds of transposition, merging, automatic variations, selective or randomized permutations, and many other transformations. Composers are now able to easily test their ideas using a variety of instrumentations and alternative arrangements.

Sound editors/librarian software manipulates and stores information about different synthesized or digitized instrument sounds. Sounds generated by the Apple IIgs can be captured, or digitized, using a hardware product from MDI ideas called the Supersonic Digitizer. The Music Studio software also allows the user to edit the already digitized sounds available on the Apple IIgs.

When a MIDI interface is connected, the computer can load, store, and edit sounds stored in keyboards from such companies as Ensoniq, Yamaha, Casio, and others. Librarian programs solve the data management problem of tracking large sound libraries. For example, there are over 3,000 different instrument sounds available for the Yamaha DX7 keyboard, yet it can internally store only 64 at one time.

At this writing, however, there are no sound editors/librarians available for the Apple IIgs. (Several are available for Apple II and Macintosh computers.) Undoubtedly, similar software will be available in the future for the Apple IIgs.

Here And Now

More software is appearing all the time for the Apple IIgs, software that turns the computer into a musical instrument. One such pro-
program, *Instant Music*, from Electronic Arts (see sidebar “Jamming with *Instant Music*”), lets you play along as the computer plays a song.

With the large library of educational software available for the Apple II, it’s not surprising that programs already exist to teach the rudiments of note composition and music theory. Since the Apple IIGS can run almost all Apple II programs without modification, it has an instant collection of usable software. Some of the better programs will certainly migrate to the II GS system over time.

**Anatomy Of A Music Program**

*The Music Studio*, a program produced by the author, is an example of what can be accomplished when the Apple II GS is used as a music processor.

The program automatically loads from a 3½-inch disk. Typical of the menu-driven software that’s appearing for the II GS, there’s little need for the instruction manual once the program is loaded.

Activision’s *The Music Studio* can show an instrument’s ADSR (Attack-Decay-Sustain-Release) envelope as a graphic on the screen.

*Music Studio* begins with a grand staff in the middle of the screen (a grand staff is the term for the horizontal bars on which notes are placed in musical scripts). Moving the mouse moves a note around the screen; every time the mouse button is pressed, a note is pasted to the staff. Writing a song is as simple as pointing and pressing. (Of course, writing a good song, as always, requires not only the computer and software, but also talent.)

The top and bottom of the screen contain two menu bars for selecting a variety of features. Choosing the note box at the top of the screen causes a submenu to pop out. Different note values, from a 30-second to a dotted whole note, may be selected. Notes can be added and deleted, from anywhere in the song, with the mouse.

Everything is graphically displayed. With 15 colors to work with, notes can be shaded to represent different instruments. A quartet can easily be written by combining four different instruments which may all be played back simultaneously for the grand effect.

Twenty-four columns of music may be edited on the screen at one time. A graphic slider is used to randomly move to any location in the song.

Notes may be dotted, tied, triplet, accidental, or accented. The tempo and volume of a song may be set to a number of different values which are displayed in traditional Italian music notation.

**Jamming With *Instant Music***

Music composition software is impressive, especially for the Apple II GS, but there are those of us who have never been near a keyboard, fret, or mouthpiece in our entire lives. Placing notes on a staff (the notation is enough to scare us off, isn’t it?) may be an effective and efficient way of, as Rick Parfitt says, *music processing*, but it doesn’t make us composers. What’s needed to get the rest of us started is something simpler, more intuitive, and most important, fun right out of the box.

*Instant Music* from Electronic Arts is the program musical morons like us have been waiting for. It’s laughably easy, lots of fun, and ready to rock ‘n’ roll as soon as you have the shrink-wrap off the package.

*Mousejamming* may be the new word for your Apple II GS lexicon. It refers to the what you use to jam with the best computerized musicians since Electric Light Orchestra. The process almost takes longer to describe than to try out.

Since *Instant Music* is menu- and mouse-driven, all you have to do is load a background song (actually more like a musical template, since it includes everything from the notes to the instruments), click in the tiny mouse icon, start the music, click on one of the four instruments at the bottom of the screen and begin to cook.

Press the mouse button and move the mouse up and down. Slow. Then fast. As the mouse moves, so does a cursor on the screen. That, in turn, produces notes. The higher the cursor, the higher the pitch. Bring the cursor down and the pitch falls. You can play with, above, or around the base tune; switch instruments with a click of the mouse button; and change volume or tempo.

The sound from the II GS is fair—plug a pair of headphones into the port at the back of the computer and the sound improves tremendously. *Instant Music* works with MDIdea’s Supersonic Stereo Card to produce stereo sound that can be sent to a home stereo system or headphones. It’s not phonographic quality, but it’s close. But then, you can’t jam with the tunes on your favorite album, can you?

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How Computers Make Sound

How is it possible for a II GS, or any computer for that matter, to make sound? The mechanical end of the process is pretty simple. Many personal computers, including all of the Apple II series, have a small speaker mounted just inside the computer. The Apple IIe, for example, makes sound by sending a simple series of on and off signals to its internal speaker. Or you can sometimes connect a computer to a home stereo system. A series of electrical waves is sent from the computer to the stereo. The speaker amplifies the signal before sending it to a loudspeaker. When the electrical signals reach the speaker, they drive a magnet which makes a paper cone in the speaker vibrate. In turn, this causes the air to vibrate—we perceive the sound when the air vibrates on our eardrum.

There are two basic ways to create the electrical signals that produce sound from a computer—digitizing and synthesizing. The II GS is designed to play digitized sounds, but it can also play synthesized sounds.

Ordinarily digitized sounds are recorded (sampled) at the factory and stored as a set of numbers in a machine's ROM memory. When the sound is played back, the numbers are converted back into electrical pulses which closely match the original sound. Anything can be recorded and played back—from the sound of a Steinway piano to the bark of a dog. The realism of digitized sounds can be amazing. In theory if a sound is carefully digitized it’s impossible to tell the difference between the original and digitized sounds. In practice, however, it’s extremely difficult to digitize all the sounds of an instrument exactly. Although it’s been done, sampling all the complex waveforms produced by a grand piano is not an easy task. Many other instruments, drums and flutes for example, are very easy to digitize.

But to capture the nuances of complicated acoustic instruments like pianos and violins (not to mention the human voice), a great amount of computer memory is required. To accurately reproduce the sound of a violin the data must be recorded at 40,000 samples a second. One second of violin sound could, therefore, consume 40,000 bytes. The problem is compounded because violin notes must be sampled over a range of octaves to capture the different qualities of the instrument at various pitches. Because of the memory-intensive nature of digitized sounds, it’s easy to understand why the sound chip on the II GS has its own built-in 64K-memory buffer.

Synthesized sounds, on the other hand, create sounds from a collection of artificial sonic building blocks. One starting point for a synthesized sound is a sine wave, a simple pattern of gentle, repeating waves. A sine wave sounds like a flute. However, by changing the shape of this wave you can generate all other sounds. The wave is generated through a set of rules (sometimes called parameters) which can be thought of as a mathematical formula. Yet some sounds are so complex that it’s hard to find a set of rules to generate the sound. An added complexity is that the wave pattern of some instruments changes as a note is held.

Since synthesized sounds are controlled by parameters, they typically require much less memory than digitized sounds, but far more sophisticated software.

Sections of a song may be highlighted for block editing. Some of the block-edit functions are copy, move, delete, transpose, and change duration. At any time the song may be automatically transposed into any one of 15 major or key signatures. Measure bars and time signatures may also be selected.

When the song is complete, or anytime during editing, the computer can play back the composition. When a MIDI adapter is installed, output can be directed to the MIDI interface. A special MIDI dialogue box is an option available for controlling MIDI channel numbers and MIDI instrument selections.

Instruments are not limited to the 15 that load when the program begins. Another option is the ability to design your own instrument by changing the parameters of an existing digitized sound.

The computer, much like a word processor, is turned into a music processor. A composition, once it's been entered, may be edited to perfection. The finished results may be played or sent to the printer for a copy of the musical manuscript.

Computers have only recently started helping make music. A new musical world remains to be explored.

Rick Parfit has spent the last five years designing music-related software. He is founder and President of Audio Light, Inc., a company which designs and develops such programs as The Music Studio (Apple II GS) and Paintworks (Atari ST). He plays various instruments, including guitar, keyboard, and accordion.

Musical Products For The Apple II GS

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Study German. Learn to type. Improve your chess game. Figure out those gadgets on your new 35mm camera. Whatever you want to learn, chances are your Apple can help. Here's a look at just some of the impressive self-teaching software you can find for Apple II and Macintosh personal computers.

Teachers don't need to worry about their jobs. Computers aren't likely to replace them in the classroom. Until recently, some people were predicting schools where computers taught and technicians replaced educators. This theory has vanished. In its place is a more realistic view of computers and their appropriate role in education.

Enthusiasm has replaced fear. Computers have become allies, not adversaries. Perhaps more than any other trend, the increasing acceptance of tutorial software in the schools demonstrates this new alliance.

Less obvious, though, are the many opportunities for using tutorial software at home. While some families still wonder what you really can do with a computer, others supplement their children's school work with motivating educational games and tutorials.

When schedules or school budgets prevent students from taking the extra courses they'd like, home-study software can fill the gap. Students who seek a greater challenge may find it just a keypress away, ready at any time to help them explore new interests, develop new hobbies, or learn new skills. Adults can study accounting or Braille or computer science or French without the pressures associated with structured college or adult-education courses.

Best of all, learning by computer is fun.

So when the fall doldrums and winter blues set in, when the kids renew their cries of What's there to do?, or when reruns dominate the television schedule, why not consider the benefits of a little self-improvement? One of the following programs may be just what you need.
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Teach Yourself Chess

Learning to play a game as sophisticated as chess can be a humbling experience. Repeated defeats at the hands of a helpful but proud friend can devastate the most healthy ego and make the game seem hopelessly complex.

Fortunately, there's a more humane way to learn. A few hours with Paul Whitehead Teaches Chess (Apple II series) will introduce you to the basics and turn you into an experienced intermediate-level player while leaving your dignity intact. That's one of the greatest benefits of computer tutorials—the computer never scoffs, chides, insults, or tells tales afterward.

And you get to study with the best. Paul Whitehead is an acknowledged chess master and American chess champion. He knows the game and presents its rules and strategies in a simple and organized manner. You control what you learn and how fast you progress through the carefully sequenced screens.

Paul Whitehead Teaches Chess introduces you to the basics of the game and can turn you into an experienced intermediate-level player.

Included with the program is The Coffeehouse Chess Monster, a powerful computer-based chess game. In fact, the Monster sounds worse than it is. It lets you change your moves at any time, and even warns you about its intentions so you can foresee the traps it sets. When you feel hopelessly lost, the monster will gladly switch sides. If that's not enough, just hit one key and it'll play dumb by reverting to Level 1, a beginner-level of play.

The Monster is a cooperative opponent. When you feel comfortable with it, you'll be ready to challenge a friend who is likely to play far more monstrosely.

Jeremy Silman's Guide to Chess Openings (Apple II series) takes up where Mr. Whitehead leaves off. This program provides advanced instruction for the truly addicted chess fan. It teaches how to initiate and counter strong opening gambits.

Study Philidor's Defense, the Latvian Gambit, or the Pirc Defense. Whether you're playing white or black, Mr. Silman's tutorial uses popular attacks to highlight common defensive mistakes. Then he suggests better moves that could prevent the embarrassment of losing within a few opening minutes.

This program also comes with the Monster, so you can test your new knowledge against one of the most powerful computer-chess games available. Best of all, if you lose, who will know?

Celebrate The Constitution's Bicentennial

Mindscape's Understanding the U.S. Constitution program (Apple II series) represents the best of the traditional tutorial genre. Although the program uses no graphics, its mix of challenge and reward is just right to lure users from one lesson to the next as they learn and enjoy.

What is a writ of habeas corpus? Which government entity has the power to impeach a President? How old must a candidate be to run for the Senate? This tutorial answers those questions and many more.

Ten self-paced lessons cover duties of the legislative, executive, and judicial branches of government as well as the contents of the constitutional amendments.

Each question set may be studied in either Learning Mode or Testing Mode. The former poses questions and provides help as needed. A memory aid appears onscreen to reinforce an answer after the question has been missed three times.

When you're up to it, you can test your knowledge with Test Mode. A software-controlled clock times each session, so you can race against yourself or challenge a friend. Final results can be printed out for future reference.

Whether at school or at home, this tutorial makes learning rewarding and entertaining. The fact that 1987 marks the 200th anniversary of the writing of our Constitution adds special significance to this package.

Learn To Type

The pervasiveness of computers at school, work, and home has divided us into two distinct groups—people who can type and people who wish they could. Keyboard skills have become an near-necessity for anyone who wants to access databases, create spreadsheets, or produce written material of any kind. Those without proper skills often find themselves hard-pressed to compete.

MasterType (Apple II series/Macintosh), originally released by Scarborough Systems but now distributed by Mindscape, will make you eager to learn what you thought would be so difficult.

Designed for ages 7 to adult, it begins with an explanation of the home-row positioning and of the keyboard. In actual practice, the interactive screen display subtly draws your attention to the monitor and away from the keyboard.

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in your learning, you'll appreciate the regular feedback offered in all the program's modes. MasterType calculates words per minute and maintains high scores for pinball enthusiasts who insist on setting ever-rising game scores.

Even advanced typists will benefit from practicing with MasterType. The versatile space game lets you control keys to be tested, length of words, and the speed of presentation. A maximum possible speed of 760 words per minute assures a challenge for most. Practice may not make perfect, but when it's this much fun, it sure can't hurt.

Play A Guitar
Guitarists and aspiring guitarists will appreciate Baudville's Guitar Wizard (Apple II/Mac). It plays no games and makes no music. Nor does it teach in the expected sense. Instead, it serves as a powerful reference tool to assist anyone who plays stringed instruments.

Four different sections provide information that's hard to find anywhere else.

What's the proper fingering for the D-flat chord? "Chord Wizard" displays it in normal position or any other location up to the twelfth fret. A-minor, C-sharp, D-minor 9—simply select the chord, and the program immediately shows how to play it. If you want, you can print the screen display for future reference.

"Scale Wizard" shows how to play the scales in any key. Whether it's major scales for beginners or minor, pentatonic, or blues scales for experienced players, all are easily available.

Need to know all fret positions of G-sharp? "Fretboard Wizard" displays any scale or any chord in all of its available locations at once.

"Fretboard Wizard" even supports other popular stringed instruments. Retune to match your banjo or bass guitar, and scale and chord information adjust to that instrument. You can save your tuning configuration for future use or load built-in data for specially tuned guitars or similar instruments.

Over all, Guitar Wizard provides just the help musicians are likely to need. The program functions well and supports printouts for its displays. You'll need to start with a basic understanding of music, but as a handy tutorial and reference tool on chords, scales, and harmony, it delivers the right stuff.

Take Good Photographs
Anyone who has ever purchased a full-featured, 35mm camera knows how intimidating its odd collection of buttons, knobs, dials, and levers can be. For those who don't know an f-stop from an ISO, Camera Simulator (Apple II series) offers some helpful guidance.

This step-by-step tutorial explains everything from focusing to troubleshooting. A series of seven short, interactive lessons guides you through the maze of technical jargon to a clear understanding of how to produce good photos. Lessons covered include An Introduction, The Rangefinder, The Shutter, The Aperture, Exposure and Film Speeds, The Light Meter, and Troubleshooting.

The program turns an Apple II computer into a camera simulator that "develops" each shot, good or bad, and analyzes the result. Practice as long as necessary. This teacher never gets impatient or critical, and poor shots cost nothing.

As a supplement to your camera's manual or as an introduction to the principles of photography, Camera Simulator has much to offer.

Become Mr. Science
Broderbund's award-winning Science Tool Kit series (Apple II series) can spark the imagination of even the most reluctant scientist, young or old. To date, the series includes three packages, each of which contains a program disk, a User's Manual & Experiment Guide, and devices of various sorts.

The Master Module is required for all the other modules. It includes an interface box for connecting scientific probes to the computer, as well as a thermometer for measuring temperatures from 10 to 140 degrees Fahrenheit and a photocell which measures light intensity.

The program disk controls both probes and adds two other useful computer-based measuring devices: a highly accurate stopwatch and a strip chart for tracking changes in temperature or light intensity over a period of time.

The Speed and Motion module turns an Apple II into a speedometer (shown here) and a tachometer.

All of this, plus a thoughtfully written manual full of intriguing experiments, makes the package a sure winner for both school and home users alike. The school version even includes a lesson plan for each experiment.

Two supplements to the Master Module offer hours of additional learning fun. Module 1: Speed and Motion comes with an additional photocell and software that converts an Apple II into a speedometer and a tachometer. It also contains a balloon-powered car which, believe it or not, can be converted into a pendulum device. Several experiments help students investigate the principles of jet propulsion, while others consider pendulum motions.

Module 2: Earthquake Lab adds a simple seismoscope to your computer-based science lab. Its manual explains the origin of earthquakes and suggests three experiments to demonstrate the principles behind them. For instance, one experiment explains...
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**COMPUTE!'s Quick and Easy Guide to AppleWorks™**
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The unchallenged leader in personal productivity software for the Apple II series, AppleWorks is an integrated package combining a word processor, database, and spreadsheet. Precisely because AppleWorks can do so much, it can prove complicated even for a regular user. COMPUTE!'s Quick and Easy Guide to AppleWorks solves that problem, giving you instant access to all the information you're likely to need on a day-to-day basis.

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and demonstrates how engineers have tried to protect the Alaska pipeline from damage as it carries valuable oil through its quake-prone territory.

For fostering an inquisitive spirit and developing creative and logical thinking in students of all ages, Science Toolkit is difficult to beat.

Score High On The SAT

Every college-bound high-school student knows the importance of doing well on the Scholastic Aptitude Test (SAT). Fair or not, many colleges rely heavily on SAT scores as a measure of an applicant’s potential success. And some scholarships are based partly on the results.

Fortunately for everyone who wants to do well on the SAT, several recent studies have shown that students can dramatically improve their scores by studying for the test. The Hayden Score Improvement System for the SAT (Apple II series / Macintosh) offers just the help necessary to improve scores and gain an important edge in the competition.

The Macintosh version includes a 47-page User’s Guide and three disks: A Program disk, a Practice Tests / Verbal disk, and a Math disk. Unlike other SAT preparation programs, this one doesn’t depend upon workbooks and other noncomputer support. In fact, reading the User’s Guide is optional for anyone already familiar with the Macintosh. Boot the Program disk and select Overview for all the instructions you’ll need.

A two-hour pretest, composed of questions similar to those on the SAT, diagnoses areas of weakness and suggests additional work. Five skill-specific modules provide tutorials and practice in vocabulary, reading comprehension, algebra, geometry, quantitative comparisons, and word problems. Two additional practice tests provide a means of measuring your results. Scores are reported on an SAT-type scale of 200–800 points.

The Score Improvement System provides a pleasant and effective means of preparing for the SAT. Who knows? A few minutes of study could make a big difference in your future.

Master A Foreign Language

Computer tutorials cover a wide range of interests and intensities. Only the most dedicated and serious student should consider such comprehensive, computer-based, self-study courses as Apfeldeutsch (Apple II series). Don’t expect arcade games and entertainment here, but if you need to learn German, this course published by Wida Software in London and distributed by Gessler can teach you.

The package includes seven disks, six audio tapes, three paperback manuals, and an instruction guide. Followed judiciously, this 30-lesson home-study course provides the rough equivalent of one year of high-school German.

Each lesson begins with an audiotape of two native speakers introducing conversational segments. Next, you listen to the tape a second time while reading the passage from the accompanying textbook. During a third time through, you listen and read aloud. Through listening, reading, and speaking, you can more easily learn and remember the language.

Workbook exercises provide practice with writing skills, and a disk-based, self-assessment test completes each lesson. The teaching approach uses proven educational techniques, and the system works effectively in a home-study environment. Encouraging results are apparent after the first lesson.

Although the included software sometimes seems a bit unfriendly by today’s standards (it’s copyrighted 1980), the package as a whole is well-planned and reliable. Foreign language teachers recognize Gessler as one of the best producers of foreign-language products. Wida Software even guarantees its disks against any damage, including intentional misuse. What greater assurances could a hopeful student of the German language want?

David Stanton is the computer coordinator for Bolivar Central School District in New York state and has written for several general and educational computing magazines.
Apple Vs. IBM:
The Struggle For The Educational Market
Keith Ferrell, Features Editor

Apple Computer has built an enviable level of leadership in educational computers. So enviable that IBM, Tandy, and many other MS-DOS compatible manufacturers are mounting campaigns aimed at taking over the educational market. Is Apple up to the challenge? Or will IBM and MS-DOS become the coins of the educational realm?

Apple and classrooms—it's been a perfect match since the company's earliest days, which were also, not coincidentally, the early days of educational microcomputing. Lately, though, some observers have seen signs of deterioration in the relationship. Is Apple's share of the educational computer marketplace slipping? Is the company in danger of losing its long-established dominance of the important kindergarten through twelfth grade market?

Some surveys indicate that it is, showing Apple's share of the K-12 market as having declined by several percentage points over the last couple of years. At the same time, the market share held by IBM compatibles—and especially Tandy—has increased dramatically.

Among the compatibles manufacturers, Tandy has been the most aggressive. In 1986, according to a leading computer industry trade publication, Tandy held 19 percent of the K-12 grade market; Apple was reported to hold 47 percent of the market, with IBM at 8 percent.

Whatever the figures, it's clear that Apple no longer has the educational market to itself. IBM's introduction of its Model 25, aimed squarely at schools, has contributed more fuel to arguments that the heyday of Apples in schools may be ending.

What does this say about Apple's future? What does it reveal about the market that Apple had so decisively made its own?

Educational Computing: Created By Apple
First, it demonstrates how much of an effect Apple exerts on the educational market. Apple influences every aspect of our increasingly computerized society, of course, but perhaps nowhere so dramatically as in primary and secondary school classrooms. Many children's first microcomputer experience came on the friendly Apple II computer tucked in a corner of their kindergarten or first grade classroom. Odds were that the first time educators encountered a representative of a computer company, that company was Apple.

The company's openness to outside developers insured plenty of educational software. Part of Apple's genius has been its understanding from the earliest days that there was much good to be reaped from placing computers in schools.

Of course there are huge market benefits to be reaped as well. Education has been among Apple's top markets since the company's inception. And if education was number one for Apple, there was little question that Apple was number one for education.

As David Seuss, president of Spinnaker, a publisher of educational, entertainment, and productivity software, says, "Apple dominates the schools because they've done it right—not from a technical or hardware perspective, necessarily, but by being consistent from year to year, by emphasizing software development and having every software developer in the world writing Apple educational software, by catering to the needs of schools, by publicly supporting computing in schools, and by being first, they've maintained their position in schools."

Getting Down To Business
No healthy business exists in a vacuum, though, and nothing breeds competition like success. Apple's domination of educational computing has lately come under dynamic assault from the MS-DOS front, the IBM clones and compatibles that have made IBM and its relatives the overwhelming choice of the business community and increasingly the choice of the home computer enthusiast.

With an estimated $1.6 billion annual hardware and software educational market, it was only a matter of time before IBM and the clone manufacturers launched an assault on buyers for the educational market.

IBM, in fact, made one early effort with its ill-fated PCjr; then it retreated from the educational hardware market. Despite the failure of the PCjr, IBM maintained an educational presence through its Write to Read program.

IBM Goes Home
While the IBM school market languished, the company and the...
compatibles manufacturers went after the home market in a big way. "In the home, people are highly motivated to do productivity applications," Seuss says. For word processing, databases, financial management, and other applications, DOS compatibles offered both a wide range of software and prices that dropped dramatically while capabilities climbed.

Additionally, many people used IBMs and compatibles in the office and workplace. "People have a strong tendency to want to buy the same machine at home that they use in the office." Another market fell to MS-DOS.

"This leaves the schools somewhat alienated from the mainstream of life. IBM dominates the marketplace, and, because of that, IBM dominates the home market."

The all-business, all-productivity image of IBM and the compatibles is helping those companies in the educational market. One frequently heard argument maintains that children need to be exposed in school to the same computing environment they'll encounter in the "real" world.

The Cost Of Going To School
Price can't be underestimated as a factor in successful marketing to schools. "One of the nice things IBM did for Apple," Seuss says, "was its pricing strategy, which protected the Apple franchise in the schools." As long as IBM-type machines were upper-end business purchases, there was little or no motivation for software developers to port their educational products to the DOS environment.

The arrival of large numbers of affordable clones changed all of that. Once there was a PC in the house, consumer demand for MS-DOS educational software began to climb.

That climb is lately becoming precipitous. Jan Davidson, president of Davidson & Associates, a leading publisher of educational software, notes that the demand for MS-DOS educational programs is accelerating. "Our MS-DOS sales have increased dramatically this last year," she says. "They aren't quite even with Apple, but they're very close."

Davidson launched her company in 1983. "We were one of the first [educational software publishers] to embrace IBM machines." The large home market helped shape that decision. "Because we sell a lot of our software into the home as well as schools, it was valuable to support IBM from the beginning."

For now, price sensitivity is likely to work in Apple's favor. As Cathy Carlston, vice president of educational market planning for Broderbund, a publisher of educational, entertainment, and productivity software, says, "Apple has an extremely well-established share of the market. The school market is price sensitive, and doesn't replace hardware quickly. Apple's market share represents quite an investment for the schools, one that schools will hold on to."

You've Got To Have Software
One of Apple's great educational strengths has been the sheer size of the educational software library that
runson Apple machines. But the number of IBM-compatible educational programs is by now nearly equal to that of Apple and is reflected in industry sales figures.

Seuss cites figures from the Software Publishers Association (SPA), saying, “Industry-wide statistics comparing the [annual wholesale dollar] growth rate of MS-DOS educational software and Apple educational software show that between 1984 and 1986 MS-DOS educational software grew 100 percent. During the same two-year period, Apple educational software grew only 15 percent.”

He adds that the figures are not cut-and-dried: “In fairness, Apple grew 15 percent, to $31 million, and MS-DOS grew 100 percent, to $8 million.” He says it’s easier to accumulate very high rates of growth that translate into dramatic figures when your installed base is smaller. “At the end of 1986,” he says, “Apple was still 80 percent of the sales. Apple is still the dominant machine in the education channel. But IBM is growing very fast, and, if the growth rate persists, it will challenge that dominance.”

High School: The Class Of MS-DOS?

So far, the majority of educational MS-DOS machines are in high schools, with many of those computers in vocational education labs. Many educators cling to the rationale that preparing students for the business environment requires teaching them how to use the dominant computers in that
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<table>
<thead>
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<th>Item</th>
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<tr>
<td>2 Big Blue Printer</td>
<td>199.00</td>
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<td>3 12&quot; 35 MHz Hi-Resolution Monitor</td>
<td>229.95</td>
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<tr>
<td>4 Magic Window IIe wordprocessor</td>
<td>150.00</td>
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<tr>
<td>5 Magica: Spreadsheet</td>
<td>150.00</td>
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<tr>
<td>6 Magic Memory Data Base</td>
<td>60.00</td>
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<tr>
<td>7 Laser 128 Big Blue Printer Interface</td>
<td>19.95</td>
</tr>
<tr>
<td>8 2 Rolls of Heat Transfer Paper</td>
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environment—MS-DOS machines.

Another upper-grade application in which computers are playing a larger and larger part is the teaching of foreign languages. Seth Levin, president of Gessler Educational Software, points out that in this applications area Apple has a clear lead that won't soon be eroded.

"The vast preponderance of language labs are Apple-based," he says. "The labs are already installed with Apple hardware, and schools aren't going to abandon that investment too quickly."

Language instruction also offers Apple a market opportunity. As Levin explains, computer instruction of foreign languages will take a great leap forward once digitized sound, able to reproduce accurately accented speech, becomes available. "At some point the Apple II GS will have an advantage in this area. It's not there yet, technically. But, when it does become viable to put sound in a program, the II GS will play an important part."

There are other reasons Levin sees Apple's educational dominance continuing. "For developers, one of the reasons we keep looking at Apple is the excellent support they give. Apple's technical and other support is far better than the other companies,' although Tandy is improving. But Apple is still the leader in support."

**Is One Machine Better?**

Although productivity applications are increasingly being stressed even in the lower grades, prevocational levels do have needs other than high-level productivity. Does this offer Apple a marketing advantage? Is one machine better than another for younger children?

Jan Davidson notes that the machines have somewhat different personalities for which some adjustments must be made as programs are developed. "We try to give IBM users the same things we give Apple users," she says. "We're certainly limited in colors, especially on the older machines. The new IBM System/2 takes care of that. Otherwise, for each system, we try to make the most of the capabilities we have."

Seuss, on the other hand, sees neither Apple nor IBM as particularly effective for young children. "I don't see what the differences are, from the perspective of a child. Apple does have a somewhat larger color palette than IBM, but it doesn't have nearly the color capabilities of the Commodore 64. Neither IBM nor Apple are particularly good at animation—they don't support sprites, for example. Both have limited sound capabilities. A program you can do on one you, can do on another. I can't personally make a meaningful distinction between Apple and IBM the way I can between either of them and the Commodore 64."

Both Apple and IBM have lately improved their graphics and sound capabilities—Apple with the II GS, IBM with its System/2 line and particularly its education-oriented Model 25. It is clear that both companies understand increasingly well the demands that educators at all levels are making, and equally clear that a battle for dominance of the educational market is currently shaping up.

**Apple's Future In Schools**

Who will win this battle? Apple, with its established leadership in education, or IBM and the compatibles, with their overwhelming numbers?

At the moment, the answer appears to be a toss-up. Apple's support remains unparalleled in education, and is further bolstered by both the trust and the money schools have invested in their computers. With the introduction of the II GS, questions about graphics and sound limitations were rendered moot. For business and vocational classes, the Macintosh is making larger inroads, especially as the Mac itself becomes more and more recognized as a workhorse business machine.

On the other side of the question is the obvious hunger of IBM and the clone manufacturers to cut a piece of the educational pie. Tandy is perhaps the hungriest of them all, bringing to the marketplace a real strength as a result of its nationwide chain of Radio Shack retail outlets.

Underlying the confrontation is the old argument of applications and the need for students to learn computing on the same machines they'll encounter in the workplace. For the next year or two, at least, this is likely to be the area around which most of the battles will be centered.

Ironically, Apple has won many of these battles by default. More and more MS-DOS software comes with Mac-like icons and pull-down menus. It's the rare compatible that hasn't sprouted a mouse port. Point-and-click is as common on MS-DOS programs as on Apple software now.

As a result, the whole operating system argument grows less relevant. The more transparent computers and software, the less it matters which operating system the computer uses.

"What really matters," says Carlson (of Broderbund), "is that children are exposed to quality software on computers that work."

Apple, of course, more than meets that criterion. The company has followed a sensible upgrade path with its machines, providing schools with an affordable path to higher capabilities and more advanced functions.

And there's that huge installed base which schools are not quickly going to abandon. For one thing, there's the investment the Apples represent. Probably more far-reaching is the fact that those hundreds of thousands of Apple machines have served—and are still serving—schools well. In schools, Apple has earned a reputation for excellence of product and support. IBM and the clone manufacturers still have to prove that they can meet the demands schools, school budgets, and students place upon them.

Apple has already proven that it is not only up to that particular challenge, but it is also enthusiastic about challenges in general. Its market leadership may be under assault, but in such a confrontation, as IBM and the others may discover, experience is more than half the battle. For some time to come, the bright Apple logo is likely to continue to be the symbol most frequently seen on computers in our schools.
AppleWorks for Everyone

Christopher Van Buren

In the first of a two-part series, Christopher Van Buren, noted AppleWorks expert, shows how templates—ready-made databases and spreadsheets—can make AppleWorks a dynamic program for the home.

AppleWorks, the premier integrated software for the Apple II, is one of the most versatile programs around. It combines a word processor, database, and spreadsheet into one system, resulting in power far and beyond what you'd find in any single application. Rather than fitting your work to the program, AppleWorks lets you make the software fit the way you work.

Although AppleWorks is found in thousands of businesses and schools, it's just as valuable in the home.

What Is A Template?

Chances are that somebody has already used AppleWorks to do exactly what you want it to do. If that person gave you a file on disk containing their setup, it would be called a template. Templates are simply predesigned word processing, database, or spreadsheet files.

You'll find two kinds of AppleWorks templates: public domain and commercial. Public domain templates are offered by user groups and other organizations at little or no cost, since the template authors have released the rights to the software. As you might guess, there are hundreds of these public domain templates. The quality ranges from outstanding to nearly useless. Commercial templates are created by experienced programmers and authors.

Figure 1: Simple Budget

<table>
<thead>
<tr>
<th>File: Budget</th>
<th>January</th>
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<td>1440</td>
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</table>

Spreadsheet budgets for the home don't have to be complicated.
and are usually of better quality. But since they’re written with the intent of turning a profit, they cost more than public domain templates—expect to pay from $9 to $99 (or more).

**Figure 2: Public Domain Budget Template**

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A20: (Label, Layout-L) Contrib

Type entry or use commands

This template from an AppleWorks User Group public domain disk provides a comprehensive list of expense categories.

**Figure 3: Public Domain Check Reconciliation**

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<td>TOTAL</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charges Not Deducted From Checkbook</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deposits Not Added To Checkbook</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

Another template from an AppleWorks User Group public domain disk helps you balance your checkbook.

**Budgets The Easy Way**

Household finances can get involved. AppleWorks, however, is capable of handling almost every household financial matter—from simple budgets and taxes to analysis of properties and investments. The spreadsheet module is best suited for financial applications, serving as a kind of bookkeeping ledger that calculates itself. Many AppleWorks users avoid the spreadsheet, fearing such grim terms as formulas, functions, and cell references. But using the spreadsheet can be quite simple, as the budget in Figure 1 demonstrates.

Most of the work in the Figure 1 spreadsheet template is done by entering the words and numbers into the appropriate columns. AppleWorks lets you adjust the width of the spreadsheet columns and the way numbers appear. The only hard part is adding up the figures to arrive at a total.

The spreadsheet, though, has built-in math capabilities that can do these calculations for you, even do them automatically. With automatic calculation, once you tell the spreadsheet how to calculate the figures, you can go back and change those numbers as often as you want. The new figures are immediately used in the new (and automatic) calculations. This feature is perfect for home budgeting because it lets you play “what-if?” games: You can easily enter various amounts into the columns to see how the bottom line is affected.

But because budgets are very personal things, it’s often difficult to find a spreadsheet template that perfectly meets your requirements. It’s not a problem with numbers—you can always enter different figures into a spreadsheet template—but is more a problem with the particular expense and income items you need to list. One template, however, appears to cover many of the common home expense categories. It’s one of the many AppleWorks templates found in the public domain library of The AppleWorks User Group (TAWUG). Figure 2 shows this template’s expense categories.

The template isn’t very fancy (the formulas are simply additions of columns) but since the templates in the TAWUG library cost only $3, you really can’t go wrong. At the least, you can use this template to save some time in designing your own budget spreadsheet.
**Figure 4: Personal Balance Sheet**

File: **PERSBAL Sheet**

**DATE:** JANUARY 1, 1986

<table>
<thead>
<tr>
<th>CURRENT ASSETS</th>
<th>SHORT TERM LIABILITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHECKING ACCOUNTS</td>
<td>$2,000.00</td>
</tr>
<tr>
<td>SAVINGS ACCOUNTS</td>
<td>$5,000.00</td>
</tr>
<tr>
<td>PREPAID RENT</td>
<td>$2,000.00</td>
</tr>
<tr>
<td>PREPAID TAXES</td>
<td>$2,000.00</td>
</tr>
<tr>
<td><strong>TOTAL ASSETS</strong></td>
<td>$19,400.00</td>
</tr>
<tr>
<td><strong>TOTAL CURRENT TERM</strong></td>
<td>$7,500.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>LONG TERM ASSETS</strong></th>
<th><strong>LONG TERM LIABILITIES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HOUSE</td>
<td>$135,000.00</td>
</tr>
<tr>
<td>FORD AUTO MARK VALUE</td>
<td>$11,000.00</td>
</tr>
<tr>
<td>BUICK AUTO MARK VALUE</td>
<td>$32,000.00</td>
</tr>
<tr>
<td>HOUSE HOLD INVENTORY</td>
<td>$52,000.00</td>
</tr>
<tr>
<td><strong>TOTAL ASSETS</strong></td>
<td>$200,400.00</td>
</tr>
<tr>
<td><strong>TOTAL LIABILITIES</strong></td>
<td>$125,086.00</td>
</tr>
</tbody>
</table>

**TOTAL NEEWTWORTH:** $74,514.00

This personal balance sheet is just one of the templates included on a disk from Personal Computer Applications.

**Figure 5: Loan Calculation Template**

<table>
<thead>
<tr>
<th><strong>USE ON X THRICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOAN CALCULATIONS</strong></td>
</tr>
<tr>
<td>To 1st Principal</td>
</tr>
<tr>
<td>Payment</td>
</tr>
<tr>
<td>Interest (APR)</td>
</tr>
<tr>
<td>Interest (1st)</td>
</tr>
<tr>
<td>Payments per Year</td>
</tr>
<tr>
<td>Number of Years</td>
</tr>
<tr>
<td>Loan</td>
</tr>
<tr>
<td>Balloon</td>
</tr>
<tr>
<td>Current Period</td>
</tr>
<tr>
<td>Principal Paid</td>
</tr>
<tr>
<td>Balance</td>
</tr>
<tr>
<td>Accrued Interest</td>
</tr>
</tbody>
</table>

**The Q-mar group offers a disk which includes, among other templates, this loan calculator.**

**AppleWorks Checks And Loans**

Besides playing what if with a budget, you can use AppleWorks to reconcile your checking accounts. The database is a good choice for this application—although it can also be done with the spreadsheet.

After entering your checks into the database, you can sort them into various categories for tax preparation. You can also total the checks in any or all categories. For example, you could find the total of all checks written to Wilshire Hospital, locate all checks written for medical purposes that are over $200, or identify all checks written to Wilshire Hospital or Doctor Jacobson. The searching, selecting, and sorting capabilities in AppleWorks' database are as powerful as most large business databases—and they're definitely easier to use.

Loan calculations, on the other hand, are commonly made on spreadsheets. You can use the spreadsheet to figure the payment schedule on a loan, the remaining balances during any term of the loan, the number of payments, the amount of interest, and so on. This can be handy for checking the accuracy of a lender's interest calculations. Some of the more elaborate spreadsheets can calculate your earnings on stocks and bonds, compare loan rates, figure an amortization table on a loan, and more.

There are several premade templates, both public domain and commercial, that handle check registers, loan calculators, and other personal financial tasks. The TAWUG public domain library has a template (Figure 3) which acts as a worksheet for balancing your checkbook. (It doesn't actually hold the check register; it simply helps you balance it.) This worksheet is on TAWUG's disk 46; another can be found on disk 33.

TAWUG's disk 5 contains a bond portfolio that tracks the issue dates, terms, and amounts of bonds held. And disk 6 has a template that analyzes income property to show if you've lost or made money, and how the expenses break down.

A commercial check register can be found on the collection of personal financial tools from Practical Computer Applications. The disk, which contains several templates, costs $24.95. Other templates on the disk include a worksheet for bills, a loan payment analyzer, a worksheet for examining present and future values of saving accounts, a personal balance sheet (Figure 4), and more. This disk covers the entire range of personal financial matters and can be a great aid in your own template efforts.

The Q-mar group publishes a commercial checkbook template,
Database creation—locating information from a variety of sources, collating it, and organizing it—can be an educational experience for junior-high and high school students.

along with a collection of other templates, for $12.95. Q-mar's checkbook template includes both the register and the reconciliator. Other files on the disk include a loan calculation tool (Figure 5), a worksheet for determining sales commissions, and other nonfinancial tools.

Works Access publishes a personal finance template disk called Home Money Works. It contains a checkbook manager, budgeting, financial planning, home inventory, and a billing reminder template—all for $25.

Death And Taxes
Tax planning and preparation can be one of the most challenging spreadsheet applications. Luckily, some people have already done the work for you. Some tax templates actually print your tax forms right from AppleWorks. After you enter the raw data into such a spreadsheet template, it calculates amounts, looks up information in tables, and creates forms. 1040Works from Personal Financial Services is one such template for AppleWorks.

AppleWorks templates are widely available. If you're prepared to customize a template and you know enough about the spreadsheet and database, start with the public domain templates. But if you want a template that does everything for you, look into one of the commercial template disks.

Presidents, Planets, And Trees
Home education covers a lot of territory, and the AppleWorks database can help with much of it. Anything that requires drawing conclusions from large amounts of data is ideal for the database. Even the simple act of entering information into the database can be educational.

Let's say your child is using AppleWorks to create a database on various countries and their characteristics (Figure 6). The student will have to go to several sources to find the necessary information. In many ways, it's a process of answering questions. When the information is finally entered for several countries, the student can arrange the data in many ways—finding all countries in the Southern Hemisphere, or all countries that produce oil, or the countries with the largest populations. Arranging information in various ways lets the student draw new conclusions.

As with many of AppleWorks applications, you can find customized templates that contain the information already entered into a database. These templates can help, either by providing a point of reference, or as a comparison to a student's database. ImagMedia Software produces a set of disks that contain this kind of data. In three volumes, the disks contain information about presidents, planets, animals, trees, inventions, and much more.

Sources For AppleWorks Templates

The AppleWorks User Group
Box 24789
Denver, CO 80224
Maintains a library of public domain AppleWorks templates. Each disk contains several templates and costs $3. Ask for a catalog of disks. Public domain templates can be good starting points for your own customized templates.

ImagiMedia Software
16640 Roscoe Pl.
Sepulveda, CA 91343
Produces FactWorks, a three-volume set of encyclopedia disks for the AppleWorks database. Will provide lists of files on each disk at request.

Practical Computer Applications
2323 Tucker Ct.
Santa Rosa, CA 95401
Produces two commercial template packages, including personal financial tools and professional financial tools. These template disks are well packaged and are professionally made.

Personal Financial Services
Box 1401
Melville, NY 11747
Publishes 1040Works, one of the best tax templates for AppleWorks. This template does most of the federal tax schedules and prints the forms.

The Q-mar group
5677 Oberlin Dr.
San Diego, CA 92121
Has a catalog full of commercially made templates for AppleWorks, including some for home finance and education. Most come with manuals. Also publishes an AppleWorks newsletter.

Works Access
2636 Churn Creek Rd.
Redding, CA 96002
Publishes templates for various professions, as well as for personal finance. Also maintains a user group for AppleWorks and Microsoft Works users.

Christopher Van Buren is editor and publisher of AppleWorks Exclusive Reference newsletter, and author of several books on AppleWorks.
$10,000.00 Programming Contest!

COMPUTE!s Apple Applications

First Prize $5,000.00 Second Prize $2,500.00 Third Prize $1,000.00

Three Honorable Mentions $500.00 each

COMPUTE! Publications, Inc., a longtime leader in personal computer publishing, is turning its popular semiannual COMPUTE!s Apple Applications into a bimonthly magazine starting this fall. Each issue will include high-quality programs for the Apple II+, IIe, IIc, and IIGS computers, ready for readers to type in and run. Along with the best in Apple software, readers will find feature articles, tutorials, reviews, and other Apple information in the new, expanded COMPUTE!s Apple Applications. We're also offering a companion disk containing each issue's programs, as well as a magazine/disk subscription.

To find the very best original software for Apple II-series personal computers, we're sponsoring a programming contest with $10,000.00 in prize money for the top six winners. In addition, the winners will receive standard purchase fees for publication of their programs in our magazine and royalties if they're republished in COMPUTE! books.

Even if your contest entry doesn't win a prize, you'll still earn purchase fees if we accept your program for publication.

Interested? If so, here are the rules:

1. Entries must be your original work, previously unpublished in any form. All those whose programs are accepted will be required to affirm this in writing.
2. You can submit as many entries as you want, but we cannot consider programs which currently are entered in other contests or are submitted for publication elsewhere.
3. The contest deadline is December 31, 1987. All entries must be received at our offices by this date. Programs submitted after this date will still be considered for publication, but will not be entered in the contest. If we purchase an entry for publication before the deadline, the entry is still eligible to win.
4. Entries are allowed (and encouraged) in virtually all software categories: home and business applications, education, recreation, telecommunications, graphics, sound and music, and utilities.
5. Entries may be written in either Applesoft BASIC, machine language, or a combination of the two. All possible efforts should be made to insure that an entry runs under both DOS 3.3 and ProDOS. Programs must be of a publishable length—BASIC and machine language program listings are printed in COMPUTE!s Apple Applications. Although this length is quite flexible, it's unlikely we would publish a BASIC program of more than 12K or a machine language program of more than 6K. Exceptional software which exceeds these sizes will certainly be considered.
6. Entries must be submitted on 5¼-inch floppy disks. If your program is written in machine language, you must submit both the object code and all of the source code required to compile the program.
7. Entries must be accompanied by an article which explains how to use the program and what it does. If your program employs any new or unusual techniques that you think will be of interest to other programmers, you can also describe how the program works. (If you feel that writing is not your strong point, please do not hesitate to enter; this is a programming contest and the entries will be judged solely on the basis of the programs submitted.)
8. Submissions which do not win a prize and are not accepted for publication will be returned only if accompanied by a self-addressed, stamped mailer.
9. Members of the staff of COMPUTE! Publications, Inc., will judge the contest, and all decisions regarding contest entries and acceptances will be made solely at the discretion of COMPUTE! Publications, Inc. All decisions are final. This includes decisions regarding creativity, similarity among entries, and general suitability.
11. This contest is void where prohibited by law. Full-time, part-time, and previous employees of COMPUTE! Publications, Inc., and Capital Cities/ABC are ineligible for the contest, but may still submit work for publication at standard rates.

Every contest entry must include this signed form:

I warrant that the program presently entitled ______________________________ is my own original work and that the work has not been submitted for consideration elsewhere, nor has it been previously published in any form. If my work is accepted by you, I understand that your decision as to the selection of winners and awarding of prizes is final and without recourse on my part. Should you select my submission, I understand that I will receive no payments until I sign your standard contract, which includes assignment of the copyright of the program to COMPUTE! Publications, Inc., and that you may use my name and image in promotional materials and other forms. (If you are under age 18, your parent or legal guardian must sign for you.)

Signature:

Address entries to: Apple Programming Contest
COMPUTE! Publications, Inc.
P.O. Box 5406
Greensboro, NC 27403

COMPUTE! Publications, Inc.
A bimonthly magazine for every Apple II and Macintosh owner. Includes informative features and top-quality programs ready to type in and run.

Millions of Apple personal computers—from the venerable II+ and Ile to the compact IleC and the powerful IleCs—are in homes, schools, and offices across the country. And Apple's Macintoch computers are showing up in more businesses, more universities, and now more homes than ever before. Apple computers are being used for almost everything—entertaining and educating people of all ages, managing home finances, running businesses, writing, painting, composing. Name something computers can do, and Apple computers do it.

That's why COMPUTE! Publications created COMPUTE!'s Apple Applications magazine as a semiannual nearly three years ago. Its informative features, product reviews, tutorials, and type-in programs have made the magazine extremely successful on the newsstands. So successful, in fact, that we're making COMPUTE!'s Apple Applications a bimonthly magazine and offering subscriptions for the very first time.

Whether you use an Apple computer at school to teach or to learn, at home to help organize your household, or at work to keep your business profitable, you'll find valuable applications, information, and news in every issue of COMPUTE!'s Apple Applications:

- **Balanced reviews.** Honest and up-front evaluations of the most interesting software and hardware for the Apple II and Macintosh.
- **Buyer's guides.** Detailed reference guides to new Apple II and Macintosh software and hardware.
- **And more.** Interviews with Apple newsmakers. Comprehensive lists of Apple user groups. Forecasts of the future of computing with Apple computers. Reports from the latest industry trade shows. And in 1988, COMPUTE!'s Apple Applications will begin publishing the winning programs from our $10,000 Apple programming contest!

Look for the December 1987 issue of the new bimonthly COMPUTE!'s Apple Applications available November 1 at your favorite newsstand. Or you can have it delivered to your mailbox six times a year for only $13.95. Each issue's companion disk can be purchased separately for $12.95, or you can take a year's subscription to the disk for just $49.95—you save 35 percent over the single-disk purchase price.

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COMPUTE!'s Apple Applications
P.O. Box 10767
Des Moines, IA 50340

To order a single copy of the magazine, or to order an individual disk for $14.95 (includes $2.00 shipping and handling), please call 1-800-346-6767. (In New York, 212-887-8525.)

COMPUTE! Publications, Inc.
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
Which Apple For You?

Gregg Keizer, Editor

There are more choices than ever. A portable IIc or an expandable IIe? Apple IIgs or Macintosh Plus? Entry-level Macintosh Plus or speedier Macintosh SE? Deciding which Apple computer is right for you depends on several things ranging from what you’ll do with it to who uses it.

It’s not easy buying a computer. Not as tough as buying a new car (you know, after all, what the computer should cost when you walk into the dealership), but not something you rush into, either. This is just as true with your first computer as it is if with your fourth.

At least you know one thing. You’re getting an Apple. You know that much. But which one?

Each of the three Apple II-series machines and the two Macintosh models discussed here offers something different. It might be its price, or its raw computing power, or its software library. But which computer you put on your desk, whether at home or at work, depends on what you want, what you have to have, and what you’re willing to spend.

The Apple IIc: Compact Computing

Inexpensive and portable are two of the better ways to describe the Apple IIc. Even with its monochrome monitor, the IIc is the smallest and lightest model in Apple’s line.

The IIc’s 5¼-inch built-in disk drive, separate power supply, and handle combine to make a transportable computer that can be carried with ease from room to room, from class to class, or from home to work. If you’re moving the computer regularly, you can even buy a carrying case.

For most people, though, the IIc’s small size and lightweight are secondary to its price. The suggested retail price for the IIc and a matching monochrome monitor is $995, but it’s not hard to find the machine substantially discounted. Check with local dealers and watch for special promotions and sales, and you might be able to pick up a complete system—IIc computer, monochrome monitor, and monitor stand—for less than $700.

Of course, the IIc runs all the popular Apple II software, including such stalwarts as AppleWorks, Where in the World is Carmen Sandiego?, MasterType, and The Print Shop, to name just a few of the more than 10,000 Apple II programs. You can also connect a mouse to the computer to use the few mouse- and menu-driven software packages available.

But the IIc’s low price and portability mean some sacrifices on your part. First and foremost, the machine is virtually unexpandable. Because the IIc is in a small case, you can’t call on the same selection of add-on cards (modem cards, memory cards, accelerator cards) that an Apple IIe
owner can. There’s just not enough room in the IIc for these cards; the same holds true for the II GS upgrade that only IIE owners can take advantage of.

You can add a memory card to the IIc, though it means cracking open the IIc case and pulling some chips. Three different sources—Apple itself, Applied Engineering, and Checkmate Technology—offer IIc memory-expansion cards. AppleWorks is the primary reason why you’d want to increase your IIc’s memory, although you can set up the additional memory as a ramdisk for use with other programs or operations.

Because it’s so compact, the IIc doesn’t include a numeric keypad. If you work extensively with numbers, you might want to consider another Apple.

The Apple IIc is the low end of the Apple II line, and for many people, their first computer. It makes a perfect choice if you

- Want to run Apple II software, but don’t want to spend a lot of money
- Need to move the computer regularly, or
- Don’t expect to need more than 128K of memory.

**Apple IIc strengths.** It’s compact and inexpensive, and it can be toed from place to place without difficulty. It includes a built-in disk drive.

**Apple IIc weaknesses.** It’s difficult to expand. The keyboard is small and is without a numeric keypad.

---

**The Apple IIE: Ten Years And Going Strong**

Ask most people familiar with computers to describe an Apple II and they’ll tell you about the Apple IIE. This workhorse of the Apple II line has changed only slightly since its introduction four years ago. It still offers solid computing power in a system that’s eminently expandable.

*Slots* is the key word to remember when you’re considering an Apple IIE. The seven slots inside the computer can hold a variety of add-on boards, each filled with its own special chips and carrying out its own special task. Because of these slots, you can customize your IIE to your heart’s content. You can add memory, a modem, a speech synthesizer, a video digitizer, and more. In most cases, all you have to do is open the case and plug in the board.

The IIE is slightly less expensive than the IIc, with a suggested retail price of $829. However, the IIE, unlike its smaller sibling the IIc, doesn’t come with a built-in disk drive. It also needs cards to use a printer, modem, or even a disk drive—things the IIc can do without expansion. Thus an Apple IIE with one drive and the necessary add-on cards costs more than a similarly equipped IIc.

Why then, should you consider the IIE? Simple—the future.

What you need your computer for now, what you use it for at the moment, is probably not what you’ll do with the computer in two years, or even one. In that time, software may have advanced to the point where the memory inside your machine is insufficient. Or you discover that your business must send files to another computer, and so you need a modem. Or you’re working with a sight-impaired child, and you could use a speech synthesizer.

The flexibility of the Apple IIE is almost without parallel (the IBM PC is the only comparably expandable personal computer). It’s one reason why the Apple II line has lived to see its tenth anniversary. Of course, with the capability of adding boards to the Apple IIE comes the responsibility of knowing what you’re doing. The IIE is not, and isn’t meant to be, a plug-in-and-turn-on kind of computer. To fully utilize the IIE’s power, you have to learn something about the computer and how its software works.

Yet the Apple IIE is an excellent first computer. Better still, an Apple IIE will probably be used longer than a closed computer (one that can’t be easily opened and customized) like the IIc. Choose the IIE if you:

- Think you’ll use the computer for more than one or two tasks
- Know a number of people will use the computer, as in a school or business (the machine just feels sturdier than a IIc), or
- Have special computing needs, such as speech/music synthesizing, video digitiz-
ing, or large amounts of file storage (in other words, you want to use a hard disk drive).

**Apple Ile strengths.** Slots make it an extremely versatile machine. It can be expanded and customized to your exact needs.

**Apple Ile weaknesses.** It has a higher cost relative to other computers. Add-on boards are necessary even for basic operations like printing.

The Apple IIGS: Top Of The Line

Introduced last fall, the Apple IIGS got a lot of attention before fading temporarily from sight. Problems in delivering the computers to dealers—scribed to everything from a shortage of the machine's sound chip to the simple fact that Apple announced the computer long before its inventory was built up—made it seem that you could never get one. Waiting lists for the computer formed.

Now, however, the wait is over. The Apple IIGS is back in the limelight. Apple advertised heavily in educational journals in early summer, and rolled out an impressive, though brief, print campaign in Apple-specific magazines in late summer and early fall. Sales are up.

The Apple IIGS is a hybrid. Although it can run most Apple II-series software (and all the popular programs), it can also run IIGS-specific programs that in most instances bear a striking resemblance to those seen on the Macintosh. This duality makes for an interesting computer. You can play it safe and use the same software that runs on Ile and Ile computers, or you can tackle the more impressive IIGS programs. Or you can do both.

The special features and advantages of the IIGS are evident only with IIGS software; pre-IIGS programs look and feel as if they're on an Apple Ile, though the IIGS's standard RGB monitor has a crisper picture than most Apple users are accustomed to. But with the right software, the IIGS's claim to fame—Graphics and Sound—are quickly apparent. At the moment, graphics quality dominates. Few developers have yet gotten a handle on the machine's sound (for the exceptions, see Rick Parfitt's "Making IIGS Music" in this issue). Paint programs, draw programs, and even word processors let you create in color, using the simple-to-learn pull-down menu and mouse-driven system popularized by the Macintosh. The available music programs are just as impressive, offering stereo sound, MIDI capabilities, and more. Educational programs that use the IIGS's built-in speech synthesis are only just appearing—the feature seems perfect for scores of programs aimed at school-aged children.

A complete Apple IIGS system—computer, RGB color monitor, and two disk drives—retails for $2,196. If you look hard, you should be able to find the system for less than that, but since the computer is the newest in the line, don't expect as much of a discount as with the other Apple II machines.

Another thing to keep in mind is the size of the existing IIGS software base—at this writing, it's small. That's changing, though, as new products are released each month.

The IIGS is being marketed as the Apple II computer to buy, with heavy emphasis on the fact that it's the newest, fastest, most sophisticated II around. The IIGS is a good choice if you:

- Want to use Macintosh-style software and classic Apple II programs on the same computer
- Have young children—for whom great graphics and sound are especially important—who will use the computer, or
- Need to have the best (and most expensive) Apple II computer available.

**Apple IIGS strengths.** It's the newest and the most powerful Apple II computer ever. It offers superb graphics and sound.

**Apple IIGS weaknesses.** This is the most expensive Apple II computer. There is not a great deal of IIGS-specific software yet.
The Macintosh Plus: Enter Power Computing

With the recent elimination of the Macintosh 512K from Apple's line of personal computers, the Plus became the entry-level Macintosh. But the Plus is a far cry from the original Macintosh introduced almost four years ago. Outwardly, there has been little change (other than a change in case color from beige to off-white), but inside things are different. Instead of the first Mac's meager 128K of memory, the Macintosh Plus sports a full megabyte; its single disk drive is double-sided, able to cram a full 800K of files on one 3½-inch disk; and its SCSI (Small Computer System Interface) port allows for speedy access to peripherals such as hard disk drives.

Put these together, add a generous sprinkling of software that can be both easy to learn and impressive in its power, and you have a system that fits the needs of a wide range of people.

The vaunted Macintosh ease-of-use derives from the almost intuitive graphics interface—the mouse-driven method of pointing and clicking, pull-down menus, and clear dialog boxes presenting information and allowing choices. The interface is religiously adhered to by Macintosh software developers. That means it takes far less time to learn the basics of any Macintosh program when compared to the startup time necessary with software on most other computers.

The value of this surface similarity among Macintosh programs has always been underestimated. Not only does it cut down on training time whenever you turn to new software, but it also breeds a familiarity with the computer and its way of doing things. You almost always know how to operate a Macintosh program straight out of the box, and that knowledge makes most people more comfortable with the computer and its programs. And the more at ease anyone is with the computer, the more he or she is likely to use the machine and use it more productively.

General advantages of the Macintosh line aside, this particular model is attractive to anyone who wants the power of the Macintosh at a relatively low price. Although its retail price is $2,199, it's at the bottom end of the three-machine Mac line, so you can expect to find it for considerably less. Dealers often sell the machine for under $1,400, considerably below the going price for an Apple IIGS.

On the other hand, if you'll need color and a need a Macintosh, look into the Macintosh II (a high-end machine that's beyond the scope of this article). The Plus is strictly a black-and-white machine. Sound, another vital part of many programs, is excellent in the Macintosh, but it's not used to its fullest capacity by many packages. Animation is generally less than acceptable in entertainment software. The Plus can run the limited number of Macintosh fast-action games, but without a joystick, the traditional game controller, such games pale in comparison to those on the Apple II series.

The Macintosh Plus is, like the IIc, a closed system: You cannot easily expand it. Though you can add such exotic things as large screen displays, accelerator cards (to speed it up), and more memory, this is a chore best handled by a technician. Unlike the Apple IIe or IIGS, you can't just open the case and slip in a board.

The Plus is the computer that took the Macintosh from a hobbyist's upscale machine to the choice of hundreds of thousands of businesses. The Plus is right if you

- Plan to use the computer for such things as word processing, database management, spreadsheet manipulation, and other traditional business applications
- Want to use almost any Macintosh software, but don't mind sacrificing some speed, or
- Go to college (Apple heavily discounts the Macintosh in higher education).

Macintosh Plus strengths. This is the most inexpensive Macintosh. It runs almost every Macintosh software package (generally, the only exceptions are those specific to the Macintosh II).

Macintosh Plus weaknesses. It's slightly slower than the next model up, the
You cannot easily expand the Mac Plus yourself.

The Macintosh SE: One Slot Means A Lot

The Macintosh SE is a beefed-up version of the Mac Plus. It includes more ROM, an internal fan, the option of two internal 3½-inch drives or one 3½-inch drive with a 20-megabyte hard disk drive, and about a 20-percent increase in speed over the Mac Plus.

But the most important difference can't be seen or heard. Once the case is opened (again, a job best left to technicians), you'll find an internal connector that mates with a variety of cards and boards. These can range from more memory and accelerated microprocessors to network connections. In other words, the SE is expandable. It has, in effect, one "slot."

The SE runs the same software as the Plus. Although the SE is reportedly selling as well as or slightly better than the Plus, no software developer or publisher wants to exclude either potential audience.

Other than the obvious benefits to owning a Macintosh SE—already outlined when we explored the Mac Plus above—there are several reasons for considering this more expensive model. First and most important is the SE's expandability. The computer was designed with the internal connector in mind, so installing an add-on board or card is much simpler. That means more card and board manufacturers should enter the market, giving you a wider selection. Connecting SEs to a non-Apple network should be especially easy when compared to the Plus.

The SE also runs a bit faster than the Plus. It's not a tremendous increase, but it's still significant. You'll probably notice the pickup in speed when doing things like recalculating spreadsheets, formatting long documents, and the like. Last, the SE is more portable than the Plus. The weight hasn't changed much either, but the fact that you can order the computer in two configurations, both with two drives inside the case, means that you don't have to tote anything else around (except perhaps a printer).

Retailing for $2,898 in its lowest-priced version (with two 3½-inch drives), the SE costs more than a Macintosh Plus. Even the "street price," what you can expect to pay if you look and ask around, is about $2,300 for the same two-drive SE.

Do the extra enhancements offset the higher price? That's something you'll have to decide. It depends on what you're planning to use the computer for. Writing is usually limited by the speed of the writer, not the computer, for example. But automatic spelling checks are a part of writing these days, and they do benefit from more speed. Rapid calculations can also be vital for such applications as graphics, desktop publishing, and CAD/CAM.

The SE is becoming the Apple machine of choice for businesses, large and small. You should look at the Macintosh SE if you:

• Need the fastest computing power offered in a traditional Macintosh (not a Mac II)
• Think you'll want to add power and capabilities to the computer in the next year, or
• Move the computer frequently and need two disk drives.

Macintosh SE strengths. It provides faster operation than the Plus and some expandability. Two disk drives fit inside the computer's case.

Macintosh SE weaknesses. It's more costly. The internal connector is not accessible to the average user.

You have choices when you're looking at the Apple II and Macintosh lines of personal computers from Apple. Apple's different computers can do different things in different ways.

And each computer has particular strengths and weaknesses. All you have to do is match up your reason for buying, and what you want the computer to do for you, with the right system.

It may not always be easy, but it's sure fun.
COMPUTE! Books introduces a new line of easy-to-use computer books.

COMPUTE!'s Quick and Easy Guides are effective, dependable reference guides to using applications on your personal computer. From command summaries and quick-reference charts to tips for power users, you'll have the information you need right at your fingertips. Each book is specially designed to be convenient and easy to understand.

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Tom and Ellen Dougher
AppleWorks, the unchallenged leader in personal productivity software on the Apple II series, is an integrated package combining a word processor, database, and spreadsheet. It's a complete program that lets you do everything from writing letters and reports to keeping extensive files and projecting financial earnings. With COMPUTE!'s Quick and Easy Guide to Appleworks, you'll see how to get started with AppleWorks, and how to use each of the three major applications. A Command Summary, Keyboard Template, and Quick-Reference Chart provide information in one-stop locations. Numerous ideas offer practical examples on new ways to use AppleWorks. And there's even all the latest information on AppleWorks' add-ons and enhancements. Clearly defined sections apply to novices and power users alike.

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Chuck Doherty
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Going To Work

Gordon McComb

There's been a bumper crop of business software this year for both the Apple II and Macintosh lines. Gordon McComb sorts it all out for us.

A funny thing happened to the Apple II and Macintosh on their way out of America's computer stores—people started using them for business. Though the Apple is touted as the perfect computer for education, and the Macintosh finds many of its users in the home front, increased memory and graphics capabilities make both machines natural for business applications, too.

It's been a great year for business in the Apple II and Macintosh lines. Here is what has happened in the past year in the business software community, and what you have to look forward to in the near future.

The Call For Business Solutions

Programs for business succeed when they solve a problem. There must be a tangible need for the program—a way to make things easier, faster, or more accurate—or the software isn't used. Word processors and spreadsheet programs precisely fit the profile of problem-solving software. It's no wonder they head the best-seller lists.

AppleWorks, which came out a few years back, is the premier spreadsheet and word processing program for the Apple II. This integrated package remains high on everyone's buying list partly because of the numerous AppleWorks add-on packages that are available. With an add-on, you can make AppleWorks an almost totally different program—from mailing list manager to time scheduler to tax preparer. A number of companies, including Pinpoint, Megahaus, Q-mar group, and Software Touch, are devoted almost exclusively to creating AppleWorks add-on software.

Competing software includes stand-alone spreadsheet programs like Applied Engineering's VIP Professional (a Lotus 1-2-3 work-alike with a Macintosh-style interface) and Microsoft's Multiplan.

An AppleWorks-like program for the Macintosh is Microsoft Works. Like AppleWorks, it combines spreadsheet, word processing, and data management functions under one roof, but it adds telecommunications and graphics for a larger set of features. Similar applications exist for the Macintosh line: Lotus Jazz (to be replaced by Lotus Galaxy by early next year), Microsoft Excel, and Data Tailor's Trapeze. Most any business application can be tackled with one of these packages.

The demands placed on word processing software by most businesses require special formatting features and elaborate printer support. The entry- and intermediate-level word processors, such as HomeWord for the Apple II, can't be effectively used in most offices. Both the Apple II and Macintosh now have several powerful word processors to
Businesses are fond of information, and of keeping that information within finger's grasp. When a filing cabinet won't do, the computer's memory and disk drives can be used to store data for almost-instant retrieval. In the past, both the Apple II and Macintosh have suffered from inadequate system memory, preventing them from being used for anything but simple data management applications. Now that you can quickly expand an Apple II GS to 512K RAM and beyond, and Apple no longer sells a Macintosh with less than one megabyte of memory, the doors are wide open to extremely sophisticated data management packages.

Two new and unique data management applications for the Macintosh include Apple's HyperCard and ACIUS's 4th Dimension. Both take a visual approach to storing and retrieving data, and they let you assign relationships by context and association.

HyperCard, written by Macintosh-guru Bill Atkinson (who designed MacPaint) is modeled after the 3 × 5 inch index card. You can enter any information you want—including text, numbers, and pictures—onto a card. How the information on the cards, and the cards themselves, relate is totally up to you. One noteworthy feature of HyperCard is that it can store an almost limitless pool of data, restricted only by the amount of available memory. The program is designed to work with video discs and CD-ROM drives, for a total maximum capacity of 4,096 megabytes of memory.

HyperCard also provides a programming language, called HyperTalk. With it, you can create your own information management applications, such as appointment books, phone dialers, inventory recordkeeper, and more.

WordPerfect
Apple II Word Power

The most popular word processor for the IBM PC is fast becoming the most popular word processor for the Apple II line. WordPerfect, version 1.1, combines all the word processing features you'd expect from a top-notch program, with many extras, including a spelling dictionary, macro language, and mail merging.

WordPerfect works on the Apple IIe, IIc, and II GS (the II GS version runs under ProDos-16). You interact with the program by pressing function keys and entering codes. Standard page formatting is automatic—you just start typing. You can change margins, page size, line spacing, line alignment, and other variables by pressing the proper keys and entering embedded codes. WordPerfect provides a menu of choices for advanced features.

The spelling dictionary in WordPerfect contains 50,000 words (the dictionary for the II GS version contains 115,000 words). You can easily check a document or a portion of the document, and you may add your own words to the list. The macros feature works a lot like a tape recorder—it records keystrokes. Turn the macro recorder on, and WordPerfect memorizes everything you do on the keyboard. Save the macro, play it back, and your actions are repeated in a flash. The powerful macros features, not available on most other word processors (for any computer), lets you instantly change the formatting of documents or enter long passages of text.

Mail merging is useful when you're sending out form letters to customers. You prepare the form letter that everyone receives; then you type the names and addresses of each individual. WordPerfect combines the two and prints each personalized letter, or stores that form for later editing.

With WordPerfect, you can go considerably beyond standard manuscript-style documents. For example, automatic line numbering can be used by lawyers to prepare legal briefs. And footnotes are available to make it easier for students and professors to prepare academic papers. Other advanced features include superscripts, subscripts, headers, footers, automatic page numbering (in a variety of formats), advanced printer control, and automatic hyphenation.

WordPerfect is found in the most popular word processors, MacWrite and Microsoft Word. MacWrite was strictly for beginners, even though many businesses tried to make effective use of it. Microsoft added plenty of business-oriented features to Word, but hid them in hard-to-use commands.

Now there are no fewer than six first-rate word processors for the Macintosh (see McNeill's "Macintosh: the Word Explosion" for a detailed roundup of five Macintosh word processors), and more are coming. Two strong contenders are WordPerfect, which has just been released, and Microsoft Word 3.01. Both can be used to create documents with just about any type of formatting imaginable. Spelling checkers are built-in and both have keyboard-shortcut features to make using the program more efficient.

For several years, the Macintosh enjoyed only two general-purpose word processors, MacWrite and Microsoft Word. MacWrite was strictly for beginners, even though many businesses tried to make effective use of it. Microsoft added plenty of business-oriented features to Word, but hid them in hard-to-use commands.

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Webster's New World Spelling Checker
114,000 Right Words

Even the best prose is marred by incorrect spelling. A document isn’t finished anymore until it’s been examined by a spelling checker. Webster’s New World Spelling Checker, from publisher Simon & Schuster, is ideal if your word processor doesn’t have its own spelling checker, or if you’re not satisfied with the performance of the spelling checker you already own.

Webster’s New World Spelling Checker contains 114,000 common and not-so-common words—that’s several times the vocabulary of a college professor. If the dictionary doesn’t have a word you regularly use, you can store it in a user dictionary so that it’s not flagged in each of your documents.

The program runs outside your word processor. It can be used with most word processors for the Apple II line, including AppleWriter, AppleWorks, Bank Street Writer, HomeWord, Magic Slate, Magic Window, Master Slate, MouseWrite, PIE Writer, Screemwriter, Word Juggler, and standard ASCII text. If you own a word processor that isn’t directly supported, you can train Webster’s to work with it.

During spell checking, Webster’s flags all suspect words, and also provides up to ten alternatives—proper spellings of the word it thinks you want to use. The suggestion system is elaborate and helps you find phonetic misspellings (home instead of hone), transpositions, repeated words, and missing spaces.

If you don’t see the word you want in the list, you can type it in. Should the word be misspelled correctly, you may skip it (and all other occurrences if you wish), or add it to the user dictionary. Once the document is checked, Webster’s saves the file under a new name, but it keeps the old one (in case you want to use it later).

Graphics Take Center Stage

Computer pundits have long criticized computers for not thinking the way humans do. According to experts, the brain thinks in pictures, not words; yet nearly all computers are text-oriented. Both the Apple II and Macintosh are graphics-oriented, which has helped establish them as masters of graphics applications. The first drawing programs came out for the Apple II+, though the colors and resolution were limited, so businesses shied away from using the computer to create charts, graphs, and meeting presentations.

The Apple II GS sports more colors and higher resolution graphics. Its color palette contains 4,096 hues and you can view your pictures in two high-resolution views—640 × 200 pixels or 320 × 200 pixels. The higher resolution means business applications, such as technical drawing, computer-aided design, and presentation graphics, are now within reach with the II GS. (As a point of comparison, the 320 × 200 pixel standard resolution screen of the II GS is the same as the Color/Graphics Adapter on the IBM PC. Though the PC now has higher resolution graphics boards available for it, most graphics software for that machine still use the 320 × 200 pixel standard.)

Among the Apple II GS software, Visualizer and DataPak’s GraphicWriter. Visualizer is a presentation graphics program that makes it easy to transform rows of numbers into easy-to-understand line, bar, column, dot, and pie charts. You have full control over the color and texture of the graph elements, and if you’re using a color output device (like the Imagewriter II), your charts are printed in color.

GraphicWriter is a unique blend of word processor and drawing program. On the same page, you can freely mix text and graphics and manipulate the two until you get just the right effect. The program includes drawing tools for making simple boxes, circles, triangles, and lines, or you can paint on a pixel-by-pixel basis for fine detail work.

The introduction of the Macintosh II brought color to the Mac line. As yet, only a few drawing applications exist for the Macintosh II, though a number of companies, including MicroCAD/CAM, Silicon Beach, and Cricket Software have announced their plans to market high-end, color business software, specifically computer-aided design and high-resolution presentation graphics packages. Some colorized applications already exist for the Macintosh II, including Microsoft Excel and Living Videotext’s More.

While the screen on the earlier Macintoshes, including the SE, are black and white, the crystal-clear images are ideal for applications such as desktop publishing. There are no fewer than a half-dozen professional page layout programs available for the Macintosh. These include Aldus PageMaker 2.0, ReadySetGo 4.0 from Letraset, Orange Micro’s Ragtime, and Xpress, from Quark. All support the Apple Laserwriter for high 300 dot-per-inch resolution output.

The Macintosh has found a comfortable niche with desktop publishing. A steady stream of hardware and software is now available that supports the desktop publishing boom. Programs that were previously used only in home or educational environments are also being applied to desktop publishing applications. These include Silicon Beach’s SuperPaint, which combines the powers of MacDraw and MacPaint, and FullPaint, an enhanced version of MacPaint.

SuperPaint supports 300 dot-per-inch drawing, making it ideal for documents that are printed on the Laserwriter. If you own a desktop scanner, such as those sold by Microtek Lab, Princeton, Datacopy, and DEST, you can edit the high-resolution images.
GraphicWriter
Blend Words And Pictures

GraphicWriter, from DataPak Software, is an unusual mix of word processing and color graphics. In this one program, you can write text, draw illustrations, add graphics elements such as boxes, rules, and lines, and arrange the layout into a finished document. With most other software for the Apple II, these functions are found in stand-alone programs. You must cut graphics created in a drawing program and paste them into the word processor.

GraphicWriter is written for the Apple II GS, and though it can be used with a black-and-white monitor, you get the most flexibility by using a color monitor. The drawing tools included with GraphicWriter let you create graphics in color—you’re limited to four solid colors on the screen, but additional hues can be created using the Ditherize mixing option. Graphics can be intermixed with text at any point in the document. In fact, you can overlay graphics on top of text, or vice versa.

GraphicWriter actually has two graphics modes: Object and Canvas. You switch between the two graphics modes depending on your requirements. Object-mode graphics are object-oriented, allowing later editing of the individual shapes. You use the object mode to make boxes, circles, and other simple shapes. You might use the object drawing tools, for example, to frame a block a text with a colored box. Canvas-mode graphics are bitmaps which can be edited on a pixel-by-pixel basis.

You can’t overlay object and canvass art, but you can mix the two in the same document. GraphicWriter lets you set up regions where you can define special formatting such as multiple columns and the drawing mode. In a two-region page, for example, one region might contain object art; the other, canvass art.

GraphicWriter looks a lot like traditional Macintosh software. Its menu bar contains nine menus, which you pull down with the mouse to choose a command. The text and graphics appear within a window, which you can resize and scroll to see different portions of the document. Drawing palettes flank the bottom of the window, and you click on an icon with the mouse to select a drawing tool.

Cricket Draw
Second Generation Drawing

MacDraw was one of the first programs for the Macintosh, and though it remains a best seller, the current version hasn’t changed in over two years. That’s prompted a number of companies, including Cricket Software, to offer competing object-oriented graphics software.

Cricket Draw, from Cricket Software, lets you combine rectangles, ovals, lines, and other simple shapes to produce any type of drawing imaginable. The program can be used to create blueprints, architectural drawings, page layouts, forms, schematic diagrams, and more.

The Cricket Draw tools include those to write text and to draw lines, square-corner boxes, rounded-corner boxes, circles, lines, polygons, and free-forms. It also includes special tools for making fountains, star bursts, and grates. These extra tools provide for remarkable special effects. Fountains, for example, are objects filled with graded tint patterns—from 0 to 100 percent. They can be used as a background for text or in an architectural rendering.

Objects can be rotated within Cricket Draw at one degree increments, giving you extra flexibility in creating such things as dramatic page layouts and isometric drawings. Full PostScript support is provided when using a printer such as the LaserWriter.

Cricket Draw lets you generate a PostScript text program that you can edit in a separate window. The PostScript program, and your drawings, can be mixed. If you know PostScript (or want to learn it), you can easily transform your graphics into PostScript code, which you can modify to obtain additional effects not offered in Cricket Draw.

(usually made at 300 dots-per-inch) then plug them into the page layout program. Most layout programs and scanners support the TIFF graphics file format, so cutting and pasting graphics between applications doesn’t require conversion nor does it result in frustration.

Hard-Core Business Applications

Sometimes general-purpose programs like word processors, spreadsheets, and databases aren’t enough for a business. Standard accounting practices often require a strict adherence to company and governmental regulations—and that takes a specialized accounting program.

Software like Monogram’s Dollars and Sense (available for the Apple II and Macintosh) is intended for personal use, but if your business is small, it can also be used to keep track of the company’s cash flow. When you need more, there are plenty of alternatives to choose from.

On the Apple II is The Clan, from Sir-Tech, BPI’s Entry Series, DAC Easy Accounting, and Peachtree’s Back to Basics accounting series. The publishers of The Clan, for instance, claim that the program is easy enough to use at home, but powerful enough for business. You can set up your own chart of accounts, or use one of the nine already made. You can ask for financial reports—up to the full fiscal year—at any time.

The Peachtree Back to Basics modules include general ledger, accounts receivable, and accounts payable. A full audit trail is provided for each transaction, and the modules are linked to reduce repetitive data entry. The chart of accounts is user-definable, and you can track up to three checking accounts.
**Xpress**
The Fast Layout

Desktop publishing is all the rage these days, and there are no fewer than half a dozen professional page layout packages for the Macintosh. A relative newcomer is Xpress, from Quark. The program combines features common to word processors with a sophisticated page layout system—so you have just about all the tools you need to produce elaborate documents of any size and shape.

Xpress works with boxes, either text or graphic. Graphics boxes hold a picture, either digitized art from a desktop scanner or drawn art from a graphics program like MacPaint or MacDraw. Text boxes hold the text of the document. You can control the size and position of both kinds of boxes on the page, and you can layer one box over another. Xpress automatically wraps text around graphics. There's no need to manually calculate the length of text lines to fit them around an illustration.

You can type text directly into Xpress—it has a number of common word processing features, such as a built-in spelling checker, search and replace, and full editing. You may also import text from MacWrite and Microsoft Word. Imported text automatically flows into columns and pages.

More demanding page layout projects require features such as kerning and tracking—Xpress offers both. **Kerning** tightens the space between certain characters to make them more readable, and **tracking** uniformly expands or contracts spaces between characters. This avoids the large gaps that sometimes appear between words when the text is justified. Xpress supports the ImageWriter, ImageWriter II (it can even do color separations using a colored ribbon), LaserWriter, and other Posi-Script-compatible devices, such as the Linotronic high-resolution imagesetter.

**4th Dimension**
A New Era In Database Management

Acius Software’s new 4th Dimension database management program sows fresh ground. With it, you can keep track of information such as customers, inventory, and cash flow. But it's more than just a workable database, for you can also create your own applications using programming commands and functions. The record-keeping you do with 4th Dimension is visual. By linking together information with simple lines and arrows, you define how things relate to one another.

As a database manager, you can define a file structure with up to 99 files, with an unlimited number of records. Each file can contain as many as 511 fields per record, and fields may contain as many as 32,767 characters of text (that's about equal to the number of words in seven pages of this magazine).

In addition to text, 4th Dimension lets you store numbers, dates, and even pictures. For example, with a desktop scanner, you could digitize photographs of all the employees in your company and then place the digitized pictures in an employee database. (You'd need a hard disk drive to store all the data.)

Once the database is established and the data is entered, 4th Dimension offers the usual database management functions, including adding new records, deleting old ones, and finding records that meet certain criteria. The program lets you define and print columnar reports of the information you've found. If you already have information entered into another database management program, don't worry—4th Dimension accepts information in SYLK, DIF, or ASCII text format.

4th Dimension is also a programmer’s tool. It understands 200 of its own standard commands and functions, and it can accept external routines written in Pascal, C, assembly, and many other languages. You can also add custom menus and commands, turning a simple database template into a stand-alone application.

**Back to Basics** is also available on the Macintosh, joined by a number of capable accounting programs including Chang Labs’ *Rags to Riches* (general ledger, accounts receivable, accounts payable, inventory control, and professional billing modules), Satori’s *Legal Billing* and *Project Billing*, and State of the Art’s *Electronic Checkbook*.

Satori’s *Project Billing*, for example, keeps track of projects for your company or your business. You set up the categories, project numbers, number of employees on the project, and the hourly fee. As long as you feed the Macintosh information on how you and your employees are spending time, the *Project Billing* program keeps tabs on the cumulative costs.

**The Future Of Business Applications**

One of the biggest fears facing any business computer user is the amount of time it takes to learn and master a program. Thanks to the Macintosh's user interface, the learning curve for most programs is greatly reduced. All commands are almost universally found in the pull-down menus, and on-line help is a standard feature in most mainstream business programs.

The mouse-based interface of the Macintosh is finding its way into Apple II products with increasing frequency. A good portion of the newly announced II GS software uses pull-down menus and onscreen palettes, and it fully supports the mouse.

Powerful business applications depend on hardware support. High-resolution graphics has already spawned a new category of sophisticated programs for the Apple II GS. And the increased memory capacity of the II GS (not to mention the faster speed) means there’s no end to the kinds
Microsoft Word
Integrated Word Processing

Microsoft Word 3.01 for the Macintosh is many programs in one: a word processor, a spelling checker, an indexer, and an outliner. The extra spelling, indexing, and outlining features are commands in Word’s menus, so you don’t need to quit the program and start another to completely write, rewrite, check, and print your documents.

Word 3.01 is a greatly modified version of Microsoft’s earlier word processor, Word 1.0. This version, which came out several years ago, had many strong features, but lacked polish and sophistication. The new version has two modes of operation, a short version that offers minimal features and a full version, where all of the program’s functions and capabilities are available. The short version is modeled after MacWrite.

One of Word’s best features is not a command or a menu option, but performance. Microsoft was able to increase the speed of Word with version 3.01 so that operations such as saving and pagination take only a few moments. Word 3.01 only partially endorses the WYSIWYG (What-You-See-Is-What-You-Get) style of computing—you see text on the screen in the font, size, and style that will appear on paper, but the onscreen display is not an exact replication of the finished page. While writing, you see only the body text, not other elements such as page numbers and footnotes. Before printing, you can switch to a Page Preview mode, where the entire page is displayed in miniature.

The spelling checker, with its 80,000-word main dictionary, lets you search any file for misspelled words. The indexer compiles an index (or a table of contents) from words you have identified. When the document is printed, Word compiles the index and automatically inserts the page numbers. The outliner allows you to first construct an outline, then change the levels and locations of the items as desired.

One of Word’s most powerful features is stylesheets. A stylesheet is a collection of character and paragraph formats stored with each document. You can access the styles—and the formats contained in them—by choosing from a menu or typing on the keyboard. Elaborate formatting changes take only a second or two.

Visualizer
Graphics Numbers

The brain thinks best in pictures, not numbers. Presentation graphics programs, like Visualizer from PBI Software, turn numbers into colorful charts. The graphics in the chart—whether in bars, columns, lines, or pie slices—represent numbers. The size of each graphic conveys value and relationship. You can easily grasp the meaning behind the numbers.

Visualizer, designed for the Apple II GS, transforms numbers into pie, bar, column, line, or scatter (X-Y) charts. You enter the numbers into a worksheet area, then tell the program the type and style of chart you want. Data can also be retrieved from AppleWorks spreadsheet files. You can use AppleWorks to handle statistical analysis, or you can perform the necessary math in Visualizer. The program can perform averaging, linear regression, and standard deviation, as well as other common statistical functions.

Graphics can be standard two-dimensional, three-dimensional, or overlapped. You have full control over the pattern and color of the elements. When used with an ImageWriter II, charts can be printed in color. Legends, titles, annotations, and other text can be placed anywhere. You use the mouse to position text within the graph area. You also use the mouse to choose commands from the pull-down menus.

A unique feature of Visualizer is its ability to combine charts with super-high-resolution pictures. The picture can be placed under the chart as background art. The program lacks graphics editing tools, but you import the image from a drawing program. Both chart and picture are displayed on the II GS screen in super-high-resolution mode.
# Apple II And Macintosh Business Software Sampler

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>Computer</th>
<th>Requirements</th>
<th>Price</th>
<th>Publisher</th>
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<tr>
<td>The Clan</td>
<td>Bookkeeping and accounting</td>
<td>Any Apple II</td>
<td>64K</td>
<td>$79.95</td>
<td>Sir-Tech Software, Inc., P.O. Box 245, Ogdenburg, NY 13669-1517, (315) 393-6633</td>
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<tr>
<td>Cricket Draw</td>
<td>Object-oriented structured drawing program</td>
<td>Macintosh</td>
<td>512K</td>
<td>$295</td>
<td>Cricket Software, Inc., 30 Valley Stream Pkwy., Great Valley Corporate Center, Malvern, PA 19355, (215) 251-9890</td>
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<tr>
<td>DeluxePaint II</td>
<td>Color free-hand painting program</td>
<td>IIGS</td>
<td>768K RAM, color monitor, mouse, ProDOS-16</td>
<td>$99.95</td>
<td>Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, (415) 571-7171</td>
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<td>Draw Plus</td>
<td>Object-oriented, structured drawing program</td>
<td>IIGS</td>
<td>128K RAM, ProDOS-16</td>
<td>$79.95</td>
<td>Activision, Inc., 2350 Bayshore Pkwy., Mountain View, CA 94043, (415) 960-0410</td>
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<tr>
<td>Easy Working Series</td>
<td>Easy Working Writer is an entry-level, menu-driven word processor; Planner and Filer are basic, no-frills spreadsheet and database management programs, respectively.</td>
<td>IIGS, Ile, IIGs</td>
<td>128K, ProDOS</td>
<td>$9.95 each</td>
<td>Spinnaker Software Corp., 1 Kendall Square, Cambridge, MA 02139, (617) 494-1200</td>
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<td>Filer's Choice</td>
<td>Personal and small-business oriented electronic database management program</td>
<td>Any Apple II</td>
<td>64K</td>
<td>$49.95 ($119.95 with Planner's Choice and Writer's Choice)</td>
<td>Activision/Personal Choice Software, P.O. Box 7257, Mountain View, CA 94039, (415) 940-6044</td>
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<tr>
<td>FontWorks</td>
<td>Font enhancement utility for AppleWorks</td>
<td>Ile, Iic, IIGs</td>
<td>AppleWorks</td>
<td>$49.95</td>
<td>The Software Touch, 9842 Hilbert St., Ste. 192, San Diego, CA 92131, (800) 541-0900, (619) 549-3091</td>
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<tr>
<td>FormDesign</td>
<td>Form-making utility</td>
<td>Macintosh</td>
<td>128K</td>
<td>$199 (template form disks $49)</td>
<td>Clearview Software, P.O. Box 3294, Providence, RI 02906, (800) 541-FORM, (401) 351-1930</td>
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<tr>
<td>4th Dimension</td>
<td>Relational database management program</td>
<td>Macintosh</td>
<td>1 megabyte RAM</td>
<td>$695</td>
<td>Actus, 20300 Stevens Creek Blvd., #495, Cupertino, CA 95014, (408) 252-4444</td>
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<td>FullPaint</td>
<td>Enhanced free-hand painting program</td>
<td>Macintosh</td>
<td>512K</td>
<td>$99.95</td>
<td>Ann Arbor Softworks, Inc., 2393 Teller Rd., #16, Newbury Park, CA 91320, (805) 375-1467</td>
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<tr>
<td>GraphicWorks (v1.1)</td>
<td>Combination painting and desktop publishing page layout program</td>
<td>Macintosh</td>
<td>512K</td>
<td>$99.95</td>
<td>Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062, (312) 480-7667</td>
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<td>GraphicWriter</td>
<td>Test-graphics document processor</td>
<td>IIGS</td>
<td>512K, ProDOS-16</td>
<td>$149.95</td>
<td>DataPak Software, Inc., 14011 Ventura Blvd., #507, Sherman Oaks, CA 91423, (818) 905-6419</td>
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<td>Great Plains Accounting Series</td>
<td>Accounting packages including modules for accounts payable, accounts receivable, payroll, general ledger, inventory, and order entry</td>
<td>Macintosh</td>
<td>512K, hard disk recommended</td>
<td>$695 per module</td>
<td>Great Plains Software, Inc., 1701 S.W. 38th St., Fargo, ND 58103, (800) 345-3276, (701) 281-0550</td>
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<tr>
<td>FactWorks</td>
<td>AppleWorks database template; each volume contains encyclopedia-like data</td>
<td>IIC, Ile or IIGs</td>
<td>128K RAM, AppleWorks, ProDOS</td>
<td>$32.95 per volume</td>
<td>ImagMedia Software, 16640 Roscoe Pl, Sepulveda, CA 91343, (818) 891-3707</td>
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<td>MacCalc</td>
<td>Electronic spreadsheet program</td>
<td>Macintosh</td>
<td>512K</td>
<td>$139</td>
<td>Bravo Technologies, Inc. c/o DPAS, P.O. Box 1, Glroy, CA 95021</td>
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<td>MacnTax</td>
<td>Income tax preparation software</td>
<td>Macintosh</td>
<td>512K</td>
<td>$99; yearly updates about $30 (depending on extent of revision)</td>
<td>Softview, Inc. 4820 Adoln Ln., Ste. F, Camarillo, CA 93010, (865) 388-2626</td>
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<tr>
<td>MegaWorks (v3.01)</td>
<td>Combination spell checker and mail merge for AppleWorks. Additional AppleWorks add-ons are ReportWorks (report writer) and ThinkWorks (outline processor).</td>
<td>Ile, Iic, IIGs</td>
<td>AppleWorks</td>
<td>$99 (retail); $49 direct mail</td>
<td>Megahaus Corp., 5703 Oberlin Dr., San Diego, CA 92121</td>
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<td>Microsoft Word</td>
<td>Word processor, with spelling checker, outline processor, and indexier</td>
<td>Macintosh</td>
<td>512K</td>
<td>$395</td>
<td>Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, (800) 426-9400, (206) 882-8080</td>
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52 COMPUTE's Apple Applications December 1987
<table>
<thead>
<tr>
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<td>Microsoft Works</td>
<td>Integrated software</td>
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<td>512K</td>
<td>$295</td>
<td>Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, (800) 426-9400, (206) 882-8080</td>
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<td>MultiScribe GS</td>
<td>Menu-driven word processor</td>
<td>Ills</td>
<td>512K</td>
<td>$99.95</td>
<td>Styleware, Inc., 5250 Gulfon, Ste. 2E, Houston, TX 77081, (713) 688-1360</td>
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<td>Paintworks Plus</td>
<td>Free-hand color painting program</td>
<td>Ills</td>
<td>512K, color monitor</td>
<td>$79</td>
<td>Activation, P.O. Box 7287, Mountain View, CA 94039, (800) 227-9759, (415) 940-6044</td>
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<tr>
<td>Planner's Choice</td>
<td>Personal and small-business oriented electronic program</td>
<td>Any Apple II</td>
<td>64K</td>
<td>$49.95 ($119.95 with Writer's Choice and Filer's Choice)</td>
<td>Activation/Personal Choice Software, P.O. Box 7287, Mountain View, CA 94039, (415) 940-6044</td>
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<tr>
<td>Ragtime (v1.1)</td>
<td>Intermediate-level desktop publishing and page layout program</td>
<td>Macintosh</td>
<td>512K</td>
<td>$395</td>
<td>Orange Micro Inc., 1400 N. Lakeview Ave., Anaheim, CA 92807, (714) 779-2772</td>
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<tr>
<td>Real Estate Analyzer</td>
<td>Investment advisor program for purchasing or dealing with real estate</td>
<td>Ills</td>
<td></td>
<td>$295</td>
<td>HowardSoft, 8008 Girard Ave., Ste. 310, La Jolla, CA 92037, (619) 454-0121</td>
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<tr>
<td>Sensible Speller</td>
<td>Spelling checking program for use with Sensible Writer, AppleWriter, PFS Write, and others; standard, medical, technical, and law dictionaries separate</td>
<td>Iic, Ile</td>
<td>128K, mouse</td>
<td>$125 main speller, $39.95 each for supplementary dictionaries</td>
<td>Sensible Software, Inc., 210 S. Woodward, Ste. 229, Birmingham, MI 48011, (313) 258-5566</td>
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<tr>
<td>Sideways (v2.01)</td>
<td>Printing utility for producing AppleWorks spreadsheets and other wide documents sideways on the printer. Supports a variety of dot-matrix printers.</td>
<td>Iic, Ile, Ills</td>
<td>64K AppleWorks, ProDOS or DOS 3.3</td>
<td>$69.95 ($129 with ProDOS clock)</td>
<td>Funk Software, Inc., 222 Third St., Cambridge, MA 02142</td>
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<tr>
<td>Space-Edit</td>
<td>3-D CAD program with variable zoom and perspective features</td>
<td>Macintosh</td>
<td>512K</td>
<td>$625</td>
<td>Abvent, 9903 Santa Monica Blvd., #268, Beverly Hills, CA 90212</td>
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<td>SuperPaint</td>
<td>Combination free-hand painting and object-oriented drawing program</td>
<td>Macintosh</td>
<td>512K</td>
<td>$99.95</td>
<td>Silicon Beach Software, 9580 Black Mountain Rd., P.O. Box 261430, San Diego, CA 92126, (619) 695-6956</td>
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<tr>
<td>Time-Trax II</td>
<td>Personal and professional time management and scheduling program</td>
<td>Iic, Ile, Ills</td>
<td>128K, ProDOS-compatible clock or Ills internal clock</td>
<td>$69 ($129 with ProDOS clock)</td>
<td>Creative Peripherals Unlimited, 22952 Alcalde Dr., Ste. 160, Laguna Hills, CA 92653, (714) 770-3334</td>
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<td>TopDraw</td>
<td>Object-oriented structured color drawing program</td>
<td>Ills</td>
<td>512K, color monitor, mouse</td>
<td>$99.95</td>
<td>Styleware, Inc., 5250 Gulfon, Ste. 2E, Houston, TX 77081, (713) 668-1360</td>
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<tr>
<td>Trapeze (v2.0)</td>
<td>Visual spreadsheet, with graphics and word processing features</td>
<td>Macintosh</td>
<td>512K</td>
<td>$295</td>
<td>Data Tailor, Inc., P.O. Box 11530, Forth Worth, TX 76109, (817) 8944-3030</td>
</tr>
<tr>
<td>Visualizer</td>
<td>Business presentation graphics</td>
<td>Ills</td>
<td>512K, mouse</td>
<td>$99.95</td>
<td>PBI Software, 1111 Triton Dr., Ste. 201, Foster City, CA 94044, (415) 349-8765</td>
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<tr>
<td>Webster's New World Spelling Checker</td>
<td>Spelling checker utility for most popular Apple II word processors, including AppleWriter, Bank Street Writer, AppleWorks, and Word Juggler.</td>
<td>Iic, Ile, Ills</td>
<td>5¼-inch drive</td>
<td>$49.95 (DOS 3.3); $59.95 (ProDOS)</td>
<td>Simon &amp; Schuster Software, 1 Gulf &amp; Western Plaza, New York, NY 10023, (212) 373-8882</td>
</tr>
<tr>
<td>WordPlus Spell</td>
<td>Spelling checker for use with Microsoft Works</td>
<td>Macintosh</td>
<td>512K</td>
<td>$59.95</td>
<td>Lundeen &amp; Associates, P.O. Box 30038, Oakland, CA 94604, (800) 233-6881, (800) 922-PLUS</td>
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<tr>
<td>WordPerfect (v1.1)</td>
<td>Word processing program with integrated spell checker and mail merge</td>
<td>Ills</td>
<td>512K</td>
<td>$179</td>
<td>WordPerfect Corp., 288 W. Center St., Orem, UT 84057, (801) 227-4000</td>
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<tr>
<td>Writer's Choice</td>
<td>Personal and small-business oriented electronic word processor</td>
<td>Any Apple II</td>
<td>64K</td>
<td>$49.95 ($119.95 with Planner's Choice and Filer's Choice)</td>
<td>Activation/Personal Choice Software, P.O. Box 7287, Mountain View, CA 94039, (415) 940-6044</td>
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Macintosh
The Word Explosion

Dan McNeill

This survey of five Macintosh word processors shows what's got what for writers of every talent and level.

You don't write like I do, and I don't write like you do. Why, then, did the Macintosh expect everyone to use the same writing tool?

Writing is the most individual of computer tasks, yet for over a year, there was only MacWrite. It was the word processor. It took Microsoft's Word to break the monopoly.

Those days are gone. An assortment of fine word-processing programs now grace the Macintosh line, and their variety is as impressive as their power.

Below you'll find surveys of five major Macintosh word processors. Each program has virtually every feature of MacWrite. In addition, unless otherwise noted, each has Revert to Save, word count, shortcut Save and Quit, alternate headers/footers on odd and even pages, split screens, and condensed and expanded text.

MacWrite 4.6

Once a bold pioneer, MacWrite now seems frozen in time. For a long while it came free with the Macintosh, a fact that discouraged third-party developers from marketing alternative word-processing software. As if to compensate, its upgrades (the last was from 4.5 to 4.6 and involved relatively minor features) haven't been frequent or wide-ranging. Why buy it then? Well, it has two main virtues: prevalence and ease of learning.

Features MacWrite is the feeblest of the five. It lacks hyphenation, multiple columns, split screens, footnotes, indexing, tabbing of contents, alternate headers/footers, and condensed and expanded text, among other things.

Ease of Learning However, MacWrite is clearly the easiest to learn. If you know the Macintosh interface, you know MacWrite. On the other hand, you can pick up this program quickly, simply because there's less to it than other programs. It's like the difference between hearts and bridge: Hearts is easier to learn, but it isn't bridge.

Ease of Use Simple programs are not necessarily streamlined, and MacWrite lacks a number of handy features common to other word processors. It's missing Revert to Save, Select All, a word count feature, and shortcut Save and Quit, (perhaps the two most important shortcuts). MacWrite is also rather slow. However, it has a fine Undo feature that replaces prose entered after a Return-delete—the others replace only overtyped text.

Summary MacWrite is the stripped-down, generic Macintosh word processor. Its whole forms the mere core of the other four programs. However, it is a standard, and it works with such software as PageMaker—something that may be critical to you. It's also fairly inexpensive.

In fairness, MacWrite is far more than just a letter-writing program; I've written books with it myself. But it lags behind other word processors in power and responsiveness, and it's clearly unsuited for outlining, layout, and other advanced tasks.

MindWrite™

MindWrite is a combination outliner/word processor with many pleasant features and a few pesky bugs. For writers who like to organize their thoughts before expressing them, there's nothing quite like it.

Features The word processor is a pleasure in itself. Because of its outline capacity, MindWrite easily distills tables of contents and offers a truly comprehensive search-and-replace. It allows numerous windows, and will wrap words around either the window (so you can see the complete text) or around the ruler. It lets you select several disconnected paragraphs and move or alter them at once. It also sorts and will shuffle or randomize paragraphs so that,
as the manual says, you may perceive intriguing new associations.

However, MindWrite's outliner has exacted some sacrifices from the word processor, which lacks multiple columns, hyphenation, footnotes, indexing, alternate headers/footers, and condensed and expanded text.

Ease of Learning The outline processor is fairly complex and takes a little time to master, but the documentation is fine and the program quite straightforward.

Ease of Use MindWrite has several special features which enhance its ease of use. The Just Print command circumvents the Print dialogue box, and outputs immediately using the last specified variables—a handy approach. Copying does not erase its Clipboard, which can, therefore, hold several items at once. It converts to and from ASCII, MacWrite, and ThinkTank formats, and its Launch feature shifts you directly into another application.

Summary MindWrite's excellent outline processor fuses directly with the word processor, so you can expand your outline into prose with no interference. The program has other fine qualities—among them treating headings as adroitly as paragraphs, and letting you drag both around with the mouse. The pointer even turns into a hand tool for easy movement of headings. MindWrite has a multitude of text-selection powers, and it can print selected text, such as all of an outline below Level 3. It collapses and expands items like most outline processors, but it will also reduce a paragraph to just its first line.

Unfortunately, MindWrite is still a bit slow, and the scroll bar is sticky on small documents. Moreover, version 1.0 retains glitches which, in my case, caused erratic display—vanishing paragraphs, duplicated lines—and eventually destroyed a document. This is a fine word processor even if you never outline, and it's the best bargain of all. But you might wait till MindWork zaps the bugs.

MindWork Software, P.O. Box 222280, Carmel, CA 93922. 408-624-0522. $125.

Laser Author™

Laser Author is a word processor with layout features—a good choice for writers who need some design powers, but not total layout prowess. It has a host of charming attributes, but its focus makes it less intuitive if you're simply writing.

Features As a word processor per se, it has further virtues. It lets you open four documents at once and zoom them in and out; it offers guttering, soft hyphenation, and superscript to seven levels; and you can set font size anywhere between 4 and 127 points. It allows paragraph and header separation, by points; permits expanded and condensed text; offers a diacritical style so you can simulate crossing out deleted text; turns selected prose into ALL CAPS, lower case, or Title format; and has the full range of pagination styles including numbers, large and small Roman numerals, and upper- and lowercase letters. It also does intelligent paste, attempting to add a space to the left or right of your insertion, whichever seems most appropriate.

Ease of Learning Laser Author is somewhat easier to learn than MindWrite, mainly because of its simpler features. The documentation is clear and easy to follow.

Ease of Use Laser Author's frames are a breeze, and they make layout simple. The program also displays far more document information than any rival, including such unusual data as time spent on the document, number of typing sessions, and time expended and words entered at the last session. The word count is always onscreen, another pleasing characteristic. Laser Author can also print pages in reverse order, and it can save automatically every few minutes.

Summary Using Laser Author is somewhat like writing on a paste-up board. Like much layout software, the program is frame-oriented. You smoothly pull out frames and use them for columns, boxes of text, or pictures. You can easily resize the frame, and text jumps to fit it. Other powerful layout features include manual kerning and line separation, by points. Moreover, Laser Author simplifies creation of styles—text

Figure 1: MacWrite

MacWrite is the first, and still the simplest, word processor for the Macintosh. Although the Format menu looks impressive, note that four of the bottom five actions can be accessed by clicking on the ever-present Ruler.
Narrators encounter with old Simon Wheeler

- To ask about friend's friend, Leonidas W. Smiley
- Friend probably knew this would remind Wheeler of Jim Smiley
- Description of being buttonholed into hearing story
- The story, told by Simon Wheeler
- Development of Jim Smiley character
  - Betiing habit
  - Winning habit
  - Examples of Smiley's betting
    - Smiley's mare
    - Smiley's bull-pup
    - Smiley's frog
- The interruption

MindWrite's outlining capabilities are impressive. Revising an outline, including moving heads and subheads, is simple when the cursor turns into the hand shape. Once created, an outline can easily be expanded into a complete article, story, report, or other document.

Laser Author uses frames for its text, an indication of its page-layout orientation. You can quickly resize a frame, and the text immediately jumps to fill it. Note the always-active word count at the bottom left of the screen.

WriteNow is the Pegasus of Macintosh word processors—swift, easy to learn and use, and packed with power. It lacks the omnipotence of Word, but its speed and graceful design make it a writer's delight.

WriteNow's powers are significant. It allows four columns per page and endless windows. It offers any point size between 4 and 127, and permits global changes to fonts, font sizes, and styles. It performs automatic footnoting, soft hyphenation, multileveled superscript and subscript, and guttering.

Ease of Learning WriteNow is easier to learn than any other program listed here except for MacWrite.

Ease of Use This program's speed makes it highly responsive and gives you a sense of floating on a thin cushion of air. It also has numerous other sleek functions, including Select All and a compact Save. It can keep a selected block, like a table, all on the same page, and, under certain conditions, even do print spooling. However, WriteNow lacks word count. Translator, its auxiliary conversion program, moves documents from MacWrite and Word 1.05 into WriteNow, but not back. This awkward method of importing other processor's documents is WriteNow's main detraction, and it's inexcusable given the abilities of most other word processors.

Summary WriteNow is primarily a straightforward word processor with some layout capac-
Microsoft Word 3.0 strode into the Macintosh word-processing world to hearty nodding acclaim—acclaim that was angrily retracted when 3.0 was found to be riddled with bugs. The newest update, 3.01, largely corrects those bugs and shows exactly what this software can do. Despite a certain awkwardness, it will likely become the major Macintosh word processor.

**Features** For sheer strength, Word has no competition on the Macintosh. Indeed, it has far too many features to list here. It makes you feel like you’re in a great hotel in which the room anticipates your every need. You may not require all the extras, but it’s nice to have them on call.

Word 3.01 allows as many columns per page as you want, and it lets you format them as tables, independent side-by-side entities, or newspaper-like columns with prose flowing from one column to the next. It footnotes with automatic numbers, daggers, or asterisks. It does indexing (including subentries) and guttering, as well as tables of contents. It will also automatically hyphenate all appropriate words in a document, which is a very likable feature.

Word performs a variety of formatting and stylistic tricks. It paginates by Arabic numbers, large or small Roman numerals, and upper- or lowercase letters. It can box or bar paragraphs with single line, thick, double line, and shadow options. It offers double underline, dotted underline, strikethrough, small caps, and all caps. It can prevent a page break between two adjacent paragraphs or between parts of a single paragraph. It lets you automatically set spacing for the lines before and after paragraphs, and it has widow control—preventing single lines from becoming separated from the rest of the paragraph.

In addition, the program boasts a wide range of keyboard powers. By using the Command key, you can Select All, delete the previous word, repeat the prior command, move the insertion point to its previous location, jump to the start or end of the document, and do much more.

**Ease of Learning** Word has online help and a Short Menu option, which reduces the choices in the menus for those doing simple tasks. However, these features do
not make up for its documentation, which is terrible—a loose-leaf reference manual arranged alphabetically. The manual is complete, but this territory needs a guidebook, not an encyclopedia.

**Ease of Use** As the Superman of Mac word processors, you'd expect Word to possess a certain grace. In fact, in many ways Word is easy to use, partly because of its power. For instance, it lets you change spacing or justification of only selected text; it can display documents as wide as 22 inches; it offers Fast Save and an option to make a backup save; and it lets you delete other documents from within a Word document. You can create your own menu items for common commands or glossary entries; Word converts to and from ASCII, MacWrite, Word 1.0, Word MS-DOS, and RTF; and it works with a variety of printers.

**Summary** Word 3.01 is really an integrated word-processing package. It has a spelling checker, an outliner, a sort capacity, and print-merge facilities. Its glossary can store prose or pictures, and it can render complex math formulas. Yet even here, its occasional obliqueness is apparent. For instance, you can't add to or delete from the main dictionary. Instead, you create additional dictionaries and place new entries there—a strange procedure. The outliner lets you assign heading levels, expand and collapse text, number headings, print the outline, and prepare a table of contents.

However, Word lacks a real Macintosh follow-through. This limitation shows up in several ways, and none of them enhance ease of use. First, it does not supply full WYSIWYG (What You See Is What You Get). It presumes you should write the prose first and format it later, and as a result, it doesn't display headers or footers, footnote position, multiple columns, or side-by-side paragraphs. In addition, it does not automatically update page breaks, so you must select Repaginate each time you want to see how much more you've written.

In compensation, Word offers Page Preview, which lets you peek at two adjacent pages to see how they'll look when printed. Page Preview magnifies parts of...
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the page so that you can read the text; it also lets you add the page number and adjust the page number position, adjust page breaks, change margins, adjust position of headers and footers, and print out a page or range of pages. It's a slick feature, and the lofty overview adds a helpful perspective, but it shouldn't be required. A true WYSIWYG would have been better.

Moreover, certain parts of Word retain a command orientation. You must type in specific instructions to carry out mail merge, math formulas, table of contents, and indexing. Mail merge actually involves a mini-BASIC language with commands like DATA, IF, and ELSE. The others use letter codes.

Finally, Word has a few important omissions, odd in such an omnibus. It does character count, but not word count; it has no Revert to Save; and it doesn't remember the Show Ruler command.

Despite these lapses, Word is marvelous. It's like a Mozart or an Edison, whose occasional gauche-
It's Not Fair

Why can't I upgrade my Apple IIc to an Apple IIgs? After all, owners of the IIc can upgrade.

It's not a matter of Apple intentionally ignoring Apple IIc owners, but more a matter of physics.

There's just not room in the IIc's case for the IIgs circuit board. The upgrade from the IIc to the IIgs involves swapping the circuit board (also called the motherboard). The IIc's motherboard is pulled out and a IIgs motherboard put in. The back panel of the computer is also changed to a IIgs-style row of connectors. These include two 8-pin mini-DIN serial ports (identical to the IIc's) and an analog RGB port (for the Apple Color RGB monitor), and the Apple Desktop Bus port (normally used to connect the IIgs keyboard).

Even if the IIgs motherboard could be fit inside the IIc, there's the matter of slots. Much of the power, and all the flexibility, of the IIc and IIgs comes from the computer's slots. In effect, you can create your own custom computer by adding memory boards, internal modems, video cards, and more. The width of the normal card is larger than the thickness of the Apple IIc's case. You just couldn't get the case closed with boards inside.

If you have an Apple IIc, don't despair. You haven't been left with an orphan. Thousands of pieces of software run on your computer, and more is written everyday. The IIgs hasn't begun to dominate the Apple II line. And your computer's greatest advantage—its portability—still remains. Try lugging around a IIgs's system box, keyboard, mouse, and disk drive, and you'll be thankful for your IIc.

ProDOS Mystery Files

When I CATALOG one of my ProDOS disks, I see a couple of strange-looking files. In the column that normally lists things like BAS, BIN, or TXT, it says $B3 instead. What are they? Can I do anything with them?
The $B3$ file type indicates a SYS16 file, a new creation of Apple's. This is a 16-bit system program for the IIgs computer and its ProDOS 16 operating system, the equivalent of an 8-bit system program like BASIC.SYSTEM (type SYS). When ProDOS 16 shows a disk's catalog, it lists this type as S16. Since ProDOS 16 only runs on an IIgs, and SYS16 files only run under ProDOS 16, there's not much you can do with one of these files on an Ile or IIc.

The eight-bit ProDOS operating system was written long before the IIgs showed up, so it doesn't recognize this new file type. Rather than display a name—like BAS or DIR—it just shows a number.

All ProDOS file types are stored internally as numbers between 0 and 255. You might recognize this range of values as the limits of a number with eight binary digits or bits: that's precisely the amount of space a file type occupies in a disk directory. When you CATALOG a disk, ProDOS usually understands the file-type numbers of all the files and shows their three-letter abbreviations. If it doesn't, it displays a base-16 (hexadecimal) number. The leading dollar sign is a symbol for hex notation, and the number itself takes two digits, in the range 0-9 or A-F.

Here's a list of the 8- and 16-bit file-type values, along with their three-letter abbreviations and a short description.

<table>
<thead>
<tr>
<th>File Type</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$00</td>
<td>BAD</td>
<td>Bad block file</td>
</tr>
<tr>
<td>$01</td>
<td>TXT</td>
<td>ASCII text file</td>
</tr>
<tr>
<td>$04</td>
<td>BIN</td>
<td>General binary file</td>
</tr>
<tr>
<td>$08</td>
<td>POF</td>
<td>Graphics screen file</td>
</tr>
<tr>
<td>$0F</td>
<td>DIR</td>
<td>Directory file</td>
</tr>
<tr>
<td>$19</td>
<td>ADB</td>
<td>AppleWorks database file</td>
</tr>
<tr>
<td>$1A</td>
<td>AWP</td>
<td>AppleWorks word processor file</td>
</tr>
<tr>
<td>$1B</td>
<td>ASP</td>
<td>AppleWorks spreadsheet file</td>
</tr>
<tr>
<td>$1C–$1F</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>$20</td>
<td>SRC</td>
<td>APW source file</td>
</tr>
<tr>
<td>$23</td>
<td>S16</td>
<td>ProDOS 16 application program file</td>
</tr>
<tr>
<td>$24</td>
<td>RTL</td>
<td>APW runtime library file</td>
</tr>
<tr>
<td>$25</td>
<td>EXE</td>
<td>ProDOS 16 shell application file</td>
</tr>
<tr>
<td>$26</td>
<td>OBJ</td>
<td>ProDOS 16 permanent initialization file</td>
</tr>
<tr>
<td>$27</td>
<td>LIB</td>
<td>ProDOS 16 temporary initialization file</td>
</tr>
<tr>
<td>$28</td>
<td>NDA</td>
<td>New disk accessory</td>
</tr>
<tr>
<td>$29</td>
<td>CDA</td>
<td>Classic disk accessory</td>
</tr>
<tr>
<td>$2A</td>
<td>BA</td>
<td>Tool set file</td>
</tr>
<tr>
<td>$2B–$2E</td>
<td></td>
<td>Reserved for ProDOS 16 load files</td>
</tr>
<tr>
<td>$2F</td>
<td>BF</td>
<td>ProDOS 16 document file</td>
</tr>
<tr>
<td>$30–$3E</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>$3F</td>
<td>PAS</td>
<td>Pascal area on a partitioned disk</td>
</tr>
<tr>
<td>$40</td>
<td>CMD</td>
<td>ProDOS 8 CI added command file</td>
</tr>
<tr>
<td>$41–$4F</td>
<td></td>
<td>ProDOS 8 user-defined files 1-8</td>
</tr>
<tr>
<td>$50</td>
<td>INT</td>
<td>Integer BASIC program file</td>
</tr>
<tr>
<td>$5B</td>
<td>BAS</td>
<td>Integer BASIC variable file</td>
</tr>
<tr>
<td>$6D</td>
<td>VAR</td>
<td>Applesoft BASIC program file</td>
</tr>
<tr>
<td>$7E</td>
<td>REL</td>
<td>Relocatable code file (Merlin)</td>
</tr>
<tr>
<td>$7F</td>
<td>SYS</td>
<td>ProDOS 8 system program file</td>
</tr>
</tbody>
</table>

But What About The GS?
When I write programs, I like to share them with friends and upload them to bulletin boards. Now that IIGs computers are around, I'm concerned that my programs might not be compatible with them. Since I'm not ready to buy one for myself yet, how can I tell if my programs will run?

If you're programming in BASIC, you have very little to worry about. The Applesoft language is completely unchanged and practically all pure BASIC programs run without any trouble. One significant difference between machines is that text page 2 (which is the same as lo-res page 2) isn't supported on the IIGs in emulation mode. Programs that use this page won't run correctly.

Even most machine language (ML) programs are compatible. The memory map—including zero page, language cards, and the auxiliary memory bank—is exactly the same. One kind of problem occurs with programs which use I/O addresses which were labeled reserved. Some of these are now used for new hardware and could cause problems.

Also, programs which directly access serial-port and mouse-port registers probably won't work right, since this hardware is different on the IIGs.

ML code which calls routines in the Applesoft ROM won't give any trouble; this range of ROM ($E000–$FFFF) is totally unchanged, byte-for-byte, so anything goes. There are some major changes in the monitor ROM ($F800–$FFFF), so if your program calls undocumented routines, or calls a documented routine at an address other than its published entry point, you might have trouble.

This seems to be the rule: If the list of entry points in Apple's Reference Manuals (Ile, IIc, and IIe) includes the name and address of a routine, it's still available. Knowing when to quit the ProDOS version of Apple SpeedScript, besides turning off the computer (or pressing Open Apple-Control-Reset, which is the same thing)? It would be nice if I could leave the program without clearing my ramdisk, resetting ProDOS's current date, and so on.

Here's a BASIC program which patches the ProDOS version of Apple SpeedScript (and only the ProDOS version) so that it can call the standard ProDOS Quit function. It will work on both the 40- and 80-column versions of SpeedScript. When you type it in, change the first filename in line 100—it's S$SYSTEM now—to match the filename of your copy of SpeedScript.

```
100 LO$ = "$S.SYSTEM"; SA$ = "$S QUIT.SYSTEM "
110 PRINT CHR$(4)"BLOAD "LO$, A$=00800,TBSYS"
120 POKE 8866,141: POKE 8871,36
130 FOR I = 15551 TO 1+ 56: RE
140 IF C < 6329 THEN PRINT "C CHECK DATA STATEMENTS FOR ER ROR$": END
150 PRINT CHR$(4)"CREATE "SA$, TBSYS"
160 PRINT CHR$(4)"SAVE "SA$, A$=00800,L91CFB,TBSYS"
170 DATA 32,138,16,32,166,10
180 DATA 169,182,166,36,32,213
190 DATA 9,32,233,9,281,217
200 DATA 240,7,76,168,16,32
210 DATA 132,294,32,9,191,181
220 DATA 173,36,4,0,0,0
230 DATA 0,0,0,0,0,209
240 DATA 213,281,212,168,206,20
250 DATA 215,160,219,217,175,20
260 DATA 221,191,0
```

To try the new version, use the ProDOS smart run command: -SSQUIT

For more information about file types, ProDOS 8, and ProDOS 16, pick up a copy of COMPUTE!'s Apple IIgs Machine Language for Beginners (19.95), written by Roger Wagner. The accompanying table, and much more, can be found there.
Your dilemma, however, is that you
Either way, you can continue to use
(Note: Some commercial software li-
If your current Apple computer has
more on a single disk. Other licenses aren't specific about backup.
software is not copy-protected, you can
thecomputer, at a tutorial disk and the
library. Like many Apple computer own-
erers, you’ve got a considerable investment
in that library. One of the advantages of the Apple IIgs is that it can run almost all Apple II programs. The only thing you need is a 5¼-inch drive.
If your current Apple computer has an external 5¼-inch drive, you can use that with your new IIgs. Remove the disk controller card from your Apple II+ or IIe, plug it into slot 6, and connect the drive. You’ll have to enter the IIgs’s Control Panel and set slot 6 to read Your Card. Connect your 3½-inch drive(s) to the disk drive port at the back of the computer and you’re ready.
If you plan on selling your entire Apple system (or you have an Apple IIc, which means you don’t have a usable external 5¼-inch drive), you should buy one 5¼-inch drive when you purchase your IIgs system.
Either way, you can continue to use your 5¼-inch disks with your new computer. However, you might want to transfer data and programs which you’ve written yourself to 3½-inch disks, simply because you can store so much more on a single disk.
(Note: Some commercial software licenses don’t allow you to make backup copies to a different format—in other words, from 5¼-inch to 3½-inch format. Other licenses aren’t specific about backup formats. If that’s the case, and the software is not copy-protected, you can back up the program to a 3½-inch disk.)

User Group For Me?
What's a user group? Should I join one, and if so, where can I find one?
A user group is simply a collection of computer users who share a common interest. That interest may be a particular computer, such as the Apple II, or an application for computers in general, such as desktop publishing.
You'll find both beginning and experienced computer users in almost every group, so there's a wide range of abilities and knowledge. That's one reason to join—no matter what your problem, whether it's getting your printer to work with a stubborn piece of software or finding just the right programming technique, it's likely someone in the group has the answer.
Because of the lead time for publications (this issue, for instance, is being put together in August), you'll find Apple product news circulating in user groups long before you read about it in a magazine. User groups make it easy for you to keep up with what new software or hardware is available, and how people use it. That, in turn, may make your hardware- and software-buying decisions easier.
Another reason to join a user group is access to a huge collection of programs. User groups are an excellent source of public domain (free) and shareware (small fee if you use it) software. If you don't have a modem or aren't able to use one of the commercial database services like CompuServe, GEnie, Delphi, and others, user groups are your only real way to find this kind of software. User group members, on the average, write more programs of their own than average Apple users, so that's another source of software.
You can look for a local user group in one of several ways. Visit a local Apple dealer and ask if they'd recommend a user group. Members may have posted notices in the dealer's store, or the dealer may be a member. Another way to locate user groups is through magazines like this. COMPUTE's Apple Applications has published complete lists of all registered Apple user groups several times and will continue to do so in the future. A third way is to contact Apple directly. Ellen Leans, Chief Apple User Group Evangelist, can steer you toward the closest user group. Contact Apple Computer, 20525 Mariani Ave., Mail Stop 36f, Cupertino, CA 95014.

Less Than Zero
I know that typing CALL -151 on an Apple II runs the monitor program, but what is it really doing? How can a machine language program start at a negative memory address?
Like any other computer, all the Apple II's memory addresses are positive integers. In the Apple's case, these addresses span the full 16-bit range, from 0 to 65535. Apple equipped its first machines with Integer BASIC, a language that couldn't understand numbers larger than 32767. In PEEK, POKE, and CALL commands, address values between 32768 and 65535 had to be expressed as negative numbers between -32768 and -1. Computer scientists use the name two complement arithmetic for this method of representing negative numbers. If you add the negative address to 65536, you'll find the equivalent positive number.
Integer BASIC was rather short-lived. Apple soon introduced the current BASIC, Applesoft, which understands real numbers and has a much larger range. But Applesoft permits either positive or negative numbers for addresses, mostly for the convenience of programmers accustomed to Integer BASIC. There's an added bonus to this feature: some memory addresses—like the monitor's entry address of 65385—are much easier to remember as negative numbers. If you use the monitor much at all, you'll have no trouble remembering -151, but recalling the true address, 65385 (65536 -151), takes a bit more thought.

Disk Drive Dilemma
I am going to purchase an Apple IIgs computer. I noticed in an advertisement that the computer was shown with the 3½-inch drive. Does that mean I should get one of those and copy all my 5¼-inch disks onto 3½-inch disks? Since I have over 100 floppies, and many are originals that don't copy easily, I am inclined to think that not is what I should do. Is there software on 3½-inch disks? I am quite worried that either one I get will be the wrong choice.
Apple's ads for its IIgs show only 3½-inch disk drives because that's the format Apple has chosen for the computer's system software. The disks which come with the computer, a tutorial disk and the Systems disk, are of the 3½-inch variety.
All the IIgs-specific software so far released—from games like Mean 18 to applications like Top Draw—are on 3½-inch disks. Few IIgs software publishers are offering a 5¼-inch disk as an alternative. Obviously, both Apple and the IIgs software developer's community expect all Apple IIgs owners to have at least one 3½-inch drive.
Your dilemma, however, is that you want to use your existing software library. Like many Apple computer owners, you've got a considerable investment in that library. One of the advantages of the Apple IIgs is that it can run almost all Apple II programs. The only thing you need is a 5¼-inch drive.
If your current Apple computer has an external 5¼-inch drive, you can use that with your new IIgs. Remove the disk controller card from your Apple II+ or IIe, plug it into slot 6, and connect the drive. You'll have to enter the IIgs's Control Panel and set slot 6 to read Your Card. Connect your 3½-inch drive(s) to the disk drive port at the back of the computer and you're ready.
If you plan on selling your entire Apple system (or you have an Apple IIc, which means you don't have a usable external 5¼-inch drive), you should buy one 5¼-inch drive when you purchase your IIgs system.
Either way, you can continue to use your 5¼-inch disks with your new computer. However, you might want to transfer data and programs which you've written yourself to 3½-inch disks, simply because you can store so much more on a single disk.
(Note: Some commercial software licenses don't allow you to make backup copies to a different format—in other words, from 5¼-inch to 3½-inch format. Other licenses aren't specific about backup formats. If that's the case, and the software is not copy-protected, you can back up the program to a 3½-inch disk.)
The Fall And Rise Of Computer Games

Dan Gutman

And I thought computer games were dead!

"You used to be the editor of Computer Games Magazine, didn't you?" I was asked recently by Gregg Keizer, who happens to be the editor of this thing. "How about writing a column on entertainment software?"

Sure, I started Computer Games. But that was before the computer games industry crashed and burned like a bad night of Flight Simulator—with my magazine on the runway. I remember it like it was yesterday.

On January 18, 1982, Time Magazine’s cover story shouted, “Video Games Are Blitzing the World.” It was one of those funny, faddy times. America was going Pac-Man crazy. There were hit songs, books, and movies about video games. They were installing arcade machines in laundromats and hairdressing salons. There were the inevitable experts saying that video games were turning the nation’s youth into brain-dead zombies, which made the kids want to play video games all the more.

*Time* said that Americans were spending more money on video games than on baseball, football, and basketball combined. More than on movies and records put together. More than twice the take of all the casinos in the country. Everybody was talking about the new national craze. It was the gold rush of the early 80’s.

At the time, I didn’t know a joystick from a trackball. I was the editor-in-chief of *Stag* Magazine. Yes, a girlie magazine. But after spending one night with a friend playing *Space Invaders* until four in the morning, I was hooked.

I marched into my publisher’s office with a suggestion—let’s put out a magazine about video games—with me as the editor. It was perfect—I wanted to break out of girlie mags and he wanted to break into the legitimate publishing world. He gave me the OK to work on the project in my spare time.

We started *Video Games Player* in March of 1982, and the first issue came out that September. I was the only employee of the magazine, but we put a bunch of names inside so it would look impressive.

These were simpler times. Words like Macintosh, ST, and IIGS meant nothing in those days. State of the art was the Commodore VIC-20, sporting a full 5K of memory.

**Rock-'n'-Roll Computing**

I remember when a little company named Amiga came out with this goofy thing called the Joyboard. It was a controller that you’d stand on and rock back and forth to manipulate the screen. I fell off it and almost had a concussion playing *Centipede* one night. The company had a little more success with a computer they were working on at the time.

The first issue of *Video Games Player* featured a centerfold of *Zaxxon*. To give you an idea of what was happening, the big controversy in those days was whether the Atari 2600 or Mattel’s Intellivision featured the best graphics. There were eight software companies at the time. One (Activision) is still making software today. In the next issue, there were 37 software companies. Video games were booming, the magazine sold well, and I was gone from girlie magazines forever.

A rash of video game titles were flooding the market:

- Eggomania
- I Want My Mommy
- Demolition Herby
- Revenge of the Beefsteak Tomatoes
- The Im mortal Communist Mutants from Space

Everybody wanted to get a piece of the action. Some of the games were fun; most were really stupid. At the end of the year we gave our Golden Joystick Award for the best game of the year to *Shamus* by Synapse Software.

Suddenly, I was an authority on gaming. That’s what happens when you put out a magazine—everybody figures you’re an expert in the subject. Reporters from the *Wall Street Journal* would call me up to get my opinion and quotations about industry trends.

As the first wave of the personal computer boom started, the video games market began to taper off. People began to say to themselves, “Why should I buy a video game system when I can buy a computer that will play games and do so much more?” On October 17, 1983, the *New York Times* announced, “Video Games Industry Comes Down to Earth.”

That January, *Time* put the personal computer on its cover and called it Machine of the Year. Video games were officially dead and computers were hot. In our October 1983 issue, we announced a change in the name of the magazine from *Video Games Player* to *Computer Games*. The Golden Joystick Awards came to be called The Golden Floppies. I noticed that the word *games* became a dirty word in the press. We started replacing it with *simulations* as often as possible.

My publisher finally gave me permission to hire a managing editor, and I picked a guy named Shay Addams. With complete freedom to do what we wanted, he and I got a little crazy. In the June 1984 issue, we poked fun at Coleco and IBM with a fake full-
Boring Computing

I always thought computer magazines were dull, and in our February 1984 issue, we did a parody of all of them—Boring Computing: The Computer Magazine for Computer Fans Who Love Their Computers and Want to Read About Computers 24 Hours a Day.

Boring Computing had articles like:

- Software Piracy: Who Cares?
- Electronic Cottage Cheese
- I Axe-Murdered My Users Group
- Mystic Modem (the first product to make it possible to telecommunicate with the dead)
- Bankruptcy Street Writer (the word processor for software companies on the rocks)
- Exclusive Photos of People Standing Next to their Computers
- How to Turn Your Bathroom into a Mainframe
- We Rate the Styrofoam from Computer Boxes

Ah, those were the days. Sometimes I would have to pinch myself. There I was, earning a pretty decent living sitting in a fancy office and playing games all day. Thousands would kill for a job like that.

Unfortunately, utopia didn’t last. Shakeout! The computer slump began and all those industry analysts who had predicted a computer in every home had changed their minds. Suddenly, everybody was saying that the home computer was a fad, just another hula hoop.

Computer companies were dropping like flies. It became harder and harder for the magazine to attract advertisers—there simply weren’t many left. The magazine started getting thinner with each issue. My publisher began jacking up the price to make up for lost revenue.

One by one our competition bit the dust. Videogaming, Electronic Games, Video Games, Vidiot, and Electronic Fun all went out of business. It was fun watching them fall by the wayside, but we knew the end was near for us, too. I was told to use black-and-white pages in the magazine to save money.

On January 1, 1984, Coleco gave up on their Adam computer. In March, IBM gave up on the PCjr. In June, the New York Times proclaimed, “Computer Makers in a Severe Slump.”

In September, I got the word to move out of my office. My publisher was losing $25,000 on each issue and had decided to pull the plug on Computer Games. Shay and I had just written and turned in a book on computer games to Simon & Schuster, but the deal fell through when the magazine folded. According to the press, computer games, if not the home computer itself, were dead.

Do What With A Computer?

I never really believed that. The computer is simply too powerful a tool to disappear so easily. While all the newspapers were saying that the home computer had failed because there was nothing useful the average person could do with it, I saw hundreds of uses. I wrote a book called I Didn’t Know You Could Do THAT with a Computer! (COMPUTE! Books) and waited for the shakeout to play itself out.

And that’s exactly what happened. Personal computers started getting more powerful and became easier to use. The companies that were putting out bad games went out of business, and the companies that were putting out good games started putting out even better ones. More and more people began using computers in their offices, in school, and at home.

If you read the papers now, they say the home computer, and computer games, have come back from the dead. Apple is selling Macs and Apple IIs like frozen daiquiris on a hot day at the beach. Commodore has stopped losing money. Atari is riding high under the Tramiels. Nintendo sold a million of their Nintendo Entertainment Systems last Christmas, and Sega and Atari have hot-selling game systems as well.

Broderbund is talking about making a public stock offering. Electronic Arts and Mindscape are swallowing up every small company in sight. Toy and Hobby World Magazine reports that entertainment software sales went from $100 million in 1985 to $300 million in 1986, and they say it could hit $800 million this year.

Computer games are finally being seen as a legitimate form of entertainment and education. Magazines are starting up entertainment software columns—like this one.

I guess the home computer isn’t just another Pet Rock after all.

Dan Gutman is the author of I Didn’t Know You Could Do THAT With a Computer! (COMPUTE! Books) and writes a syndicated newspaper column of the same name. His column on computer entertainment will be appearing in every issue of COMPUTE!’s Apple Applications.
Each issue, Tips, Tricks, and Tidbits serves up a wealth of inside information on programming and application software for Apple II and Macintosh personal computers. If you have an interesting (and unique) solution to a programming problem, or a tip or tidbit on almost any popular application program, send it to Apple/Mac Tips, COMPUTE!'s Apple Applications, P.O. Box 5406, Greensboro, NC 27403. We'll pay $25-$550 for each tip we publish.

[Editor's Note: For the debut of Tips, Tricks, and Tidbits, we asked Vincent O'Connor, a collector of Apple programming and application software bugs, to share some of his tidbits. He offers four notable bugs—one each in BASIC, DOS 3.3, ProDOS, and AppleWorks—and their elegant solutions, below.]

**BASIC And Decimals**

Since the introduction of the Apple IIe, Applesoft BASIC has been built into the ROM of every Apple II computer. This, along with the wealth of programs written in Applesoft BASIC and books on how to write programs in it, makes Applesoft BASIC a popular programming language. Originally written by Microsoft in 1978, Applesoft has not been changed, despite the upgrades to the Apple II line, including the IIGS. Even though the IIC and IIGS ROMs were upgraded (the tape cassette commands were eliminated and the space reused), the bugs were left intact. While this has the obvious advantage of maintaining compatibility—allowing an Applesoft BASIC program written on a II+ to run on a IIGS—it also means that the bugs went unfixed.

And since Applesoft BASIC is within ROM—the computer's permanent memory, which isn't modifiable—you can't load it into RAM and then change or patch it.

There are other ways to deal with BASIC bugs on the Apple, but for the most part they're too technical. What's left is finding ways to either bypass the bugs or fix them in ways that use only Applesoft BASIC commands.

That's what we've done with the following bug.

Like most versions of BASIC available for personal computers, Applesoft doesn't always handle decimals correctly. Let's look at some examples of where this can happen, and how to avoid the problems that occur.

**FOR-NEXT.** To begin with, FOR-NEXT loops simply don't execute correctly with decimals in them. Type in and run the following program:

```
10 FOR I = 1 TO 2 STEP .1
20 PRINT I
30 NEXT I
```

If the program ran correctly, it would print 1, 1.1, 1.2, and so on, up to 2. But it actually prints 1, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9. There is no 2. Why? Because the numbers are actually slightly larger than they appear. PRINT rounds them off to five significant digits to produce what you see on the screen. This means that when I should equal 2, it actually equals slightly more than 2. Thus, the FOR-NEXT loop doesn't execute, since it's not supposed to go past 2 (FOR I=1 TO 2, remember?).

If at all possible, use only whole numbers in your FOR-NEXT loops. If this isn't possible, use whole numbers in the loop and convert them to decimals when you need to. Using this method, the program above would be written like this:

```
10 FOR I = 10 TO 20
20 PRINT I / 10
30 NEXT I
```
Like its predecessor, ProDOS is Apple's newest disk operating system and is much more powerful than DOS 3.3. It beeps up many of the DOS 3.3 file-handling commands and adds some new ones, as well. It is several times faster when accessing disk drives; it supports files up to 16 megabytes in size; and it does string garbage collection at lightning speed. ProDOS also comes as two files, one labeled PRODOS and the other labeled BASIC.SYSTEM. Unlike DOS 3.3, which puts an image of itself on a disk every time you format one with the INIT command, ProDOS has no command to format a disk. This means you have to manually copy the two files to a disk after the disk has been formatted. The easiest way to copy PRODOS and BASIC.SYSTEM to the newly-formatted disk is with FILER (which comes on the ProDOS User's Disk) or the Copy Files option on the IIc or IIgs Systems Utility Disk.

Like its predecessor, ProDOS has its share of bugs. To make matters worse, it's frequently updated. There are several versions, all containing slightly different bugs. One of the worst can be found in versions 1.1.1 and 1.2 (the latter is also known as ProDOS 8, labeled P8 on the System disk which comes with the IIgs, and is dated 06-SEP-86).

These versions of ProDOS have a tendency to destroy track 0 on standard 5 1/4-inch disks. That's disastrous because track 0 contains the directory. If track 0 is destroyed, the disk is useless (unless you can reformat only that track and then rebuild the directory—not a job for the faint-hearted). Worse, this is the version of ProDOS that's distributed with AppleWorks 1.2 through 2.0. The source of the bug (discovered by Stephen Thomas of Maclagan, Wright, and Associates, of Australia) lies in the way the floppy driver (the section of code which turns on the drives) reads and writes to the disks. Thomas suggests two small changes to correct the problem; the following listing is a short program that makes these suggested changes. Type in Program 2 and save it to disk as PRODOS.PATCH.

See DOS Run, Don't See DOS Run

DOS 3.3 is the older of the two currently-used Apple disk-operating systems. Although Apple no longer supports DOS 3.3, thousands of programs, commercial and amateur alike, still run under it. Like BASIC, DOS 3.3 has its share of bugs, but unlike Applesoft, it's disk-based. That makes it easier to fix bugs, since DOS can be patched, then saved back to disk.

One DOS 3.3 bug involves its MON and NOMON commands. MON displays some kinds of information sent to and from your disk drive, on the screen. The information includes commands a program sends to DOS 3.3, anything that's transferred from a disk to memory using either the READ or EXEC commands, and data transferred from a program to disk using the WRITE command. NOMON simply turns off the MON command.

These two commands are useful in finding and fixing problems in programs that access the disk. The problem is that every time you do a Control-Reset on an Apple IIe, IIc, or IIgs, or use FP or INT on any Apple II, the computer thinks you've just executed a NOMON command. Since hitting Control-Reset is quite common when debugging a program, it's very frustrating to constantly reissue the MON command. To fix this bug, type in Program 1 and save it as MON/NOMON FIX.

Program 1: Fix it MON

```
5 REM FIX MON/NOMON Bug In DOS 3.3
10 TEXT : HOME : CLEAR
15 IF PEEK (48896) = 76 THEN VTAB 121: PRINT "SORRY, THIS WILL NOT WORK UNDER PRODOS": END
20 FOR I = 40487 TO 40489: POKE 1,2344: NEXT I
25 VTAB 121: PRINT "MON/NOMON PATCH INSTALLED": END

Load and run it by entering

RUN MON/NOMON FIX
```

When you run the program, the bug is fixed. Now, when you issue a MON command, it won't be turned off unless you enter a NOMON command.

This only fixes the copy of DOS 3.3 in memory, so you must run it every time you boot a DOS 3.3 disk. You can do this by naming the program HELLO, which then automatically runs every time you boot the disk.

You can also use the program to make sure the fix is on any new DOS 3.3 disks you initialize. To do this, run the program, insert a blank unformatted disk into the drive, and type

```
NEW <Return>
```

This means you have to manually copy the two files to a disk after the disk has been formatted. The easiest way to copy PRODOS and
Choose the version of ProDOS you’re patching. The program does the rest, including checking for sufficient memory to load the ProDOS system file, and insuring that you are patching the right version of ProDOS.

AppleWorks Spreadsheets Won’t Load
AppleWorks, Apple’s integrated word processor/spreadsheet/database software, has sold more copies than any other Apple program. For a short time, it sold more copies per month than Lotus 1-2-3, the perennial best-seller of the IBM world.

Despite its limitations, it is extremely popular not only because of what it can do, but also because of the wealth of add-on programs available.

Although it is not generally known and is not documented in the manual, there’s a limit to the number of data bytes that can be entered and saved is larger than the number of bytes that can be loaded. This can result in a situation in which you create a spreadsheet that can’t be loaded.

The only sure way to prevent this problem is to avoid placing anything in columns CS-DW (DW is the last available column). There are situations in which you can use these columns, but they’re dependent on the total number of bytes that exist in the other columns, and they lack any way to accurately determine that number of bytes—it’s not worth the risk.

If you’re working in a large spreadsheet and get the message Some cells were lost from row X, with X being the row you were working in, use Open Apple-B to blank all cells in that row from CS to DW, and place the information elsewhere in your spreadsheet. This should make it possible to safely save the file. To be sure, save it on a different disk—that way you won’t have lost everything if you’re unable to reload the file.

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DEALER INQUIRIES WELCOME

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The Clipper

Jenny Schmidt

Cut images from any high-resolution screen, save them as clip-art files, and paste them down again to make new and unusual pictures with "The Clipper," an impressive software package for all Apple II computers. This menu-driven program runs under either DOS 3.3 or ProDOS.

Scissors in hand, you cut pictures out of an old magazine or catalog. The glue is next, as you paste those pictures to paper. You've just created a work of art. Call it a collage if you're over five years old, or refrigerator art if you're not.

You can do the same thing with your Apple II computer now that you have "The Clipper," a sophisticated software package that comes in two parts. The first part, "Clip Maker," cuts images from different hi-res pictures, combines them in libraries, and saves them to disk as clip art. The second, "Clip Plotter," electronically pastes together those images to make new screens.

And though it's not strictly a drawing program, the Clipper system offers features for modifying your works of art. It's easy to change colors in a clipping or to paste down dozens of versions of the same image.

It doesn't even matter how the art was originally created, or with what drawing program. Clipper can combine art drawn by any program that saves work as standard Apple hi-res screens. Whether you're using MousePaint on the Apple IIc, 816/Paint on the IIGS, or COMPUTE!'s own "Picture Maker" (Spring/Summer, 1987) on the Ile, you can peel off images and put them back together again.

Software System

Clipper is actually two separate BASIC applications and one machine language program. You'll need to type in and save all three listings to use the entire Clipper system.

Type in Program 1, Clip Maker, using "Apple Automatic Proofreader," the error-checking utility included in this issue. Once you've entered it, save it to a disk (one that has been formatted with either DOS 3.3 or ProDOS) as MAKER.

Next, type in Program 2, Clip Plotter. Save the completed program to the same disk that Clip Maker is on, but call it PLOTTER.

The last listing, Program 3, is a machine language routine that Clipper needs. Program 3 is listed in COMPUTE!'s Apple Applications' MLX format for easy entry, so you need a copy of "Apple MLX" on disk before you begin typing it in. Load and run MLX, and then answer the two prompts as follows:
STARTING ADDRESS? 9300
ENDING ADDRESS? 95EF

Press E at the options menu to enter the program, then type the starting address. If this is your first session at entering Program 3 with MLX, type 9300. Type in Program 3, and, when you're through, save it to the same disk as the other two programs. Make sure you name it CLIPPER, the filename both Program 1 and Program 2 expect to find on the disk.
Snipping With Clip Maker

Clip Maker and Clip Plotter are very easy to use. They’re menu driven and Clip Plotter even has an UNDO option.

Since you haven’t made any clippings libraries, start with Clip Maker. Place the Clipper disk in the drive, type RUN MAKER, and press Return. A moment later, the main menu appears at the bottom of the screen.

MAIN MENU:
CLIP:
<NEXT> SHOW REMOVE NEW FILE
FIND PIN ADD VIEW QUIT

Make selections from the menu by moving the brackets with the left- and right-arrow keys to the appropriate feature and pressing Return. Since you probably don’t want to clip from a blank screen, you need to load a picture. Insert a disk which contains one or more Apple hi-res picture files in either disk drive and select FILE. The menu changes to show:

FILE MENU:
<LOAD> SAVE MERGE DELETE
DRIVE CATALOG PICTURE MAIN

If you put the hi-res picture disk in drive 2, change the drive number by choosing DRIVE and entering the correct drive number.

Select PICTURE to load a picture. Type in the picture’s filename (you can type ? and press Return to view the disk’s catalog). You’ll have to confirm that you want to erase the current picture by loading a new one. Press Y for Yes. Note: You are not erasing anything from disk—only from the Apple’s memory.

Once the picture loads and appears on the screen, go back to the main menu by picking MAIN. You’re ready to start clipping. Move the cursor (you may have trouble seeing it in a complex picture—it’s a tiny crosshair in the middle of the screen) with the I, J, K, and M keys.

You can move the cursor in small or large increments by pressing keys 1–9. The cursor moves the same number of plotting points as the number key last pressed. Press 6, for instance, and the cursor jumps in increments of six plotting points.

Clipping Libraries

Use the cursor to box the image you want to clip. Move the cursor to the upper left corner of the image and choose PIN in the menu at the bottom of the screen. Press Return and that corner is fixed. Now move the cursor to the lower right corner of the image to define the box—all four corners are visible as guides. Don’t press Return until you’ve moved the menu brackets off PIN.

Using “Clip Maker,” you snip images from hi-res pictures like the ducks-galore one shown here. The clipping box has been pinned and is being stretched around the duck in the center row at the far left.

If you want to change the upper left corner, unpin the cursor by selecting PIN again. Move the freed cursor to a new position and pin it again. PIN acts as a toggle between pinning and unpinning the cursor.

Once you’ve boxed the clipping, choose ADD in the menu at the bottom of the screen. ADD adds the image inside the box to the library you’re creating.

Type in the name you want to give the clipping. The name can be any length, but those longer than 12 characters are truncated. Commas and colons are not allowed. After you name the clipping, it’s added to the library—note that the clipping’s name is shown on the menu after CLIP:. This clipping window indicates which clipping the program is currently pointing to.

You can add more clippings by following the same procedure. (You have to choose PIN to free the cursor, if you haven’t done so already.) To see the part of the screen obscured by the menu, select VIEW. Press Return when you want to see the menu again. If you want to make clippings from another picture, go to the File menu and load a new one by selecting PICTURE.

The number of clippings you can place in a library depends on the size of those clippings. The larger each clipping, the fewer you can put in a library. (Total library size is limited to 13,044 bytes—for your technical reference, each clipping takes up 16 bytes plus a number of bytes equal to the number of dots in the image divided by 4.)

Eventually, you’ll want to edit and review the clippings library you’re creating. To see the clipping in the clipping window, choose SHOW. The current clipping appears in the upper left corner of the screen for a couple of seconds and
Clipper Command Reference Guide

Clip Maker Main Menu
ADD Adds the image within the clipping box to the current library.
FILE Calls the File Menu.
FIND Brings a specific clipping to the clipping window (user enters name).
NEW Deletes the current clipping library.
NEXT Brings the next clipping in the current library to the clipping window.
PIN Sets the upper left corner of the clipping box.
QUIT Exits Clip Maker and returns to BASIC.
REMOVE Deletes clipping currently in the clipping window.
SHOW Briefly displays current clipping in the upper left corner of the screen.
VIEW Erases the menu display.

Clip Maker File Menu
CATALOG Lists the current disk's catalog.
DELETE Deletes specified library file.
DRIVE Changes current disk drive.
LOAD Loads specified library file from disk.
MAIN Calls the Main Menu.
MERGE Merges one library with another.
PICTURE Loads a standard Apple hi-res graphics file from disk.
SAVE Saves current clipping library file to disk with CLIP prefix.

Clip Plotter Main Menu
CHANGE Exchanges one color for another in the clipping on subsequent DRAWs.
CLEAR Erases the screen.
DRAW Draws the current clipping at the clipping box position.
FILE Calls the File Menu.
FIND Brings a specific clipping to the clipping window (user enters name).
IGNORE Prevents selected color(s) from being plotted on subsequent DRAWs.
NEXT Brings the next clipping in the current library to the clipping window.
QUIT Exits Clip Plotter and returns to BASIC.
UNDO Restores the screen under a DRAWn clipping to its original state.
VIEW Erases the menu display.

Clip Plotter File Menu
CATALOG Lists the current disk's catalog.
CLIPS Loads a new clipping file from disk.
DRIVE Changes current disk drive.
LOAD Loads specified standard Apple hi-res screen from disk.
MAIN Calls the Main Menu.
SAVE Saves standard Apple hi-res screen to disk.

then disappears. Change the contents of the clipping window (in other words, change the clipping the program is pointing to) with the NEXT and FIND commands. NEXT brings the next clipping in the library to the clipping window. You can thumb through the entire library of clippings by repeatedly selecting NEXT. Selecting NEXT when the last clipping is in the window moves the first clipping back into the window.

Use FIND to bring a specific clipping into the window. Enter the clipping name, and the program finds it and moves it into the window. The contents of the window remains unchanged if the desired clipping is not found in the library.

REMOVE lets you remove unwanted clippings from the library. Bring the unwanted clipping into the window by using NEXT or FIND. You may want to select SHOW to verify that this is the clipping you want to delete. Now choose REMOVE. As a precaution, you must confirm the deletion before the clipping is erased.

The only way to restore a removed clipping is to box the original image and ADD it to the library again. The REMOVE option should always be used with caution.

Two main menu options remain—QUIT and NEW. QUIT is self-explanatory. NEW, however, is not. It deletes the entire library. Use it only when you want to start a new library. As always, you must confirm your selection before the current library in memory is wiped out.

Fortunately, all is not lost if you accidentally erase a library. Quit Clipper and enter the following BASIC commands:

```
CALL FE,EP
BSAVE CLIP.NAME,A$6000,LET+1—SP
```

This changes pointers used by the program and saves the former library to disk. Change NAME to the filename you want.

And Saving Libraries
Of course, it's easier to use the program's File menu to save your work. Move to the File menu (choose FILE from the main menu). Then, to save your library, simply select SAVE. Enter a filename and the library is saved to disk. The program automatically adds CLIP prefix to the filename. The prefix is used only to make it easy to tell which disk files are clipping libraries. Note: Don't add the CLIP prefix yourself; the program handles that for you.
Pick LOAD when you want to load a library. Type in the filename (again, you can view the catalog by typing ? and hitting Return). Don’t include the CLIP prefix, since the program adds it automatically.

It’s sometimes convenient to create a library by merging two smaller clipping libraries. MERGE does this. Load a library into memory or create one. Select MERGE and enter the filename of the library to be merged with the one in memory. The two libraries are treated as one by Clipper.

The other options in the File menu provide disk maintenance functions. CATALOG catalogs the disk, and DELETE removes unwanted files (not libraries in memory, remember, but disk files).

**Drawing With Clip Plotter**

Clip Maker makes it possible to quickly and easily create extensive libraries of images. But once you’ve created and saved libraries of clip art, you’ll want to do something with them.

Clip Plotter, with an interface similar to Maker’s, puts those libraries to use. Exit Clip Maker and type RUN PLOTTER. The menu appears at the bottom of the screen.

**MAIN MENU:**

CLIP:

- <NEXT> CHANGE DRAW VIEW FILE
- FIND IGNORE UNDO CLEAR QUIT

Make selections from this menu just as you did in Clip Maker.

First you need a clipping library to work with. Select FILE to enter the file menu.

**FILE MENU:**

- <LOAD> SAVE CLIPS
- DRIVE CATALOG MAIN

Now choose CLIPS, then enter the name of the appropriate library.

*Do not type in the CLIP prefix. Clip Plotter will terminate if you type in a filename beginning with CLIP.* Once the library loads, return to the main menu (select MAIN).

**Paste Down**

The name which shows in the clipping window indicates the clipping currently in use. Change the clipping with the NEXT and FIND options—both work as in Clip Maker.

Instead of a single cursor on the screen, you’ll see a box formed with four cursors at its corners. This outlines the dimensions of the clipping currently in memory. Move the box with the I, J, K, and M keys; change the movement increment with the 1–9 keys. The box’s size changes when the clipping in the window changes.

**Color Changes**

Changing and ignoring colors in a clipping is one of Clip Plotter’s greatest strengths. One clipping can generate almost limitless variations.

The IGNORE option prevents selected colors from being plotted when the clipping is drawn. Select IGNORE, and you’ll see this menu:

By using the IGNORE option in “Clip Plotter,” you can alter an image. In this example, first the duck and then its background were ignored.

Move the box to the screen position where you want the clipping to appear and select DRAW, and the clipping will appear. You can move the box again and paste down more clippings.

If, after selecting DRAW, you decide you don’t like the clipping in that spot, choose UNDO—the screen area under the clipping will be restored to its original contents.

If you move the box or change the contents of the clippings window after a DRAW, UNDO won’t work. UNDO should be used immediately after a DRAW, if it’s to be used at all.

**Figure 2: Glued Down**

With “Clip Plotter,” you can paste down clippings to create new artwork. It’s especially easy to lay down several identical images.

**Figure 3: Ignoring Colors**
Short Description of Program 1, Clip Maker

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Short Description of Program 2, Clip Plotter

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<td>1280–1310</td>
<td>Get CATALOG option</td>
</tr>
</tbody>
</table>

Possible Confusion

You may become confused when you use IGNORE and CHANGE together. For example, suppose you chose to ignore BLACK1 in the IGNORE menu, and you changed BLACK1 to GREEN and changed VIOLET to BLACK1 in the change menu. What happens when you draw a clipping? Is the BLACK1 ignored, or is it plotted as GREEN? Is VIOLET drawn as BLACK1, or is it ignored since BLACK1 is supposed to be ignored? The answer is that BLACK1 is ignored: It is not drawn as GREEN. But VIOLET is not ignored and is drawn as BLACK1.

Here's what happens when you select DRAW: The program goes dot by dot, plotting the colors in the clipping following the rules set up by IGNORE and CHANGE. For each dot,
the program reads the original color given in the clipping. Then it checks that color with the IGNORE list. If the color is to be ignored, the dot is skipped entirely, without checking whether it should be changed to another color. If the color is not to be ignored, however, then it’s changed to the color in the CHANGE list. Only then is the dot plotted.

In other words, ignores are done first, changes second. A dot of an ignored color is skipped entirely. Only colors that are not ingored are changed.

Other Plotter Options

VIEW shows the portion of the screen obscured by the menu. Press Return when you want to see the menu again.

CLEAR erases the screen. QUIT exits the program and returns to BASIC. LOAD and SAVE respectively load and save high-resolution screens. DRIVE lets you change the current disk drive. CATALOG catalogs the disk, and CLIPS loads a new clipping library (do not enter a filename with the prefix CLIP; the program does this automatically for you).

Program 1: Clip Maker

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

```assembly
10 REM COPYRIGHT 1997 COMPUTE! PUBLICATIONS, INC. ALL RIGHTS RESERVED
20 TEXT: HOME: VTAB 8: HTAB 14: PRINT "COPYRIGHT 1997": HTAB 8: PRINT "COMPUTE! PUBLICATIONS, INC."
30 FOR I = 1 TO 1000: NEXT I
40 ON ERR GOTO 1170
50 HIMEM: 7168
60 SZ = 5: DD = 1: MC = 37632: DC = 37905: DE = 37871: FC = 38162: UN = 38057: PD* = "": REM 12 SPACES
70 DATA 1,0,4,0,62,96,21,5,0,104,168,104,166,-223,154,72,152,72,96
80 FOR I = 768 TO 786: READ J: POKE I, J: NEXT I
90 FOR I = 0 TO 7: POKE 816 + I, 0: NEXT I
100 FOR I = 0 TO 7: POKE 824 + I, 1: NEXT I
110 PRINT CHR*(4): "LOAD CLIPPER"
120 BL = 1: POKE EP + 11, 0
130 TEXT: HOR
150 CS = 1: CY = 23
170 IF EP < > SP THEN GOSUB 1220: VTAB
180 POKE 49168, 0
190 HTAB CX: VTAB CY: PRINT ",": HTAB CX + 7: PRINT ",":
200 IF PEEK (49152) < 128 THEN 200
210 KY = PEEK (49152): POKE 49168, 0
220 IF KY < > 149 THEN 260
230 IF W Vern THEN 190
250 GOTO 190
260 IF KY < > 136 THEN 360
270 IF W Vern THEN 190
290 GOTO 190
310 IF KY = 141 THEN ON (CX - 1) / 7 + 1 + 5 * (CY - 23) GOTO 340, 370, 390, 430, 690, 450, 470, 490, 520, 540
320 IF KY > 200 AND KY < 206 AND KY > 204 THEN GOSUB 560: GOTO 190
330 PRINT CHR*(7): "quirter": GOTO 190
340 IF SP = EP THEN 190
350 CP = CP + PEEK (CP + 12) + PEEK (CP + 13) + 256: IF CP = EP THEN CP = SP
360 GOSUB 1220: VTAB 22: HTAB 6: PRINT CP*: GOTO 190
370 IF SP = EP THEN 190
380 CALL DC, 0, 0, PEEK (CP + 14), PEEK (CP + 15), CP: FOR I = 1 TO 1000: NEXT I: CALL UN, 0, 0, PEEK (CP + 14), PEEK (CP + 15): GOTO 190
400 CALL DC, CP, EP, EP: IF CP = EP THEN CP = SP
410 POKE EP + 11, 0
420 GOTO 150
430 GOTO HOME: VTAB 21: PRINT "ARE YOU SURE ", CP$: INPUT A$: IF LEFT$(A$, 1) = "Y" OR LEFT$(A$, 1) = CHR$(ASC("Y") + 32) THEN EP = SP: CP = SP
440 GOTO 150
460 GOTO 150
470 IF PN THEN GOSUB 660: JX = HX: JY = HY: GOSUB 660: PN = 0: GOTO 190
480 IF JX = HY: JY = JX: JY = JX: GOTO 190
490 IF NOT PN THEN GOTO 190
500 IF EP + (JX - HX) / 4 % (JY - HY) + 16 > MC THEN HOME: VTAB 21: PRINT "NO ROOM": PRINT "PRESS RETURN": A$: GOTO 150
520 IF NOT W Vern THEN W Vern = 1: POKE 49234, 0: GOTO 190
530 IF W Vern = 0: POKE 49235, 0: GOTO 190
540 HOME: VTAB 21: PRINT "INPUT "QUIT": A$: IF LEFT$(A$, 1) = "Y" OR LEFT$(A$, 1) = CHR$(ASC("Y") + 32) THEN HOM E: TEXT: END
```

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Program 2: Clip Plotter

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

A3 10 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. ALL RIGHTS RESERVED
47 20 TEXT: HOME: VTAB 8: HTAB 14: PRINT "COPYRIGHT 1987": HTAB 8: PRINT "COMPUTE! PUBLICATIONS, INC."
ID 30 HTAB 10: PRINT "ALL RIGHTS RESERVED."
"""" FOR I = 1 TO 1000: NEXT I
40 ONERR GOTO 1220
50 HIMEM: 716B
60 PRINT CHR$(4); "LOAD CLIPPER"
70 DIM CL$(7)
80 DATA "BK1" , "GRN", "VIO", "WT1", "BK2", "RED", "BLU", "WT2"
90 FOR I = 0 TO 7: READ CL$(I): NEXT I
100 SZ = 5: DD = 1: MC = 37632: DC = 37905
110 : DE = 38072: FE = 37B71: FC = 38162: UN = 38057: PD$ = "": REM
120 DATA 1,0,4,0,62,96,21,5,0,104,168,1
130 FOR I = 768 TO 786: READ J: POKE I, J: NEXT I
140 FOR I = 0 TO 7: POKE 816+1,0: NEXT I: FOR I = 0 TO 7: POKE 824+1,1
150 IF BL = 1
160 TEXT: HBR
190 VTAB 24: HTAB 2: PRINT "FIND"; HTAB 16: PRINT "IGNORE"; HTAB 23: PRINT "UNDO"; HTAB 30: PRINT "CLEAR"; HTAB 30: PRINT "QUIT";
210 POKE 49168, 0
220 HTAB CX: VTAB CY: PRINT "<"; HTAB CX + 7; PRINT ">";
230 IF PEEK (49152) < 128 THEN 230
240 IF KY = PEEK (49152): POKE 49168, 0
250 IF KY > 149 THEN 290
260 IF VW THEN 220
210 POKE 49168, 0
220 HTAB CX: VTAB CY: PRINT "<"; HTAB CX + 7; PRINT ">";
230 IF PEEK (49152) < 128 THEN 230
240 IF KY = PEEK (49152): POKE 49168, 0
250 IF KY > 149 THEN 290
260 IF VW THEN 220
270 HTAB CX: VTAB CY: PRINT " "; HTAB CX + 7: PRINT ":"; CX = CX + 7: IF CX < 1 THEN CX = 29: CY = CY - 1: I F CY = 22 THEN CX = 24
280 IF KY < > 136 THEN 330
290 IF VW THEN 220
300 IF KY < > 136 THEN 330
310 HTAB CX: VTAB CY: PRINT ":": HTAB CX +": PRINT ":": CX = CX - 7: IF CX < 1 THEN CX = 29: CY = CY - 1: IF CY = 22 THEN CX = 24
320 GOTO 220
330 IF KY = 141 THEN ON (CX - 1) / 7 + 1: I F (CY - 23) GOTO 370,400,510, 550,900,556,580,700,720,740
340 IF KY > 206 AND KY < 286 AND KY < 284 THEN GOSUB 768: GOTO 220
350 IF KY > 176 AND KY < 186 THEN SZ = KY = 176: GOTO 220
360 PRINT CHR$(7): GOTO 220
370 IF SP = EP THEN 220
380 CP = CP + PEEK (CP + 12) + PEEK (CP + 13) * 256: IF CP = EP THEN CP = SP
390 GOSUB 870: JX = HY + PEEK (CP + 14): JY = HY + PEEK (CP + 15): GOSUB 850: GOTO 260
400 HOME: VTAB 21: PRINT "CHANGE: (<>SC> MAIN MENU)"; FOR I = 0 TO 7: PR INT " "; CL$(I): NEXT I
420 VTAB 23: HTAB IX: PRINT ":": HTAB IX + 4: PRINT ":":
430 IF PEEK (49152) < 128 THEN 430
440 KY = PEEK (49152): POKE 49168, 0
450 IF KY = 155 THEN 180
460 IF KY = 149 THEN HTAB IX: PRINT " "; HTAB IX + 4: PRINT " "; IX = IX + 4: IF IX > 29 THEN IX = 1
470 IF KY = 136 THEN HTAB IX: PRINT " "; HTAB IX + 4: PRINT " "; IX = IX - 4: IF IX < 1 THEN IX = 29
480 IF KY < > 141 THEN 420
490 I = PEEK (824 + (IX - 1) / 4): I = I + 1: IF I = 8 THEN IX = 0
500 POKE 824 + (IX - 1) / 4, I: I = I + 1: PRINT CL$(I): GOTO 420
510 IF EP = SP THEN 220
520 GOSUB 870: CALL DC, HX, / 2, HY, JX / 2
530 IF KY = PEEK (49152): X = HX: Y = HY: P = CP: GOTO 220
540 IF NOT VW THEN VW = 1: POKE 49234, 0
550 IF EP = SP THEN 220
570 GOSUB 870: JX = HX + PEEK (CP + 14): JY = HY + PEEK (CP + 15): GOSUB 830: GOTO 180
580 HOME: VTAB 21: PRINT "IGNORE: (<E SC> MAIN MENU)"; FOR I = 0 TO 7: PRINT ":": CL$(I): NEXT I
590 IX = 1: VTAB 23: FOR I = 0 TO 7: IF PEEK (816 + I) > 127 THEN HTAB 2 + I: 4: PRINT "YES";
600 NEXT I
610 VTAB 22: HTAB IX: PRINT " "; HTAB IX + 4: PRINT " ";
620 IF PEEK (49152) < 128 THEN 620
630 KY = PEEK (49152): POKE 49168, 0
640 IF KY = 155 THEN 180
650 IF KY = 149 THEN HTAB IX: PRINT " "; HTAB IX + 4: PRINT " "; IX = IX + 4: IF IX > 29 THEN IX = 1
660 IF KY = 136 THEN HTAB IX: PRINT " "; HTAB IX + 4: PRINT " "; IX = IX - 4: IF IX < 1 THEN IX = 29
670 IF KY < > 141 THEN 610
680 IF PEEK (816 + (IX - 1) / 4) = 0 THEN POKE 816 + (IX - 1) / 4, 128: VTAB B 23: HTAB IX + 1: PRINT "YES"; VT AB 22: GOTO 610
690 POKE 816 + (IX - 1) / 4, 0: VTAB 23: HTAB IX + 1: PRINT " "; VT AB 22: GOTO 610
700 IF KY = HY AND Y1 = HY AND P1 = CP THEN GOSUB 870: CALL UN, HX / 2, HY, JX / 2, JY: GOSUB 870
710 GOTO 220
720 HOME: VTAB 21: INPUT "SURE?"; A$: IF LEFT$(A$, 1) = "Y" OR LEFT$(A$, 1) = CHR$(ASC("Y") + 32) THEN HGR:
730 HOME: VTAB 21: INPUT "QUIT?"; A$: IF LEFT$(A$, 1) = "Y" OR LEFT$(A$, 1) = CHR$(ASC("Y") + 32) THEN HOM E:
740 TEXT: END
750 GOTO 180
760 HOME: VTAB 21: INPUT "SURE?"; A$: IF LEFT$(A$, 1) = "Y" OR LEFT$(A$, 1) = CHR$(ASC("Y") + 32) THEN HGR:
770 HOME: VTAB 21: INPUT "QUIT?"; A$: IF LEFT$(A$, 1) = "Y" OR LEFT$(A$, 1) = CHR$(ASC("Y") + 32) THEN HOM E:
program 3: clipper

for mistake-proof program entry, use "apple mix" found elsewhere in this issue, to type in this program.

9300: 20 BE DE 20 7B DD 20 52 AA
9310: 07 85 51 85 09 A5 50 85 14
9318: 08 20 BE DE 20 E3 FF A0 F9
9320: 08 B1 83 05 FE CB B1 B3 FE
9329: 08 FF AA 08 B1 FE 91 08 B3
932B: 08 10 F9 20 4C E7 86 FD E5
9330: 86 CE 20 4C E7 86 FC 20 8A
9338: 4C E7 86 FF 20 4C E7 86 98
9340: FA A5 FB 38 E5 FD AA 0E C7
9349: 01 08 CB A5 FA 38 E5 FC 2F
9350: 01 08 A5 09 BF 05 FF 08 0E 07
9359: 08 FF 16 69 10 05 08 06 D2
9360: 02 E6 09 A5 CE 0A AA 09 FB
9369: 00 2A A6 A5 FC 20 11 F4 09
9370: 20 61 95 A5 F9 0A 0A 23
9379: 00 A6 09 A5 CE 0C 0B 0E 00
937E: 00 A5 CE 0A 0A 0C 0B 0E 00
9389: A9 00 2A A6 A5 FC 20 0E 00
9399: F4 20 61 95 A0 00 A5 F9 12
93A0: 11 08 91 08 E6 08 D8 02 FF
93A8: E6 09 A5 CE 0C 0B 0E 00
93B0: 00 08 CB A5 FA 38 E5 FC 2F
93B9: 00 08 A5 09 BF 05 FF 08 0E 07
93C0: 08 FF 16 69 10 05 08 06 D2
93C9: 02 E6 09 A5 CE 0A AA 09 FB
93D0: 20 61 95 A5 F9 0A 0A 23
93D9: 00 A6 09 A5 CE 0C 0B 0E 00
93E9: 00 A5 CE 0A 0A 0C 0B 0E 00
93F0: 00 B1 08 F0 DA 00 0C B1 BF

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Number Construction Kit

Daniel L. Stone
Original game design by Gerald W. Rightmer

You've got the tools, materials, and the final blueprint for this construction project. All you have to do is think hard and work fast. For children, it's an excellent math-skills game. For adults, it's a real brain teaser. Works on all Apple II-series computers in DOS 3.3 or ProDOS.

Your bid has been accepted for a new construction project—to build a three-digit number between 100 and 999. Fortunately, you have your "Number Construction Kit," which includes everything you need.

Your tools are the four basic arithmetic operators: +, −, *, and /. Your building materials are single-digit integers—three, four, or five of them, depending on the skill level you choose. And, as in all construction projects, there's a deadline. In this case, it's one, two, or three minutes.

Putting The Kit Together
Number Construction Kit is written in BASIC and can be typed in using "Apple Automatic Proofreader," an error-checking utility published elsewhere in this issue.

Type in and save the game to disk, perhaps with a filename like NUMBER. If you’re using an Apple II GS, set the speed from the Control Panel to Normal before you begin the game. Number Construction Kit still works if the Control Panel is set to Fast, but your deadlines will come sooner than expected.

Now, type
RUN NUMBER

With just over 70 seconds left, this player has only one spot in the Construction Site open but is still 75 points from the goal.

press Return, and a simple title screen appears. Press any key, and you’re in the Number Construction Kit.

If the game is to be used by young children, you may want the program to run automatically when you boot the disk. In this case, type this single-line program and save it as HELLO (DOS 3.3) or STARTUP (ProDOS) on the same disk as the Number Construction Kit program:

10 PRINT CHR$(4); "RUN NUMBER"

That's assuming, of course, you named the file as NUMBER. With this boot program, the child need only insert the disk in the drive and turn on the computer to start the game.

Use the up- and down-arrow keys (left-
and right-arrow keys on the Apple II+) or the appropriate number key to select the number of players. Press Return when the desired number is highlighted, then choose the skill level using either the arrow keys or the 1-3 keys.

The difference between levels is one of time and materials. The Beginner level gives you three minutes and five numbers to complete the project; the Intermediate level gives you two minutes and four numbers to work with; and the Advanced level offers only three numbers and a one-minute deadline. Scoring is based on your level, the time remaining when you finish a project, and how close you come to the project goal.

On The Clock
After selecting the number of players and the difficulty level, you're ready. Your project blueprint (the goal) and materials (the numbers you'll work with) are displayed, and you're asked to press any key to begin.

The timer begins counting down when you start the game. It's based on a counting loop which includes the game action. That means the clock runs fast if you just watch it. Normal play makes it tick off the seconds in close to realtime.

First, press a number key that matches one of the listed materials. Then, press one of the operators (tools). Don't press Return—in fact, press Return only when you've finished the construction project.

Build toward your project goal without hesitating. You can view the numbers and operators in the construction site. To change a previously entered number or operator, use the left- and right-arrow keys to move the question mark back and forth along the construction site. Once you've entered a number or operator, it can't be deleted, but you can replace it with one or the other numbers or operators. If you reach the goal before time runs out, press Return.

Each game consists of five rounds, each ending when you press Return or when time runs out. At game's end, you can play again if you like. Highlight your choice and press Return. You can change the number of players and the skill level as you start a new game. The previous project's goal will show as LAST TIME on the right. This gives you a chance to see how you did before you start the next round.

Staying In Bounds
Like any construction project, there are constraints. Notice that there are only fifteen work spaces at the CONSTRUCTION SITE. This means you can use a maximum of only eight numbers and seven operators to complete the project. A running total is displayed to the right of the CONSTRUCTION SITE so you can watch your progress. The goal is always positive and over 100. No negative project totals are allowed; nor can you create numbers larger than 9,999.

The program randomly generates numbers for the project goal and the materials. Zero and duplicates are excluded. The only keys that work are the designated number keys (materials), the four operators (tools), the arrow keys, and Return.

Number Construction Kit is a challenge at any age, and it can be an entertaining way to reinforce basic arithmetic skills. Because of the game's immediate feedback, children can learn much by trial and error.

If you're just out to win the game, a few strategy tips may be helpful. The first step is to study the project number and materials before pressing a key to begin. For larger, more difficult numbers, it's usually easiest to get close to the project as fast as possible, and then fine tune your answer with the remaining spaces and time. Remember that the materials can be used as often as needed—you have an unlimited supply.
GAME OVER

I = 1 TO LEN(M*)
PRINT O*;: NEXT

1 TO 2 B: PRINT O*;: NEXT: N

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I - 1 TO 40: PRINT O*;: NEXT: GOTO 2 TO 22: VTAB 3: HTAB NN: PRINT O*

PRINT MID*(M*, NN - 8, 1)

NEXT

M(4) OR R «■ M(5) > THEN 810

HTAB 15: FOR I = 1 TO K

WAIT W.128: POKE KB,0

IF NN = 15 OR NN = 28 THEN 640

0580

HTAB I

NEXT:

FOR I = 1 TO X: PRINT W*W*;: HTAB 30: PRINT W

SPEED = 220: NORMAL

NN = 9: M* = "NUMBER CONSTRUCTION KI"

T: FOR I = 1 TO LEN(M*) : FOR I = 2 TO 22: VTAB 3: HTAB NN: PRINT O*

IF NN = 15 OR NN = 28 THEN 640

2 TO 22: VTAB 3: HTAB NN: PRINT O*:

HTAB NN: PRINT MID$ (M*, NN - 8, 1)

660 NEXT

650 NN = NN + 1

660 NEXT

670 SPEED = 255

680 VT = 2: M* = " G A M E O V E R ": FLASH

690 N$ = M*: FOR I = 1 TO LEN (M$)

700 VT = VT + 1

710 M$ = MID$ (NN, 1, 1)

720 GOSUB 1510

730 NEXT

740 NORMAL

750 END

760 REM ROUND START UP

770 LE = LE * 60: LF = LE

780 VTAB 20: HTAB 30: PRINT W$*

790 VTAB 8: HTAB 8: PRINT LE" SEC.

. N = 1: G = 0: FOR I = 1 TO 5: M(I) = 0:

NEXT

800 REM GET MATERIALS

810 R = INT ( RND (1) + 9): IF R = M(1) OR R = M(2) OR R = M(3) OR R = M(4) OR R = M(5) THEN 810

820 FOR I = N TO S: M(I) = R: NEXT: IF " " THEN 810

830 VTAB 8: HTAB 15: PRINT W$*

840 N = 1: O = 1: G*(T(I)) = 0: VTAB B: HTAB 15: FOR I = 1 TO K

850 PRINT M(I)O*$: NEXT: REM DISPLAY M A T E R I A L S

860 V = INT ( RND (1) * 900) + 100: VTA B 12: HTAB 14: PRINT V: REM GET & D ISPL AY PROJECT

870 VTAB 12: HTAB 36: PRINT D: REM ROUN D D #

880 VTAB 18: HTAB 4: PRINT "PLAYER " P"":

890 PRINT TAB( 4) "PRESS ANY KEY TO"

900 PRINT TAB( 4) "BEGIN CONSTRUCTION!":

WAT W, 128: POKE KB, 0

910 VTAB 16: HTAB 8: PRINT W$*W$*W$: H

920 VTAB 20: PRINT TAB( 4) "BEGIN CONSTRUCTION!"

930 RETURN

940 REM ERASE R19-25/C1-25

950 FOR I = 19 TO 23

960 HTAB 1

970 FOR I = 1 TO 25

980 VTAB I: PRINT TAB( I)O$: NEXT: N

EXT

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Who? Where? What? When?

Sports Scheduler

One of the joys of being a parent is watching your child play sports in an organized league. However, errors in scheduling can spoil the fun. Now you can:

- Schedule any league where teams meet: football, soccer, hockey, baseball, softball, bowling.
- Create and print a "pure schedule" listing up to 231 games in less than 5 minutes.
- Calculate the required dates for the entire schedule.
- Save the completed schedule on a "storage" disk in ASCII or DIF format for transfer to a word processor or spreadsheet for unlimited editing.
- Schedule a minimum of one round robin of up to 231 games by entering the number of sets desired.

Schedule each team to play all other teams in the league equally for the number of sets requested.

Schedule as many games per week as desired.

Schedule any league where teams meet: football, soccer, hockey, baseball, softball, bowling.
Calendar Maker

William Coleman
Apple Version by Randy Thompson

Print custom calendars for any year from 1900 to 2050 with this surprisingly short, efficient program. Calendars can be printed on paper, to the screen, or saved to disk. For all Apple II computers, using either DOS 3.3 or ProDOS.

Create a calendar for each year from now until 2050. Or find out on which day of the week Christmas falls in the year 2000. Or locate the day of the week on which you were born.

You can do all this with "Calendar Maker" and your Apple II+, IIe, IIc, or IIgs computer. Calendar Maker prints out a nicely formatted 12-month calendar with a personalized message that you write.

Calendar Maker is a short program written entirely in BASIC. Type in Program 1 using "Apple Automatic Proofreader," the error-checking utility in this issue, and save it to disk as CALENDAR.MAKER. When you're ready to make a calendar, run the program by typing RUN CALENDAR.MAKER

Years
When you see the prompt WHAT YEAR WOULD YOU LIKE?, enter a number from 1900 to 2050. If you enter 0–99, Calendar Maker assumes you're asking for a year in the twentieth century and sticks on a prefix of 19 to your request. Typing 0, then, creates a calendar for the year 1900, not the year 2000.

The program next asks for a message to put at the top of the calendar. Type in a message (maximum is 254 characters), and Calendar Maker prints it over and over to form the numerals of the year. Press Return here if you'd rather have solid numerals printed with the asterisk (*).

This line then appears on the screen:

(S)creen, (P)rinter, or (D)isk?

If you choose S, the output will go to the screen. The display will be unreadable unless you're in 80-column mode. You can enter 80-column mode (on your IIc, IIgs, or suitably equipped IIe) by pressing Escape-8, but you'll have to rerun Calendar Maker.

Press P to print the calendar to your printer. This is the option you'll be using most often. To center the calendar, move the paper about one-fourth inch down from the top of the page before printing.
Calendars On A Disk

Choose D if you wish to save the calendar to disk. This is useful if you want to make several copies of the same calendar. Each calendar is saved in text file format with the filename CALENDAR.YEAR, where YEAR is the number you entered earlier.

If you have a word processor that loads and prints standard text files (most do), you can use it to print the calendars saved to disk. If you don't have a word processor with this feature, type in and save Program 2, "Calendar Lister." It's a short text-file printing utility.

Run Calendar Lister and answer the prompt by entering the year of the calendar you want printed. If you type in a two-digit number, the Lister assumes you mean a year in the twentieth century and automatically precedes the number with a 19.

Turn on your printer and press Return. The calendar is quickly printed.

Program 1: Calendar Maker

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

Note: Calendar Maker will not print properly through the Apple IIgs's printer port. You must have a serial card of some sort installed in slot 1 and the Control Panel set to Your card for that slot.
Program 2: Calendar Lister

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

8E 10 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. ALL RIGHTS RESERVED.
8E 11 HOME: VTAB 8; HTAB 12: PRINT "COPYRIGHT 1987": HTAB 6: PRINT "COMPUTE!
8E 12 PUBLICATIONS, INC.": HTAB 10: PRINT "ALL RIGHTS RESERVED."
8E 13 FOR I = 1 TO 1500: NEXT I
8E 14 HOME: INPUT "WHAT YEAR IS THE CALENDAR FILE?"; Y;
8E 15 IF LEN(Y) < 2 THEN Y = "19" + Y
8E 16 PRINT: PRINT: PRINT "MAKE ANOTHER? <Y/N>"; GET A:
8E 17 IF A = "Y" THEN RUN
8E 18 HOME: END
8E 19 DATA 31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31
8E 20 DATA "SUN MON TUE WED THU FRI SAT"
8E 21 DATA "JANUARY", "FEBRUARY", "MARCH", "APRIL", "MAY", "JUNE"
8E 22 PRINT: PRINT "OPEN CALENDAR."; PR#1: PRINT "READ CALENDAR."; Y;
8E 23 FOR I = 1 TO 1000: NEXT I
8E 24 HOME: PRINT "FILE DOES NOT EXIST. PRESS ANY KEY."; GET A*
8E 25 REM DATA
8E 26 DATA 7277577777561441555273777717
8E 27 DATA 752441151517777177717717717
8E 28 FOR I = 1 TO 70: NEXT I
8E 29 OPEN "NEWCAL: PR#0": OPEN "OLDCAL: PR#0": CLOSE "NEWCAL": CLOSE "OLDCAL"
8E 30 ONERR GOTO 210
8E 31 OPEN "NEWCAL: PR#0": OPEN "OLDCAL: PR#0": CLOSE "NEWCAL": CLOSE "OLDCAL"
8E 32 ONERR GOTO 310
8E 33 GET L*: L* = L* + S*: IF S* ≠ Chr*(13) THEN 310
8E 34 PRINT L*; GOTO 210
Vulcan Mines

Brett A. Painter

A fast and challenging all-machine language game, "Vulcan Mines" features high-resolution graphics and exciting sound effects. It runs on all Apple II computers under either DOS 3.3 or ProDOS. Apple II and II+ computers require either a pair of paddles or a joystick. The joystick is optional on all other models.

The folks in accounting finally had to shut down the Special Projects Center. Sure, SPC did some brilliant work for TransGlobal Labs, but they never figured out what a budget or a schedule was. Their last masterpiece was the Vulcan security system, a networked array of Computer-Automated Manufacturing (CAM) stations. Each station can generate an almost limitless number of simple but effective mobile mines. Of course, SPC installed the prototype in their own building.

That's why a munitions expert like yourself is needed. Before leaving, a disgruntled engineer decommissioned the system's master computer with a lug wrench. Isolated from the rest of the network, each station has assumed the worst and is building mines as fast as it can. Before the legal department can move theiroffices into the building, someone has to neutralize the Vulcan system. That someone is you. So sit down at the control console of your robotic minesweeper. You've got some work to do.

Typing In The Game

You'll need to type in several different files to get "Vulcan Mines" going. These include the master program and five files that define the predesigned game levels. Only the first listing is really a machine language program—the rest are pure data, but they're all stored in the same type of file. You should use the "Apple MLX" machine language entry program, published elsewhere in this issue, to enter all of the files.

Start by typing in Program 1, the Vulcan Mines program. Load and run Apple MLX, then answer the starting and ending address prompts with:

STARTING ADDRESS? 4000
ENDING ADDRESS? 495F

Your minesweeper is just left of center, near the top end of the leftmost wall. Mines surround you (one is to the sweeper's upper left) and four generators remain (the closest is to the left, against the wall).

When Apple MLX displays its options menu, select E to enter the program, then type the address where you'd like to start typing. (If you're just starting to work on Vulcan Mines, type 4000, the first address in the listing.) Type in the data and save this file on the disk with the name VULCAN.
The Vulcan Mines program expects to find definitions for all the levels of the game on the disk. Programs 2-6, which define five game levels, must be typed in with Apple MLX and saved as separate files. For each file, give the corresponding starting and ending address from the following list. Then press E and type 5020 to enter data from the start of the listing. After you’ve typed in all the lines of a level file, be sure to save a copy. Put all the game level files on the same disk as the game file (Program 1). If you’re using ProDOS, put all the files in the same subdirectory. Also, be sure to use the names shown below for the level files (LEV01, LEV02, and so on). If you don’t, the game program won’t be able to find its files. Continue until you’ve entered all five levels:

Program 2: LEV01
STARTING ADDRESS? 5020
ENDING ADDRESS? 50C7

Program 3: LEV02
STARTING ADDRESS? 5020
ENDING ADDRESS? 50D7

Program 4: LEV03
STARTING ADDRESS? 5020
ENDING ADDRESS? 50BF

Program 5: LEV04
STARTING ADDRESS? 5020
ENDING ADDRESS? 5117

Program 6: LEV05
STARTING ADDRESS? 5020
ENDING ADDRESS? 510F

Finally, you need to create a one-byte file containing the current total number of game levels. Make sure that the disk containing the other game files is still in the drive, then enter the following two lines at a BASIC J prompt, pressing Return after each line:

POKE 758,5
BSAVE NUMLEV,A$300,L$1

Playing The Game
Type BRUN VULCAN to begin. The Caps Lock key should be down before you start playing. The computer will print the message, JOYSTICK OR KEYBOARD? Press J to use a joystick if you have one connected, or K to use the keyboard.

Note: If you’re playing Vulcan Mines on an Apple IIcs, make sure the Control Panel’s System Speed option has been set to Normal.

After a short pause to read the data for the first level from the disk, the first level begins. You’ll see your score displayed at the lower left of the screen (initially 0000000) and your energy level (initially 0500) at the lower right. Your character on the screen will be invisible until you move. This gives you time to look at the board and establish a strategy. It also protects you from being hit before you’ve had a chance to react.

To move using the joystick, simply move the stick in the desired direction. From the keyboard, Vulcan Mines uses an inverted-T key arrangement, using the I, J, K, and L keys—I for up, J for left, K for down, and L for right. You may not move diagonally.

If you’re playing a level for the first time, you probably won’t know where you are on the screen before you move. You can find out by firing your laser a couple of times; the shots will appear on the screen, but you’ll remain invisible. To shoot using the joystick, press joystick button 0, then move the stick in the direction you want to fire. From the keyboard, press Open Apple and the key for the desired direction. On Apple II’s and II+’s, which don’t have the Open Apple key, the paddle 0 button should be used instead.

You should shoot at the mines and their generators, both to disable them (once disabled, they’re no longer shown onscreen) and to protect yourself. Refer to the screen photo—the small diamond-shaped objects are mines, the four-sided blocks represent generating stations, and the eight-pointed star shows the position of your minesweeper. There’s no way to shoot diagonally or through walls, or to shoot anything that’s right next to you—there has to be at least one empty space between you and whatever you’re trying to shoot. This feature adds an extra challenge to the game, since you can get trapped in a swarm of mines if you’re not alert.

Be careful not to run into mines. They can’t shoot at you, but they will do some damage to your minesweeper if you run into them. Every time you touch a mine, your energy level drops by ten units. When you disable a mine or a generator, you can recover some energy from the scrap that’s left. Each mine that you shoot adds one energy unit and scores 10 points; each generator adds five energy units and 500 points. If your energy level reaches zero, the game ends. Press Control-Reset if you want to stop playing or any other key to play again.

When you’ve deactivated all the mines and generators on a level, Vulcan Mines loads the next level from disk. After you’ve completed the highest level, the game continues by returning to the first screen, but with a higher difficulty factor.

Designing Extra Boards
Five different levels are included with Vulcan Mines, but the game may consist of as many boards as you want. Even better, you can de-
Start by entering the board editor listed as Program 7. You'll find it much easier if you use the "Apple Automatic Proofreader" program, found elsewhere in this issue, to help you check your typing. Save Program 7 on the same disk with the game and all the existing levels, giving it the filename MAKE. Check that the Caps Lock key is down and then type

**RUN MAKE**

The program clears the text screen and draws a border of asterisks (*). It also shows a cursor—a flashing plus sign—that you can move using the keyboard. Use the same keys you use to control the game from the keyboard. Here's a list of all the keys that the board-maker program recognizes:

<table>
<thead>
<tr>
<th>Key</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Move up</td>
</tr>
<tr>
<td>J</td>
<td>Move left</td>
</tr>
<tr>
<td>K</td>
<td>Move down</td>
</tr>
<tr>
<td>L</td>
<td>Move right</td>
</tr>
<tr>
<td>X</td>
<td>Draw a wall</td>
</tr>
<tr>
<td>G</td>
<td>Draw a generator</td>
</tr>
<tr>
<td>Space</td>
<td>Erase a square</td>
</tr>
<tr>
<td>S</td>
<td>Set player's starting position</td>
</tr>
<tr>
<td>Return</td>
<td>Save the board to disk</td>
</tr>
</tbody>
</table>

Move the cursor around the screen and use the X and G keys to place walls and generators wherever you want. To erase a wall or generator that you don't want, press the space bar. Walls and generators appear in the same places on the editing screen as on the finished game screen, but the board-maker program uses text characters to represent them—asterisks for walls and uppercase Gs for generators. You should also press the S key once to set the player's starting position. (This won't be displayed on the screen.)

Make sure that the player can actually get to all the generators and can get a straight shot from more than one square away in at least one direction. Otherwise, that generator can never be destroyed and the round will never end. You should also remember that each level is limited to 32 generators at most.

When you're satisfied with the layout, press Return. The program will ask you for a random seven-value, which sets the speed at which each generator in the level produces mines. Enter a value between 0 and 255. Higher numbers are faster speeds. Ten is a good value for beginners, while 255 is nearly impossible, since a new mine will appear each time you shoot one. Next, enter the number for this level. This number will become part of the filename for this level and will indicate the order of play for the different boards. (Use numbers greater than 5 unless you want to overwrite one of the existing level files.) After a short period of processing, the program will write the data for the new level to the disk.

The NUMLEV file also gets updated when you create a new level. This binary file contains only one byte, indicating the number of levels on the disk. If the number you've assigned to the new level is greater than the old value in NUMLEV, the board editor will write the new number to NUMLEV. Otherwise, it will add your level's new level number to the end of the file.
Program 2: LEV01

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

```
5020: 06 08 13 58 0C 11 16 02 00
5028: 11 16 25 00 00 00 00 00 00
5030: 00 00 00 00 00 00 00 00 00
5038: 00 00 00 00 00 00 00 00 00
5040: 00 00 00 00 00 00 00 00 00
5048: A0 A0 A0 A0 A0 A0 A0 A0 A0
```

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Program 3: LEVO2
For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

Program 4: LEVO3
For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

Program 5: LEVO4
For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

Program 6: LEVO5
For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.
Program 7: Vulcan Mines Level Editor

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

```
73 5 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. ALL RIGHTS RESERVED.
0: NEXT I
C1 10 LOMEM: 8192
48 20 HOME
A6 30 DIM M(40,24)
E0 40 DIM GX(32),GY(32)
E9 50 FOR T = 1 TO 40
87 60 HTAB (T): VTAB 1: PRINT "*";
70 70 HTAB (T): VTAB 23: PRINT "*";
A4 80 M(T,1) = 1: M(T,23) = 1
E1 90 NEXT T
E2 100 FOR T = 1 TO 23
B0 110 M(I,T) = 1:M(40,T) = 1
99 120 HTAB 1: VTAB (T): PRINT "*";
B8 130 HTAB 40: VTAB (T): PRINT "*";
A1 140 NEXT T
B0 150 X = 20: Y = 13
E1 160 HTAB (X): VTAB (Y): PRINT "*";
C3 170 HTAB (X): VTAB (Y)
E9 180 N = M(X,Y)
E0 190 IF N = 1 THEN PRINT "*";
E9 200 IF N = 0 THEN PRINT "";
E7 210 IF N = 2 THEN PRINT "O";
E9 220 IF PEEK (-16384) < 128 THEN 160
E9 230 GET R$
B9 240 IF R$ = "S" THEN PRINT CHR$ (7):SX = X:SY = Y
$6 250 IF R$ = " " THEN M(X,Y) = 0
B9 260 IF R$ = "X" THEN M(X,Y) = 1
E0 270 IF R$ = "G" THEN M(X,Y) = 2
B7 280 IF R$ = "I" THEN Y = Y - 1
E9 290 IF R$ = "K" THEN Y = Y + 1
E7 300 IF R$ = "J" THEN X = X - 1
B0 310 IF R$ = "L" THEN X = X + 1
93 320 IF R$ = CHR$ (13) THEN 380
12 330 IF Y < 2 THEN Y = 2
C4 340 IF X < 2 THEN X = 2
E2 350 IF Y > 22 THEN Y = 22
B3 360 IF X > 39 THEN X = 39
A0 370 GOTO 160
17 380 IF SX = 0 THEN HTAB 1: VTAB 24: PRIN
C9 390 HOME : INPUT "RANDOMNESS -> ";RA
48 400 GOSUB 580
C4 410 G = 5 * 4096 + 100
E9 420 X = 1: R = 0
E9 430 PRINT
44 440 PRINT "FORMING MAP:"
E0 450 FOR O = 1 TO 24
D1 460 FOR T = 1 TO 40
20 470 IF M(T,O) = X THEN R = R + 1: GOTO 510
C0 480 X = M(T,O): POKE G,R
A6 490 R = R + 1: G = G + 1
12 500 GOTO 520
18 510 IF R = 256 THEN POKE G,255: POKE G
+ 1,0:B = G = 2:R = 1
```

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ProDesk

David Bailey

"ProDesk," a superb menu-driven program launcher, works with all Apple II computers using ProDOS. ProDesk makes it easy to find and run programs, no matter how many levels of subdirectories are involved. It also offers file maintenance features such as creating subdirectories and deleting, locking/unlocking, and renaming files. An 80-column card is required for Apple II+ and older IIe computers.

The Macintosh has its Finder. The Apple IIGS has its Desktop. Both are applications that let you locate files, execute programs, and conduct routine file maintenance chores like deleting and renaming files. But if you're using an Apple II+, IIe, or IIc computer and ProDOS, you've been pretty much out of luck. Until now—until "ProDesk."

ProDesk uses a folder metaphor to show you what files and directories are on any disk; then it lets you select and execute system, BASIC, and machine language files. ProDesk opens and closes directories and subdirectories with the touch of a key, letting you locate buried files with ease.

More than just a file locator and program launcher, ProDesk also offers some basic file maintenance features. Instead of typing in cumbersome commands like DELETE filename or RENAME oldname, newname, ProDesk deletes and renames files at your order.

Name It STARTUP

ProDesk is a BASIC program that should be entered using "Apple Automatic Proofreader," the error-checking utility found elsewhere in this issue. Type in the program and save it to a blank disk using the name STARTUP.

When a ProDOS disk boots, the computer reads the first track from the disk. That starts a process of loading the PRODOS and BASIC .SYSTEM files. After that, the computer searches the disk for a file named STARTUP. If it finds one, the STARTUP program is executed. Saving ProDesk as STARTUP, then, causes the program to run automatically when the disk boots.

It's easiest if you copy ProDesk to each of your disks and make it the first file you place on any newly formatted disk. That way, you won't need to switch disks as often.

You can name ProDesk something other than STARTUP, but then you'll have to manually load and run it the usual way, such as with the command

RUN PRODESK

File Folder Mentality

It takes only a moment for ProDesk to find all the files on the disk and display them on the screen. Figure 1 shows the ProDesk file folder as you'll see it on your computer's monitor.

Figure 1: The ProDesk Screen
Pathname lists the complete directory pathname in the standard ProDOS format of /volume/directory/subdirectory/filename. The boldfaced brackets indicate the current volume, directory, or subdirectory.

The current volume, directory, or subdirectory name is also placed here.

Filenames appear in the first column.

File types (BAS, BIN, DIR, TXT, SYS) are listed in the second column. A vertical bar separates the two-column combinations.

When there are more than 36 files on the disk, the word more appears. Selecting it displays the next group of 36 files.

Command key summaries are listed at the bottom of the screen.

You can operate ProDesk with just the up- and down-arrow keys (or the A and Z keys for up and down, respectively), Return, Escape, the left-arrow key, and the spacebar. These six keys let you do everything from executing a machine language program to accessing ProDesk's file maintenance utilities.

Using ProDesk

ProDesk is simple to use. The up- and down-arrow keys (or the A and Z, if you have an Apple II+ keyboard) select the file to execute (or the directory to open). Notice that the arrow appears next to the chosen file or directory. If "wraps" around as well, so that when it's at the top of the leftmost column, you can reach the bottom of the rightmost column by pressing the up-arrow key.

Press Return to execute the file or to open the selected directory. ProDesk changes to the 40-column mode before running a program, in case the executed program isn't formatted for 80-columns.

Note that ProDesk can be fooled into trying to execute some files that aren't really programs. Although binary (BIN) files often hold machine language programs, such files can also be used to store character shape data or other information. An example is the playing level data files for the "Vulcan Mines" game elsewhere in this issue. ProDesk has no way of knowing which BIN files contain data and which contain executable machine language. If you try to execute a data file, you'll probably experience an immediate system crash. If this occurs, press Control-Reset to return to the familiar ] prompt, then type RUN STARTUP (or whatever name you gave to ProDesk) to re-run the program.

When there are more than 36 files on the disk, the word more shows at the bottom of the file folder. It's normally in lowercase, but changes to uppercase (MORE) when it's selected. Pressing Return when MORE is visible puts the disk's next 36 files on the screen. (Notice that the back-arrow key is now labeled for last group of files instead of for last subdirectory.)

Use the Escape key to look at another disk's files. Put another disk in the drive and press Return to view the root directory, or type in the pathname if you want to view a directory on that new disk. Pressing the Escape key at this point exits ProDesk and puts the ] prompt on the screen.

The left-arrow key closes the current directory and takes you back one level. If you're in a directory named DOX in the volume PRODESK, for instance, pressing the left-arrow key closes DOX and displays the main root directory of the volume PRODESK. Closing a disk's root directory puts the same options on the screen as when you press the Escape key.

When you use ProDesk to execute a program in a subdirectory, the path to that program will still be the default ProDOS path when the program ends. If you attempt to load a program (ProDesk, for example) not in the selected subdirectory, you'll get a Path not found error message. To avoid this, use the command PREFIX / to return to the volume directory before attempting to load another program.

Empty directories and non-existent pathnames are errors that ProDesk cope's with. The program displays a short message and allows you to continue with the press of any key.

Using The Utilities

ProDesk also offers several file maintenance features that you can use without exiting the program. To reach the Utilities menu, press the spacebar. Selecting the proper utility takes just one keypress.

Note: Make sure the Caps Lock key is down.

Create Subdirectory puts a short note on the screen. Read the note, hit any key, and type in the name of the new subdirectory. Although you can create a subdirectory within a directory here (by separating the two with a slash (/) and by keeping the total character count under 15), it's best if you first open the appropriate directory, and then create the new subdirectory.
Figure 2: ProDesk’s Utilities

ProDesk’s Utility menu appears when you press the spacebar. Each of the four features is called with a single keypress.

Delete File does just that. Press the D key, move the arrow to select the file, and press Return (hitting the Escape key aborts the delete process entirely). You’ll have to confirm the delete by pressing Y for Yes. Pressing N cancels the delete. Important note: ProDesk’s Delete feature will delete locked files.

Rename File lets you change the name of any file or directory. Just press the R key, select the file or directory, and type in the new name. You can type in as many characters as you want, but only the first 15 are used. Make sure you use only letters, numbers, and periods for the new filename. As with Delete, pressing the Escape key aborts the process.

Toggle Lock Flags lock and unlock files and directories. Locked files and directories are marked on the screen with an asterisk (*). Select the file and press Return. If the file is unlocked, it becomes locked; if it’s locked, it becomes unlocked. Press the Escape key to return to the Utilities menu.

Escape exits the Utilities menu and returns you to the main ProDesk screen.

Some Hows And Whys
As an operating system, ProDOS comes equipped with many of the same commands as the older DOS 3.3. One of the major differences, other than its faster speed, is ProDOS’s parameters. ProDOS includes three parameters which can be used with most DOS commands. The parameter used most frequently in ProDesk is the T parameter.

The T parameter lets you use many commands—such as BSAVE, BLOAD, and BRUN—with any file type. That’s significant, for normally only binary files (marked as BIN) can utilize those commands. BSAVE, BLOAD, and BRUN are powerful, fast commands that take a chunk of memory and either save it to disk, load it from disk, or execute it from disk. They’re much faster than the usual text file commands of SAVE, LOAD, and RUN.

ProDesk takes advantage of the commands’ ease of use. Using the T parameter, the program was able to load filenames into variables for use. An example is the way directories were handled. In ProDOS, directories are considered files (DIRectory files). Since there’s no way to access some file types (other than using the format -filename, which finds the file, then executes it), to open a current directory, you must get the pathname with the command PREFIX, and then use the statement OPEN prefix,TDIR. The files can then be read in one by one.

The MouseText characters are another important addition to ProDesk. I discovered them quite by accident.

To create the MouseText characters, you must print an Escape (CHR$(27)), followed by an inverse, uppercase character. With some experimentation, you’ll quickly find some very useful characters.

Four are especially hard to make out. That’s because they’re really half-characters—two characters must be placed side by side to print the actual figure. Both sets are used in ProDesk. One is the symbol of the directory; the other is the symbol of the running man.

The running man is printed with the FG combination, while the directory is printed by XY. To print the running man, for instance, enter 80-column mode, then type PRINT CHR$(27);CHR$(15);"FG";CHR$(14)

Two other MouseText characters found in ProDesk are the closed Apple (@) and the open Apple (A).

ProDesk

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

8E 10 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. ALL RIGHTS RESERVED.
8F 15 HOME : VTAB 6 : HTAB 12 : PRINT "COPYRIGHT 1987": HTAB 6 : PRINT "COMPUTE! PUBLICATIONS, INC.": HTAB 18 : PRINT "ALL RIGHTS RESERVED.": FOR I = 1 TO 1590 : NEXT I
9E 100 LOMEM : 24576
92 110 POKE 768,0
97 120 CLEAR
98 130 REM POKE 216,0
99 140 DIM FS(36)
21 150 D* = CHR$ (4) : CR* = CHR$ (13) : ES$ = CHR$ (27) : SS$ = CHR$ (15) : NS$ = CHR$ (14)
48 160 PRINT : PRINT D$"CLOSE"
62 170 TEXT : HOME
64 180 SF = 0
5F 190 PRINT D$"PR#3

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13 THEN PRINT CHR$(95);: NEXT
270 IF MF > 0 AND DFS < = 3 THEN PRINT "more";
280 IF MF > 0 AND DFS > 3 THEN PRINT "for last sub-
directory":
290 IF DFS = 0 THEN PRINT "for last sub-
directory":
300 IF DFS > 0 THEN VTAB 9: HTAB 7: PRINT S*N$: "K"
310 IF DFS < = 3 THEN PRINT S*N$: "B"
320 IF DFS > 3 THEN PRINT S*N$; PRINT "to SelectFiles:<R"
330 IF DFS > 3 THEN PRINT S*N$: "J"
340 IF DFS > 3 THEN PRINT S*N$: "N*" & "S*" & "J"
350 IF DFS > 3 THEN PRINT S*N$: "N*" & "S*" & "K"
ED 1010 POKE - 16368,0: WAIT - 16384,128:
IF PEEK (-16384) = 155 THEN POKE -16368,0: TEXT: HOME: PRINT:
PRINT D$"CLOSE": END
8A 1920 INPUT ";PF*
CC 1930 ONERR GOTO 1630
22 1940 PRINT: PRINT D$"PREFIX ";PF$
DC 1950 GOTO 120
84 1960 REM \ FILE UTILITIES
C0 1970 HTAB SH * 23 + 6: VTAB SV + 9: PRINT:
7F 1980 POKE 34,22: VTAB 23: HOME
1F 1990 PRINT "Create Sub-Directories: D>
elete File: R>ename File: T>Togg
le Lock Flags"
18 2010 PRINT "Esc>exits";
CD 2020 POKE-16368,0
AE 2030 WAIT -16384,128: GET A*
89 2040 IF A* = "C" THEN 1190
87 2050 IF A* = "D" THEN 1260
B3 2060 IF A* = "R" THEN 1410
CD 2070 IF A* = "T" THEN 1540
70 2080 IF A* = ES$ THEN HOME: POKE 34,0:
PRINT 768,0: GOTO 600
76 2090 GOTO 1120
5E 2100 HOME
9E 2110 PRINT "Sub-Directories must start
with an alphabetic character, must
not exceed 15": PRINT "characters
, and can contain only letters, nu-
merbers, and periods.";: WAIT -1638
4,128: GET A*
4F 2120 HOME
64 2120 INPUT "Enter Sub-Directory Name (c
r>menu); "; SD$
A0 2130 IF LEN (SD$) = 0 THEN HOME: POKE 768,1: GOTO 120
8F 2135 ONERR GOTO 1630
A1 2140 PRINT: PRINT D$"CREATE "SD$
E9 2150 HOME: GOTO 1210
54 2160 HOME
64 2170 VTAB 23: PRINT "Select File to Del-
et from list and Press Return or Esc to Abo-
rt": IF PEEK (765) = 3 THEN RETURN
F4 2180 POKE 768,2
85 2190 POKE 34,0
00 2195 POKE 670,670
B3 2198 POKE 768,0: HOME
11 2200 FL$ = MID$(F$(SF),2,15)
58 2210 PRINT "Deleting FL$": PRINT T "Approved? (Y/N) > ";
07 2220 GET A$: IF A$ < "Y" AND A$ > "N" AND A$ < > ES$ THEN 1340
A1 2230 PRINT A$
CA 2240 IF A$ = "N" OR A$ = ES$ THEN PRINT:
PRINT "Canceled."; FOR T = 1 TO 1000: NEXT: GOTO 120
77 2250 ONERR GOTO 1630
44 2260 PRINT: PRINT D$"DELETE FL$"
F0 2270 PRINT FL$: Delected.
37 2280 FOR T = 1 TO 1000: NEXT
D6 2290 POKE 120
44 2300 HOME
D9 2310 VTAB 23: PRINT "Select File to Ren-
ame and Press Return or Press Esc
to Abort": IF PEEK (768) = 3 THEN RETURN
F4 2320 POKE 768,3
A5 2330 POKE 34,0
F3 2340 POKE 670,670
D0 2350 POKE 768,0
8A 2360 FL$ = MID$(F$(SF),2,15): FT$ = RIG
HT$ (F$(SF),3)
70 2370 POKE 34,22: VTAB 23: HOME
3E 1490 PRINT "Old Name: "FL$; SPC ( 10); "N
ew Name: ";
60 1500 INPUT ";NN$;
F2 1505 ONERR GOTO 1630
39 1510 IF LEN (NN$) = 0 THEN 1060
AE 1520 PRINT: PRINT D$"UNLOCK "FL$": PRIN
T DS"RENAME "FL$"," LEFS (NN$,15)
9A 1530 PRINT "Done.": FOR T = 1 TO 1000:
NEXT: GOTO 120
52 1540 HOME
AE 1550 VTAB 23: PRINT "Select File to Tog-
gle Lock On and Press Return. Esc
to end."; IF PEEK (768) = 4 THEN RETU
RN
33 1560 POKE 768,4: POKE 34,0
F0 1570 GOTO 670
68 1580 FL$ = MID$(F$(SF),2,15): L$ = LEFS
(F$(SF),1)
BD 1590 IF L$ = "*" THEN PRINT D$"UNLOCK 
FL$": HTAB SH * 23 + 7: VTAB SV + 9 :
PRINT " ":F$(SF) = " " + RIGHT$(F$(SF), LEN(F$(SF)) - 1)
A8 1600 IF L$ = " " THEN PRINT D$"LOCK "FL
$: HTAB SH * 23 + 7: VTAB SV + 9:
PRINT ":F$(SF) = "*: + RIGHT$(F$(SF), LEN(F$(SF)) - 1)
E7 1610 GOTO 670
4C 1620 HOME
61 1630 ER = PEEK (222): PRINT "Error! ";
E9 1650 IF ER = 4 THEN PRINT "Write Protec-
ted."; GOTO 1710
80 1655 IF ER = 10 THEN PRINT "File Locked
. Directory must be Empty."; GOTO 0 1710
96 1660 IF ER = 6 OR ER = 8 THEN PRINT "In-
sert ProDos Disk": GOTO 1710
CA 1670 IF ER = 7 THEN PRINT "No Such Path
ame!": GOTO 1710
A0 1670 IF ER = 12 THEN PRINT "No Buffers
Available!": GOTO 1710
28 1675 IF ER = 16 THEN PRINT "Filename to
o Long."; GOTO 1710
78 1680 IF ER = 17 THEN PRINT "Program too
Large": GOTO 1710
7B 1690 IF ER = 17 THEN PRINT "Directory F
ull!": GOTO 1710
F0 1700 IF ER = 19 THEN PRINT "Duplicate F
ile Name!":
C0 1710 PRINT " Press Any Key to Continue."
89 1720 POKE -16368,0: WAIT - 16384,128:
POKE -16368,0
E2 1730 GOTO 120
2C 367 December 1987 COMPUTE's Apple Applications 97
Make, open, and close text windows in your BASIC programs with "WindowMaker," an impressive utility that also adds word processor-like full-screen editing capabilities to your Apple II, II+, IIe, IIc, or IIgs. Language card required on Apple II and II+. Works only with ProDOS.

Create innovative screen displays with windows of all sizes with "WindowMaker," a utility that packs a double punch. Windows are just part of what WindowMaker does—it also adds extensive screen-editing features to any Apple II–series personal computer. Produce miniwindows or text screens with the convenience of a full-screen, word processor-like program editor.

All In Machine Language
WindowMaker is written in machine language, so you'll need to type it in with "Apple MLX," the machine language entry program found elsewhere in COMPUTE!'s Apple Applications. MLX is used to enter a number of programs in this issue, so make sure you have a copy typed in and saved to disk. Load and run MLX, then respond to the two questions with

STARTING ADDRESS: 0800
ENDING ADDRESS: 1177

Press E at the options menu to enter the program, then type the starting address. If this is your first session at entering WindowMaker, type 0800. Type in WindowMaker, and when you're through, save it to disk—perhaps with a filename like WINDOW.MAKER.

Check to make sure that your computer is in 40-column mode (press Escape-4 if you're not sure), then activate WindowMaker by typing

BRUN WINDOW.MAKER

and pressing Return.

Note: WindowMaker uses a portion of the language card to store screen areas covered by windows. The program works on Apple II and Apple II+ computers only if a language card is installed.

Editing First
While WindowMaker is active, the checkerboard cursor is replaced with an underline cursor. You also won't see the ?, ], *, and ! prompts on the screen.

All the cursor keys function, including the up cursor key. You can edit any BASIC program line that's displayed on the screen. You don't even need to place the cursor after the last character on a line before pressing Return. It doesn't matter where you press Return—BASIC reads the entire logical line (see "Logical Lines" below).

Several keys now function like those on popular word processors. The Delete key works as in most word processors. In other words, it deletes the character to the left of the cursor, and moves the character under it and those to the right of it one space to the left. The Tab key moves the cursor to the nearest column. Columns start at the left side of the current window and appear every ten spaces.

Two control-key combinations also have special functions. Control-L clears the window and moves the cursor to the upper left corner of the current window (just like the HOME command). Control-Y homes the cursor without clearing the window. Since WindowMaker uses the alternate character set, except for those used for text editing, the Control key combinations produce graphics characters in a program listing.
Logical Lines
When you type in a BASIC program, the computer has to have some way of organizing the screen so that you can enter more than 40 characters at a time. WindowMaker organizes the 24 physical screen lines into logical lines. Logical lines can consist of as many as four physical lines (160 characters) and are treated as a single unit. When a BASIC program is listed on the screen, each program line will be one logical line, though it may occupy more than one physical line. While WindowMaker is active, a bell sounds to let you know when you've typed past the right window boundary onto a new logical line.

Quote Mode
To make formatting text within BASIC PRINT statements easier, WindowMaker enters what's known as quote mode every time a quotation mark is printed (you're familiar with this if you've used a Commodore computer). Typing another quotation mark or pressing Return exits the quote mode.

Cursor and control keys don't work normally in quote mode. Instead, a letter character is printed when such a key is pressed. When the PRINT statement is executed in the program, however, the computer interprets the character as the cursor or control key it replaced—even if WindowMaker is not loaded (exceptions are the Ctrl-L and Ctrl-Y combinations, which work only when WindowMaker is present or an 80-column card is active.)

<table>
<thead>
<tr>
<th>Table 1. Quote Mode Results</th>
<th>ASCII code</th>
</tr>
</thead>
<tbody>
<tr>
<td>In quote mode you type</td>
<td>You see on the screen</td>
</tr>
<tr>
<td>Up</td>
<td>K</td>
</tr>
<tr>
<td>Down</td>
<td>J</td>
</tr>
<tr>
<td>Left</td>
<td>H</td>
</tr>
<tr>
<td>Right</td>
<td>U</td>
</tr>
<tr>
<td>Clear screen (Ctrl-L)</td>
<td>L</td>
</tr>
<tr>
<td>Home cursor (Ctrl-Y)</td>
<td>Y</td>
</tr>
<tr>
<td>Esc</td>
<td>[</td>
</tr>
<tr>
<td>Tab</td>
<td>]</td>
</tr>
</tbody>
</table>

The only two control characters not affected by quote mode are the Delete and Return keys.

Normally, when you press the up cursor key, the computer moves the cursor up one line. But if you type a quotation mark when WindowMaker is active, then press the up cursor key, the cursor doesn't move up one line. Instead the letter K is printed. This character has the same ASCII value as the up cursor key. If this is part of a PRINT statement, the computer executes an up cursor move—it doesn't print the letter K—when the PRINT statement is performed.

Windowing Second
Imagine a collection of index cards. You can only see the top card, which covers all the rest. Imagine that every time you put another card on top of the stack, the one beneath is completely erased. This is the normal Apple text screen.

Now pretend the cards are of varying sizes. When you place a card on the top of the stack, the card now covered isn't erased, but is stored somewhere. You can write only on the topmost card, even when the one underneath is partially exposed. But when you remove the top card, the one beneath reappears. That's a perfect model of the WindowMaker system.

Like the index cards, you work with only one window at a time. The entire text screen is your window when you start. As you create windows, however, you create miniature, but fully operational screens.

The current window is like the normal text screen in that all output goes to and all input is from that window. Windows scroll independently from the rest of the screen and operations like clearing the screen affect only the current window.
window. When a window slides up, the hidden portion of the screen is completely restored.

**New Commands**

WindowMaker adds three new commands to BASIC.

- **PULLDOWN**
- **SLIDEUP**
- **CUR**

**PULLDOWN** opens a new window on the screen, and has the format:

```
PULLDOWN x1,x2,y1,y2,Ctrl-F,Title
```

where \( x_1, y_1 \) indicate its upper left corner and \( x_2, y_2 \) its lower right corner. The range for \( x \) is 0–39, and for \( y \), it is 0–23.

Ctrl-F (entered by pressing the Ctrl key and the F keys at the same time) is an optional parameter. If present, a frame is drawn around the window; the coordinates of the two corners will be those of the frame, not of the inside of the window. If a frame is drawn, the **Title** parameter can be used. The title will be printed and centered within the top line of the frame. It cannot be longer than the length of the top of the window’s frame; if it is, it won’t be printed.

**SLIDEUP** removes the last opened window and restores the one beneath it to its former state. It has no parameters. If no window is open, the entire screen is cleared.

**CUR** sets the cursor position, since HTAB, VTAB and HOME won’t function correctly with WindowMaker. CUR has the following format:

```
CUR x,y
```

where \( x, y \) is the new position of the cursor relative to the upper left corner of the current window. Again, the range for \( x \) is 0–39, and it is 0–23 for \( y \). CUR does not function correctly in direct mode.

**Note:** Make sure that you do not specify a position for CUR which is outside of the current window. With a window created by the command **PULLDOWN 10,20,10,20**, for example, issuing **CUR 21,15** sets the cursor outside the window. The results are normally not disastrous, as you can usually cursor manually back into the window, but they should be avoided. To prevent placing the cursor outside the window, just insure that CUR’s coordinates fall within the range (exclusive) used by the active window’s **PULLDOWN** command. In the example, then, neither \( x \) nor \( y \) could be smaller than 11 or larger than 19.

When used in a program, these commands are considered to be DOS commands. As such, they must be put within a PRINT statement.

```
10 PRINT CHR$(4);"SLIDEUP"  
20 PRINT CHR$(4);"PULLDOWN 2,8,1,10"
```

The following short program “WindowMaker Demo” is a sample of WindowMaker’s abilities. Type it in, save it to disk, and then run it after you’ve installed WindowMaker (with a BRUN WINDOW .MAKER).

The characters within brackets represent various keypresses.

- `[CLR]` Ctrl-L
- `[TAB]` Tab
- `[DWN]` Down cursor
- `[CTRL-D]` Ctrl-D
- `[CTRL-F]` Ctrl-F

Thus, `[DWN-3]` means to press the down cursor key three times.

**WindowMaker Demo**

```
10 SPEED=150: PRINT "[CLR][TAB]WINDOWMAKER"  
20 PRINT "[DWN-3]"; FOR A=1 TO 12: PRINT "[DWN]This is a Demo...";: NEXT: FOR A=1 TO 200: NEXT  
30 PRINT "[CTRL-D]PULLDOWN 5,38,5,19,[CTRL-F],DEMO": FOR A=1 TO 200: NEXT  
40 FOR A=1 TO 200: PRINT "[DWN]This one has no frame...";: NEXT: FOR A=1 TO 1000: NEXT  
50 FOR A=1 TO 200: NEXT; PRINT "[CTRL-D]PULLDOWN 8,32,8,16": FOR A=1 TO 8  
60 PRINT "[DWN]This one has no frame...";: NEXT; FOR A=1 TO 1000: NEXT  
70 PRINT "[CTRL-D]SLIDEUP": FOR A=1 TO 1000: NEXT; PRINT "[CTRL-D]SLIDEUP"  
80 FOR A=1 TO 500: NEXT; PRINT "[CLR]"
```

**Input**

Because of the way WindowMaker works, the INPUT command needs the following special format. Programs written like this operate normally, even if WindowMaker isn’t loaded into memory.

```
INPUT "PROMPT|DWN||LEFT cursor the same number of times as there are letters in the prompt string|",a$  
```

or if there’s no prompt, the format

```
INPUT "[DWN]|3 LEFT cursors"]",a$  
```

Some examples are

```
INPUT "VALUESJHHHHHH",a$  
INPUT "JHHH",a$  
```

**Note:** In the above example, you enter keys which appear in brackets by pressing the indicated key. You don’t type the brackets. For instance, if you see [LFT], you press the left cursor key.

**Machine Language**

You can perform all the WindowMaker functions and three additional functions from machine language.

**INPUT** flashes the cursor and inputs a logical line storing the text at address 0200 (512 decimal) and up with a delimiter of 8D (141).
This is the equivalent of the FD67 monitor ROM routine.

**GET** flashes the cursor, waits for a key to be pressed, and returns its ASCII value in the accumulator with the high bit set. This is the equivalent of the FDOC monitor ROM routine.

**PRINT** prints the character or control code whose ASCII value is in the accumulator.

For WindowMaker functions **PULLDOWN** and **CUR**, values must be stored in memory before calling the appropriate routine. The locations to be loaded correspond exactly to the previously-discussed **BASIC** values, except for **CUR**'s x and y values. Here they're relative to the upper left corner of the screen, not the current window.

After loading the appropriate memory locations, your program should perform a **JSR** to the appropriate calling location for the function you wish to access.

<table>
<thead>
<tr>
<th>Address</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0804</td>
<td>JMP PRINT</td>
</tr>
<tr>
<td>0807</td>
<td>JMP GETKEY</td>
</tr>
<tr>
<td>080A</td>
<td>JMP INPUT</td>
</tr>
<tr>
<td>080D</td>
<td>JMP PULLDOWN (Carry set means error)</td>
</tr>
<tr>
<td>0810</td>
<td>JMP SLIDEDOWN</td>
</tr>
<tr>
<td>0813</td>
<td>JMP CURSOR</td>
</tr>
<tr>
<td>0819-C</td>
<td>x1,x2,y1,y2 or x,y for CUR</td>
</tr>
<tr>
<td>081D:</td>
<td>=Frame, 00=None</td>
</tr>
<tr>
<td>081E-F</td>
<td>PTR to Title or 00 if none. Title ends with 8D.</td>
</tr>
</tbody>
</table>

**WindowMaker**

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

<table>
<thead>
<tr>
<th>Address</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800:</td>
<td>4C D4 0F 11 4C 20 08 4C 9D</td>
</tr>
<tr>
<td>0808:</td>
<td>0D 08 4C 3E 0C 4C F6 0C D9</td>
</tr>
<tr>
<td>0810:</td>
<td>4C 9E 0C 4C 91 0C 60 00 B1</td>
</tr>
<tr>
<td>0818:</td>
<td>00 00 27 00 17 00 00 00 C5</td>
</tr>
<tr>
<td>0820:</td>
<td>85 07 8A 4B 0B 48 20 2D DF</td>
</tr>
<tr>
<td>0828:</td>
<td>0E F0 44 C9 7F F0 40 A5 B6</td>
</tr>
<tr>
<td>0830:</td>
<td>1E 29 01 0B A5 07 29 7F 55</td>
</tr>
<tr>
<td>0838:</td>
<td>2D 80 17 29 7F C9 1A B0 OE</td>
</tr>
<tr>
<td>0840:</td>
<td>11 C9 0B 9D C9 0E 90 91</td>
</tr>
<tr>
<td>0848:</td>
<td>26 C9 15 F9 22 C9 19 EA E4</td>
</tr>
<tr>
<td>0850:</td>
<td>F0 1D C9 22 D0 08 A5 1E 8B</td>
</tr>
<tr>
<td>0858:</td>
<td>49 01 B5 05 A5 07 20 50 B9</td>
</tr>
<tr>
<td>0860:</td>
<td>04 A4 24 91 28 20 0C 09 1F</td>
</tr>
<tr>
<td>0868:</td>
<td>68 A8 68 AA 05 07 60 20 B8</td>
</tr>
<tr>
<td>0870:</td>
<td>0E D0 0A 08 0A 02 02 A9 EA</td>
</tr>
<tr>
<td>0878:</td>
<td>79 3B 4B 0C 0C 30 4F 53</td>
</tr>
<tr>
<td>0880:</td>
<td>E9 01 D0 F7 6B E9 01 D0 1D</td>
</tr>
<tr>
<td>0888:</td>
<td>F1 CA D0 EB 6B 8A 48 9B 73</td>
</tr>
<tr>
<td>0890:</td>
<td>40 A8 24 B1 28 06 A7 9A</td>
</tr>
<tr>
<td>0898:</td>
<td>9F 91 2B 28 75 08 AD 00 0B</td>
</tr>
<tr>
<td>08A0:</td>
<td>C0 30 0C 05 08 91 2B 28 DF</td>
</tr>
<tr>
<td>08A8:</td>
<td>75 0B AD 00 C9 10 EB B5 8B</td>
</tr>
<tr>
<td>08B0:</td>
<td>07 AD 10 C0 9E 01 9B 2E 4E</td>
</tr>
<tr>
<td>08B8:</td>
<td>68 A8 68 AA 05 07 60 20 EA BB</td>
</tr>
<tr>
<td>08C0:</td>
<td>85 CA A5 07 65 CA AD</td>
</tr>
<tr>
<td>08C8:</td>
<td>88 84 06 20 D5 60 08 A4 84</td>
</tr>
<tr>
<td>08D0:</td>
<td>06 2B 0D F4 60 9B A2 00 02</td>
</tr>
<tr>
<td>08D8:</td>
<td>C9 0B 09 05 EB 0E 60 44</td>
</tr>
<tr>
<td>08E0:</td>
<td>F7 AB B5 FA 39 EB 08 60 5B</td>
</tr>
<tr>
<td>08EB:</td>
<td>80 40 20 10 08 04 02 01 A3</td>
</tr>
</tbody>
</table>
If you OPEN and READ the directory of the built-in ProDOS/RAM volume, you'll find that you get an END OF DATA error before ProDOS reports how much free space is left there. This bug is caused by a non-standard directory on the RAM volume—it's only big enough to hold 12 filenames rather than the usual 33. To work around the problem, CREATE a subdirectory, OPEN and READ it, then DELETE it. For more information, see 'Good Bye, RAM Bug' in the August 1987 Open-Apple, page 3.52.

From our fan mail:

I want to say that I am extremely impressed with Open-Apple. I did not realize a publication that provides so much interesting and practical information about the Apple II world existed.

Joseph J. Sokolosky
La Crosse, WI

I find Open-Apple to be packed with solid advice every month. Rather than becoming thinner and thinner with more advertisements, Open-Apple just seems to get better and better.

Michael Fisher
Milwaukee, Wisc.

Press return
Open-Apple is Tom Weaher's monthly newsletter for knowledgeable Apple II users. It's thin but packed tight with Apple II lore, humor, letters, tips, advice, and solutions to your problems. Compared to other Apple II publications, Open-Apple has the highest news per-dollar ratio: the clearest writing, the funniest cartoons, the longest index, the only warranty (all your money back if you're not satisfied), and it takes up the least shelf space. The only thing it doesn't have is the most subscribers. Yet...

Il cue #22

If you OPEN and READ the directory of the built-in ProDOS/RAM volume, you'll find that you get an END OF DATA error before ProDOS reports how much free space is left there. This bug is caused by a non-standard directory on the RAM volume—it's only big enough to hold 12 filenames rather than the usual 33. To work around the problem, CREATE a subdirectory, OPEN and READ it, then DELETE it. For more information, see 'Good Bye, RAM Bug' in the August 1987 Open-Apple, page 3.52.

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Michael Fisher
Milwaukee, Wisc.
ProDOS File Stamper

Louis-Eric Simard

No need for a clock card when you have this program handy. Run it each time you start your Apple II+, IIe, or IIc, and it automatically stamps files as they’re saved or changed. Use only with ProDOS.

Type CATALOG, and ProDOS shows you information ranging from the names of files to their lengths. Two columns, Modified and Created, however, are usually filled with the label <NO DATE>. These columns should show the date and time each file was created, and the date and time of the last change to that file.

Dates and times can be important, especially when you want to know which version of a file is the oldest (the original, in other words) or which version you most recently altered. “ProDOS File Stamper” fills in the missing dates and times for you automatically.

Stamp Those Files

File Stamper is a short BASIC program. Type it in with “Apple Automatic Proofreader,” our error-checking utility published in this issue. Automatic Proofreader makes typing mistakes almost impossible.

Once you’ve entered File Stamper, save it to a ProDOS-formatted disk using any filename you want. FILE.STAMPER would be a good choice.

Note: If you want File Stamper to automatically run whenever you boot the disk, save it with the name STARTUP.

To run File Stamper, type RUN FILE.STAMP (or whatever other name you might have given it), or use the ProDOS smart run option: Enter -FILE.STAMP and press Return. You’ll see the default values for the current day, month, year, hours, and minutes.

The first time you run File Stamper, the screen will show 06-DEC-86 and 18:30. Line 110 in the program uses those values. As you’re typing in File Stamper, you can change them to create a more recent date if you wish.

The second and subsequent times you run File Stamper, the last entered date and time are displayed.

Note: File Stamper is unnecessary with an Apple IIgs since that machine includes a battery-driven clock which time and date stamps all files.

Date By Default

Press the Y key if you want to use the default date and time. If not, press N, and you’ll have a chance to supply both date and time.

The date format is DD-MMM-YY, where

- DD Date from 1 to 31. When entering dates 1–9, add a preceding 0, as in 01.
- MMM Month, in the form of a three-letter abbreviation. Months are JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, and DEC.
- YY Year. Use the last two digits of the year, as in 87.

The time should be entered as HH MM, where

- HH Hours expressed in military time. For example, 4 p.m. should be entered as 16, midnight as 24.
- MM Minutes from 1 to 59. Precede minutes 1–9 with 0.

The time format is HH MM.

You have to manually cursor across the hyphens when entering the date. (You can use the space bar to move from one part of the date entry to another; though this erases the hyphen, it doesn’t affect the result.) Acknowledge the new default values and the messages UPDATING PRODOS and PRODOS UPDATED will appear.

Any files you save or create from this point on will have date and time supplied under MODIFIED and CREATED columns.
How Stamper Works
ProDOS stores date and time as binary information in several memory addresses. Addresses 49040 ($BF90 in hexadecimal) and 49041 ($BF91) of the MLI Global Page contain the date in YYYYMMDD format. The time is stored at addresses 49042 ($BF92) and 49043 ($BF93) in 000HHHHHO0MMMMMM for mat. (The 0s stand for unused bits.) The trick is to code values in that manner.

Lines 470–550 do the job for the day, month, and year by converting all necessary values to the binary format and concatenating them all to create a 16-bit string. That string is split into two eight-bit substrings and converted back to decimal.

Data for the hours and minutes is POKEd into memory, since each part of the information exactly fits in two bytes.

ProDOS File Stamper
Be sure to use “Apple Automatic Proofreader,” found elsewhere in this issue, to enter the following program.

```
73 5 REM COPYRIGHT 1987 COMPUTE! PUBLICATIONS, INC. ALL RIGHTS RESERVED.
75 10 DIM MO$(12)
73 20 TEXT: HOME
68 30 REM
65 40 REM <> MAIN PAGE <>
60 50 REM
68 60 HTAB 11: PRINT "PRODOS FILE STAMPER"
77 70 HTAB 13: PRINT "Copyright 1987"
65 80 HTAB 7: PRINT "COMPUTE! Publications, Inc."
65 85 HTAB 11: PRINT "All Rights Reserved."
79 90 FOR A = 1 TO 40: PRINT "": NEXT: PRINT: POKE 34,5
60 160 ONERR GOTO 140
EA 110 HO = 18: MI = 30: MM = 12: DD = 6: YY = 86
EE 120 PRINT CHR$(4) "VERIFY DATESTAMP"
73 130 GOTO 170
72 140 FOR A = 1 TO 12: READ MO$(A): NEXT
7# 150 POKE 222,0: PRINT CHR$(4) "STORE DATESTAMP"
EE 160 PRINT
76 170 PRINT CHR$(4) "RESTORE DATESTAMP"
7# 180 VTAB 8: PRINT "CURRENT SET-UP IS: "
5E 190 VTAB 10
5$ 200 PRINT "DATE: " "DD": "MO$(MM) "" - " YY
5I 210 PRINT "TIME: " "HO": "MI
5A 220 VTAB 15: PRINT "USE EXISTING SET-UP"
? (Y/N) "
11 240 IF A$ = "Y" THEN PRINT "YES": GOTO 440
10 250 REM
1# 260 REM <> CHANGE SET-UP <>
4 270 REM
6 280 PRINT "NO"
5 290 HOME
5E 300 VTAB 10: HTAB 15: PRINT "DD-MMM-YY"
6T 310 INPUT "": N$: DD = VAL (LEFT$(N$,2))
7 320 YY = VAL (RIGHT$(N$,2))
7 330 IF DD < 1 OR DD > 31 OR YY < 1 THEN 300
5 340 MS = MID$(N$,4,3)
12 350 FOR A = 1 TO 12: IF MS > MO$(A) THEN NEXT: GOTO 300
7 360 MM = A
5 370 VTAB 12: HTAB 17: PRINT "HH MM": VTAB 12: HTAB 17
6T 380 INPUT "": N$: HO = VAL (LEFT$(N$,2))
7 390 IF MI < 0 OR MI > 59 OR HO < 1 OR HO > 24 THEN 370
5 390 PRINT CHR$(4) "STORE DATESTAMP"
6# 400 RUN
67 410 REM
68 420 REM <> UPDATE PRODOS <>
7# 430 REM
74 440 VTAB 15: PRINT "UPDATING PRODOS..."
7 450 POKE 49042,MI: POKE 49043,HO
64 460 REM ++ CALCULATE DD-MMM-YY VALUES +
7E 470 ST$ = "": N$ = STR$(YY) GOSUB 610
78 480 IF LEN (N$) < 7 THEN M$ = "": FOR M = 1 TO 7 - LEN (N$): M$ = M$ + "0"
7B 490 NEXT: N$ = M$ + N$
7B 500 ST$ = N$: N$ = STR$(MM) GOSUB 610
7E 510 IF LEN (N$) < 4 THEN M$ = "": FOR M = 1 TO 4 - LEN (N$): M$ = M$ + "0"
7B 520 NEXT: N$ = M$ + N$
5 510 ST$ = ST$ + N$: N$ = STR$(DD) GOSUB 610
7B 520 IF LEN (N$) < 5 THEN M$ = "": FOR M = 1 TO 5 - LEN (N$): M$ = M$ + "0"
7B 530 NEXT: N$ = M$ + N$
5 530 ST$ = ST$ + N$
5E 540 N$ = RIGHT$(ST$(8)): GOSUB 630: POKE 49040, VAL (N$)
6A 550 N$ = LEFT$(ST$(8)): GOSUB 630: POKE 49041, VAL (N$)
5 560 PRINT: PRINT "PRODOS UPDATED."
7B 570 END
5E 580 REM ++ MONTH DATA ++
7E 590 DATA JAN,FEB,MAR,APR,MAY,JUN,JUL,AUG,SEP,OCT,NOV,DEC
78 600 REM ++ DECIMAL->BINARY ++
7E 610 A = 16: B = 2: GOSUB 650: RETURN
6B 620 REM ++ BINARY->DECIMAL ++
6D 630 A = 2: B = 10: GOSUB 650: RETURN
67 640 REM ++ GEN. PURPOSE BASE CONVERTER ++
7D 650 N = 0: FOR M = 1 TO LEN (N$): C = AS (C (MID$(N$,M,1))): 48: N = N + A: C > 9: C = 7 + C < 10: C:
7C NEXT: C = 0:N$ = ""
7E 660 FOR M = 1 TO 0 STEP 0: C = C + 1: D = N / B: C = C + 1: E = 4 - M: D = INT (D: R = INT ((D - M) * B): N$ = CHR$(R < 10) * (R + 48): R > 9: (R + 55)
7C N]: NEXT: RETURN
```
Hardball
David Florance
Programming Assistant

Baseball is an American phenomenon, one that embodies the traditional American spirit. Where else but at a ball park can you find a Wall Street broker and Wall Street sweepers sitting side by side, both eating hotdogs and drinking sodas?

Baseball's vernacular is as universal as its fans. Three strikes and you're out!, getting to first base, and out in left field have meanings far removed from the sport.

Now from Accolade comes a game for your Apple II+, Iie, Iic, IIgs, or Macintosh computer that comes close to literally bringing the sport into your home. It's not like watching the game on TV. You're involved. With Hardball, you can instantly become player and manager. You call the shots and get the hits—or strike out. Hardball looks realistic enough to make you smell the roasted peanuts. Play a friend or foe, or play the computer.

The Apple II version lets you use the joystick to choose the home-field advantage and decide which type of game you'll play. The Macintosh version uses the mouse and is completely menu driven. Macintosh Hardball also features digitized sound. When you first hear the umpire yell S-T-R-I-K-E, you'll think you're at the ball park.

The Defensive Game
Baseball is a strategic game. So is Hardball. The program allows you to select pitchers, substitute hitters, and keep track of statistics on which you can base your strategic decisions.

Choose your pitcher carefully. Some have plenty of off-speed stuff, some have plenty of hard stuff, and some have a mixed bag of tricks. They're all good once you learn how to work over the batters. A helpful hint: A high earned run average (ERA) doesn't mean that the pitcher can't get batters out. Some of the pitchers may have just come up from the minor leagues. Others may have been through a slump recently.

The more you play Hardball, the more you'll see that each pitcher has his own strengths as well as weaknesses.

You can pitch the ball anywhere you like. Your catcher has the inhuman (but handy) habit of not allowing passed balls or wild pitches. He'll catch anything you throw at him.

Once the ball is hit, the nearest defensive player begins to blink. That's the player currently under joystick or mouse control. After fielding the ball, throw it to the base or player desired: Move the joystick right for first, up for second, left for third, or down for home on the Apple II version. The Macintosh game has a diamond insert at the bottom of the screen that highlights the base you're throwing to. Once the base is highlighted, press the mouse button to pump your toss.

You're On Deck
You can substitute not only pitchers, but other players as well. Remember that a high batting average doesn't always mean automatic base hits. You can swing the bat anywhere in the strike zone—inside, outside, high, or low. Timing is the most crucial element here. Batting is tougher to learn than pitching. The designer, Bob Whitehead, must agree with famous pitcher Don Drysdale, who said that good pitching will likely beat good hitting. It seems only fitting, especially in light of today's home-run extravaganzas, that Hardball brings back a bit of the old game, with a clear advantage given to the pitchers.

Keep your eye on the ball. Practice will yield better results than anything else. Don't worry if the hits come slowly. They're supposed to in the majors. Use smooth strokes, wait for the ball down the middle, and you'll quickly be knocking it long. And don't forget the steal and bunt options. Should you get behind, remember the words of Yogi Berra (or was it Casey Stengel?): It ain't over till it's over.

How Does It Stack Up?
Hardball has almost everything you could want from a baseball simulation. It stacks up well against the computer-baseball competition because it's a versatile program. There are three types of baseball software. In one, you're the manager. In another, you're the player. And in the third, you're the statistician.

You get to do all three in Hardball. You must demonstrate manual skills for simulated fielding, pitching, and batting. If things look bleak (or unusually good), you can instantly become manager and change the players around to your liking. You can keep up with the statistics as well.

Great color graphics are the trademark of the Apple II version of Hardball. The behind-the-mound perspective changes to a view into the field once the ball is hit.

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Macintosh Hardball offers crystal-clear graphics, smooth animation, and superb sound effects. The mouse controls pitch selection and batting.

The exceptionally clear and precise graphics are another big part of Hardball's success. You've got a clear view of the field from two perspectives: right behind the pitcher and high above home plate. A clever divided-screen technique provides a more panoramic view of the field.

Hardball's realism is outstanding—at a level unmatched by other baseball software to date. The game, like real-life baseball, has endless variations. Each game is different.

But then, that's baseball, isn't it?

Hardball
Apple II-series computer with 64K minimum; joystick required. Macintosh requires 512K minimum.
Accolade
20813 Stevens Creek Blvd.
Cupertino, CA 95014
$34.95 (Apple II); $44.95 (Macintosh)

**DiskFit**
Gregg Keizer, Editor

You must back up your hard disk. It's not just a good idea, it's the law.

Or at least it should be. There will come a moment when you wish you had just finished backing up the disk. For whatever reasons—and they're almost legion—all or part of the 20, or 30, or 40 megabytes of your hard disk will be unreachable. A head crash; garbled document files; a strange System file that decided to go south permanently—these things have happened to others. It's only a matter of time and bad luck before they happen to you.

Preventing hard disk horrors is as simple as regularly backing up the data on your hard disk. Everyone tells you to do it. Following through, though, is another matter. Backing up a hard disk—one that has enough data to fill 25 to 50 800K disks—can be time consuming, tedious, and wrist wrenching. That's why tape-backup manufacturers are doing such land office business. But if you're like most Macintosh owners who use the computer at home, school, or in a small business, you may not be able to afford an expensive tape-backup system.

So you have two choices: Either do not back up at all, or back up to floppy disks. The second choice is much more palatable, and almost painless, if you use DiskFit, a backup program for the Macintosh from SuperMac Software.

SuperMac, best known for its line of hard disks and large screens, has published a backup utility that's quite good at global, or disk-wide, backups, and is superb at incremental backups. This is how it should be. After all, few people need to back up their entire disk more than a few times. It's much more common to want to copy only those files which have changed or been added to the disk since the last backup. An excellent implementation of incremental backups is what makes DiskFit stand above most every other such program.

**SmartSets**

Once DiskFit is installed on your hard disk (a simple process since DiskFit is not copy protected), you can run the program and begin your first backup. DiskFit's screen appears.

The hard disk device(s) connected to your Macintosh appears in the window at the lower right. If you've partitioned a hard disk into several volumes, perhaps for file-serving purposes, or on an older hard disk, each volume ap-
消毒，使它容易被清洗。

DiskFit is an outstanding backup utility. I’ve used several of these in the last two years, and none of the others has the quickness and ease-of-use of DiskFit. It actually makes me want to back up my hard disk, not dread it.

And that makes it easy to follow the law of hard disks: Back up now, back up often.

DiskFit
Macintosh (512, Plus, SE, and II); one or more HFS-formatted hard disks
SuperMac Software
295 N. Bernardo Ave.
Mountain View, CA 94043
$74.95
All the fantastic programs from COMPUTE!'s Apple Applications on a fast, convenient companion disk.

COMPUTE!'s Apple Applications Disk is the easy way to enjoy the programs from the magazine.

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- Works under both DOS 3.3 and ProDOS
- Eliminates errors caused by typing mistakes
- Includes many ready-to-use applications, games, and utilities, all ready to select from a disk menu

The Clipper
An impressive graphics system that cuts images from any Apple hi-res picture, saves them in custom libraries, and pastes them back down to create interesting and new artwork. Menu-driven and packed with features.

ProDesk
Tired of typing long ProDOS pathnames to run programs? Can't remember which subdirectory has that valuable file? This program launcher uses a file-folder interface to simplify finding, running, and even modifying files.

WindowMaker
This full-screen programming editor for the Apple II also lets you create, open, and close customized windows from BASIC.

Vulcan Mines
Deactivate swarms of mines before they turn your sweeper into jagged metal. This arcade-style game comes with five game boards and a program you can use to make dozens more.

Number Construction Set
Beat the clock as you build numbers in this entertaining program that teaches basic mathematics skills.

COMPUTE!'s Apple Applications Disk offers you some of the best and least expensive Apple software on the market. The Disk costs only $12.95 (plus $2.00 shipping and handling) and is available only through COMPUTE! Publications.

Complete documentation for the Disk is provided in COMPUTE!'s Apple Applications. Be sure to specify the December 1987 issue.

To order your Disk, mail your payment to:

COMPUTE!'s Apple Applications Disk 12/87
P.O. Box 5038
F.D.R Station
New York, NY 10150

For fastest service, call toll-free 1-800-346-6767 (in NY call 1-212-887-8525).
Create A Calendar
Duncan R. Teague

Time is nature’s way of keeping everything from happening all at once.

—A famous, but anonymous, graffito on the walls of a building at the University of Arizona

Create a Calendar helps you keep track of what happens when. This program from Epyx produces seven different chronicles of events, ranging from a desktop calendar whose pages you flip (or forget to flip) each day to a one-page calendar that displays the entire year in one glance.

Each calendar can be created from scratch, or you can opt to use one of several master calendars. These contain a predefined list of events and holidays automatically placed in your calendar. Master calendars exist in several forms, all of which contain some common elements. The Holidays master calendar includes federal government holidays, like New Year’s Day, Memorial Day, Independence Day, and Labor Day; widely-celebrated religious holidays that affect department store sales, like Valentine’s Day, St. Patrick’s Day, Easter, Halloween, and Christmas; gift-giving occasions such as Mother’s Day, Father’s Day, and Grandparents’ Day; and seasonal events such as the spring and fall equinoxes and summer and winter solstices.

The Holidays master calendar contains 34 events for 1987. In contrast, the Holidays.Plus master includes 58 events. The events are listed not only in greater number but also in greater detail.

The Jewish master calendar has 46 events, 18 of which are religious celebrations not appearing on other masters. And the Historical master boasts a whopping 98 events, a list that could serve as a final exam for a social studies class.

Moving Around The Calendar
The opening and all following screens are presented in a consistent and logical format. The name of the current operation or the selected date appears at the top. At the bottom is a prompting area, which reminds you of the input expected, the disk required, and the keys used to make menu selections or editing maneuvers. The center is used for menus and the display of the current calendar format.

From the main menu, you can start a new calendar, retrieve a previously created calendar, work on the current calendar, or access disk utilities. The last option is the first choice you’ll want to make. Two-drive users can specify which disk drive will hold the calendar data disk and which drive will hold the master program and/or graphics disks. One-drive users will likely lose their sanity in a flurry of disk swapping.

To start a new calendar, the program formats a disk dedicated to hold all the information for a single year. The master program will access this disk to create screen displays and hard copy in whatever format you choose. It will also access its own flip side or some Print Shop compatible disks for new graphics, borders, and fonts for your calendar.

If you decide to use one of the master calendar options, some dates will automatically be entered. When you select the month for which you want to enter new events, you’ll see the numerals for those dates underlined.

Maneuvering around the monthly calendar display highlights individual dates. Pressing Return selects one for an expanded view. If an event has been entered by a master calendar option, an appropriate graphic may...
be loaded from the program disk and displayed in the top half of the box. Text appears below the graphics area.

Six lines of text will fit below a day's graphic. About 14 proportional characters fit on a line. Text entry includes global cursor movement (within the confines of the date box), word-wrap, and character insertion and deletion.

**Days, Weeks, And Months**

It's possible to change the screen display to show daily, weekly, or monthly formats. Hard copy can also include two different yearly formats—single page or banner—and a simple chronological listing of events. The text, graphics, or both are resized to fit each format.

The daily calendar allows you to enter another 12 lines of text. One side of the daily calendar shows any graphics and any text already entered in monthly format. The other side, left or right at your option, can hold additional text, which will appear only in this format (see Figure 1).

**Graphics**

When you select a date from the default monthly calendar screen, you have the option of including a graphic with any text you type. Graphics are not just a cute idea. They're attention getters—they tell you at a glance what's significant about that day's events (see Figure 2). You can load graphics from side B of the program disk or from another disk.

Side B of the program disk contains 81 graphics, some of which are included with some of the master calendar events. Epyx has also produced three additional graphics disks, called Graphics Scrapbook Collections. Sports, Off the Wall, and School are the categories. Each contains about 100 new graphics, a couple of fonts, eight borders, and several full-panel displays.

It's also possible, according to the documentation, to load graphics from any Print Shop compatible disk. However, Print Shop Graphics Library disks did not work. Print Shop Companion graphics, though, did load, as did graphics from Beagle Minipix Disks 1, 2, and 3.

**Repeat That Day**

The most useful function of Create a Calendar is its ability to repeat an entry. You may schedule events that occur at regular intervals—the first Monday of each month, every other Tuesday, and so on. The Repeat this date option lets you copy a single event and duplicate it over a selected range of dates in subsequent or previous months, on the appropriate day of the month.

The program correctly identifies each date by its ordinal position within the month. Thus, you can schedule staff meetings on the third Friday of each month, faculty meetings every first Wednesday, a beauty shop appointment every Tuesday, and aerobics exercise every second day.

If a repeated event conflicts with one previously entered, you have the option of replacing the first event or skipping that date.

Some careful planning eliminates many conflicts, which most often occur with events included by a master calendar option.

**Hard Copy**

Create a Calendar supports a variety of printers and interfaces for hard copy. Before printing, you can customize the calendar with a title printed in the font and graphic of your choice. While there is no choice of graphic size, repetition, or placement, you can choose what type of calendar to print, can add a credit line at the bottom, and can specify how many copies you want printed.

The print routine is excellent, properly maintaining the line-feed count to bring the top of the next page to the correct position. It avoids using a form feed, which does not take into account the 1/9-inch spacing used by graphics mode.
A Red-Letter Day
The end result is quite nice, but as in the creation of any database (which the calendars are), the entry process is tedious. Master calendar options save some of the labor, but some of the events they automatically add are of marginal importance.

I was especially impressed with the treatment of leap years and seasonal events. The program correctly shows that the year 1900 was not a leap year, but the year 2000 will be. It also differentiates between the traditional dates on which seasons begin (the 21st) and the actual dates on which the seasons begin according to the precise configuration of the Earth and the Sun.

There are several features that detract from the program. The screen font, which I call bold peculiar, has an unusual m character. It's easy to confuse it with an n. The documentation is not always in agreement with the actual program. The 16-page booklet omits one font present on the disk, and it incorrectly states that Control-Q will take you back to the main menu from any screen in the program. Instead, the Escape key is used to back your way to the menu. And the program could not read Print Shop Graphics Library disks.

One additional flaw was the inability of the master Historical calendar to find the graphic for Hanukkah. The source of the problem was found in a screen message that declared HANUKAH graphic not found. Note the missing k.

An electronic calendar is more elegantly corrected than a paper one. Create a Calendar is easy to learn, text entry is versatile, and the ability to include appropriate graphics for each date is a clever idea. Educators and families will probably find Create a Calendar output a useful addition to their bulletin boards and refrigerator doors.

Create a Calendar
Apple II-series computer with 64K minimum
Epyx, Inc.
600 Galveston Dr.
Redwood City, CA 94063
$29.95

Stepping Out
Keith Ferrell, Features Editor

I've always found the Macintosh screen to be confining. For all the conveniences of format and organization the Macintosh delivers, its inability to display a full page or more of text, graphics, or spreadsheet columns can be frustrating and annoying. Expensive add-on screens are available, but at prices that verge on the prohibitive. Now, Berkeley System Design offers an affordable way around small screen frustrations.

Stepping Out: The Macintosh Screen Extender, provides an extended screen environment for the Macintosh 512K, Macintosh Plus, and Macintosh SE. The program resides in memory and offers a variety of features in addition to screen extension. With Stepping Out, you can enlarge screen images from 1 to 16 times, select the screen image size with which you are most comfortable, and change the format of the screen from black on white to white on black.

Easy Installation
It's a simple matter to start Stepping Out. The program is not copy-protected, and it can be placed on a working disk.

Stepping Out itself needs approximately 80K of RAM—and more to hold the screen size you've selected. The program's manual suggests that Stepping Out needs 648 bytes of memory for each square inch of the oversize screen image it holds.

While the memory required to hold a larger screen in memory can be restrictive with huge programs, the fact that Stepping Out is in RAM makes its features immediately accessible, eliminating scroll delays and jerky transitions.

Installation, as you might expect with a Macintosh-specific program, is mouse-driven. Upon booting up, Stepping Out's installation screen offers the opportunity to change the default screen size (576 X 720 pixels, the size of a MacPaint document) to the size you desire. The program's brief, well-organized manual gives information on several screen sizes, including full-page display (640 X 864 pixels) and workstation display (1024 X 1024 pixels). Of course, you can select your own screen display size, bearing in mind that the larger the display, the more memory the program requires.

Memory Intensive
The amount of memory required for a particular size screen is displayed in the lower right-hand corner of the installation window. It's handy to have this information, especially if you have a sense of the amount of memory your applications will require. If you're not careful, Stepping Out may not leave enough RAM for those applications.

For example, a full-page display requires about 70K, plus the 80K that Stepping Out takes. The workstation display consumes a whopping 207K (program and screen memory combined). If you define a screen that won't fit into memory, the program tells you that there's not enough RAM available.

Stepping Out does not automatically display your full page of text. Unless you invoke Stepping Out, the Macintosh's screen display remains unchanged. Stepping Out features are accessed from the keyboard, with access conveniently confined to combinations of Command/Option and letter or numeral keys. When not in use, Stepping Out terminates, but remains resident in RAM, ready to step out when you are.

Suppose, for example, you are writing an article and wish to see a full page of text. Press the Command and Option keys and the spacebar, and your screen divides. The left half displays a portion of the traditional Macintosh screen; the right half of the screen shows the full-page image reduced by a factor of either two or four (selectable from the keyboard). Both halves have cursors, and you can continue to enter text, with new characters reflected on both halves of the screen.

Since the left (Macintosh) section of the screen is only a partial screen, you must wait for the image to scroll as you enter text. This scrolling is slow and unwieldy, depending upon the size of the Stepping Out screen you've
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Another interesting feature of Stepping Out is that any screen dump to disk (accomplished by pressing Command-Shift-3) transforms an area up to 576 pixels wide by 720 pixels high into a MacPaint file.

selected. Likewise, the right side of the screen shows the whole page, but because the image is reduced its characters can be hard to read.

To return to the full view, simply repeat the Command-Option-spacebar sequence.

Applications

I doubt if word processing will be one of the major applications for Stepping Out. For simple text processing, the program's advantages seem a little limited, although it's convenient to be able to see a full page or more in order to tell how long a subsection is, or how a series of paragraphs appear in relation to one another.

But where Stepping Out really begins to shine is in desktop publishing and graphics applications. Here, the advantages of being able to see a full page or more at a time become obvious.

Equally effective is the program's ability to extend the width of a page, making it possible to scroll easily across even a wide spreadsheet or drawing.

Scrolling is fast—almost too fast. It's easy to over-scroll, and simply brushing the mouse can move you a long way from your home image. (This can be confusing if you're at a point requiring interface with a dialog box. Stepping Out's manual suggests that in such situations you either use the mouse to scroll around the display or call up a reduced view of the whole page. Neither solution seems particularly efficient.)

The Big Picture

In addition to offering screen reductions, Stepping Out can expand your screen image from 2 to 16 times. This function gives users the opportunity to magnify the area where your cursor rests.

Again, the screen divides, with normal view on the left and enlarged view on the right. Magnified areas can be resized using a combination of keyboard input and the mouse.

Enlargements of areas of the screen are particularly useful for some graphics packages that don't otherwise permit easy close-up or detail work. Stepping Out's character enlargement also reflects another Berkeley System Design product, inLARGE, aimed at making the Macintosh more accessible to the visually impaired.

Stepping Out also lets you alter the screen format to project white images on a black background, although the black-on-white Macintosh screen is so readable that it's hard to think of too many situations where such a reversal would be advantageous.

I like Stepping Out. It's an honest program that does what it sets out to do. Were I in constant need

of a full-page screen image, I'd consider getting a larger monitor. But for occasional applications, or frequent previewing of large documents or images, Stepping Out makes a lot of sense.

Stepping Out
Macintosh 512K, Plus, and SE
Berkeley System Design
1708 Shattuck Ave.
Berkeley CA 94709
$95
Writer's Choice Elite
Jim Trunzo

Writer’s Choice Elite, an Apple IIc word processor from Activision, offers a generous glimpse into the world of the Macintosh. As a matter of fact, the program bears more than a passing resemblance to MacWrite, and uses many features that could once be found only in the Macintosh environment. Windows, dialog boxes, and mouse-activated menus are all part of Writer’s Choice Elite. Writer’s Choice Elite possesses all of the standard editing features—cut and paste, automatic insert, find and replace—that one expects to find in any word processor. But where does the program exceed expectations, break new ground, or take advantage of the IIgs’s capabilities?

The first place the program shines is in its use of the desktop environment. Writer’s Choice Elite can place 16 open documents on the desktop at one time and let you manipulate them in a number of ways. You can change the size of documents, move them to different locations on the screen, and have multiple versions of the same document open and on the desktop at once. This feature is invaluable if you want to compare two drafts of the same piece of writing, move material from one document to another, or create a notepad for ideas and memos. However, the more documents open on the desktop, the slower Writer’s Choice Elite operates. This becomes noticeable when more than three documents are open at one time.

Cutting And Pasting
Cut and paste is another standard word processing feature that’s included in Writer’s Choice Elite. With the program’s Clipboard (a special offscreen location that acts as a holding area for material you’re editing or moving) you can cut and store one piece of material at a time, pasting it into the desired portion of your document. A final editing option is the Cross command. This feature crosses out unwanted text rather than erasing it. Cross can be used in two ways—first, it can show changes that have been made in a document you’ve edited. Second, it can simply mark off an area that doesn’t fit in its current position but which will be used later in the document.

Writer’s Choice Elite makes excellent use of color, and cross marks (solid horizontal lines) can be shown in black, red, or white. The color you choose will depend on the color of your text and background—those colors also being selectable.

Rules
The program uses Rulers to help lay out a page. The ruler controls left and right margins, automatic indentation of the first line in new paragraphs, tab stops, decimal tab stops (for easy alignment of numbers containing decimals), line spacing, and alignment. To make changes in the formatting defaults, simply click the mouse on the appropriate icon shown on the current Ruler.

Rulers are quite powerful, and once mastered, can be used to speedily and accurately format complex documents. Writer’s Choice Elite manages its Rulers by having you assign a name to each new Ruler. The Main Ruler usually governs the majority of the document. If formatting changes are needed, a new Ruler or Rulers must be created and named; this naming process is the key to using Rulers effectively, as the following example illustrates.

The default name of any new Ruler created is LOCAL. Any ruler named LOCAL never affects more than one paragraph. All paragraphs typed after a paragraph affected by a LOCAL ruler are formatted according to the Main Ruler. This, in itself, is a powerful and useful feature. But what if you know that you’re going to repeatedly use a specific nonstandard format? You might wish to single space and double indent long passages of quoted material, for example. Rather than create new Rulers every time you want to format long quoted passages, name a Ruler as LONGQUOTE. Then, when you wish to use that particular format, select the Change Ruler option and choose LONGQUOTE from the list of rulers.

Head To Foot
Headers and footers also fall under the province of formatting, and these features play a special role in Writer’s Choice Elite. Not only do they determine where, when, and how headers and footers are used, they also determine top and bottom margins.

Activate headers and footers by selecting the Header or Footer option from the pull-down Format menu found on the Main Menu line.

Headers and footers default to margins ranging from zero to six lines, with six lines equaling one inch. You determine the margins by hitting the spacebar the desired number of times. If you wish to use larger top or bottom margins, the header and footer windows can be expanded beyond one inch by enlarging the window.

Page numbers, dates, and even the time are easily placed anywhere within a header or footer by positioning the pointer on the appropriate icon, clicking and holding down the mouse button, and dragging the icon to the spot where you want the item located. Writer’s Choice Elite can also designate a page as a Title Page. When you do, the program automatically skips the first page when it places its headers and footers, and begins numbering with page 2.

A Picture Is Worth...
The G in IIgs stands for Graphics, and the designation hasn’t escaped the people at Activision. Pictures created with either Paintworks Plus or Draw Plus can be copied into Writer’s Choice Elite with a special function called Copy Image. Just insert the disk containing the picture and select Copy Image from the Edit menu. Next, use the mouse to draw a marker box around part or all of the picture, depending upon your needs. Click the word COPY in the dialog box and your selection is placed on the Clipboard. From there it can be placed anywhere in your document. Pictures can be
The program is not copyright protected, allowing you to use a copy of the original (called the Master) disk available. On one hand, this method seems fair—it lets you protect your master disk from unauthorized use. However, other printers may not allow Writer's Choice Elite to operate to its fullest capabilities.

Another problem is that only two printers are officially supported. Apple did not, understandably enough, provide print routines for other printers. Any printer that's ImageWriter compatible should perform admirably.

You've composed your document, edited it, and formatted it. Now you want to print it. Before actually printing, however, you might want to identify your printer type and do a Page Setup. Writer's Choice Elite supports the ImageWriter printer and the Apple LaserWriter. Several impressive options are available when using either printer. Paper types may range from standard US Letter (8½ × 11) to International Fanfold (8½ × 12).

Special effects are also possible. With an ImageWriter you can select a 50 percent option; condense vertically, printing text in normal density but at half height; or print the document in the Wide mode, which prints the text sideways on the page. Additionally, print quality can range from draft to near letter.

If you're printing with a LaserWriter, you can select several other options. More control over the vertical sizing of the print is available, for one thing; a process known as Smoothing (having the printer add extra dots between points that form a line, producing a higher resolution copy) can be employed. Finally, LaserWriter users can either reduce or enlarge text between 25 and 400 percent.

One or all pages can be printed, regardless of printer choice, and up to 99 copies can be designated prior to printing. Also, printing can be done in color if you have an ImageWriter II and a color ribbon.
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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). If 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.
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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 calculation. 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 redispays 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
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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 incorrectly, 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.

```basic
81100 N =9: HOME: NORMAL: PRINT "APPLE MLX": POKE34,2: ONERR GOTO610
8C120 VTAB1: HTAB20: PRINT "STARTADDRESS":: GOSUB530: IFA= 0 THENPRINTCHR*(7): GOTO110
8C130 S=A
8C140 VTAB2: HTAB20: PRINT "ENDADDRESS";S;: GOSUB530: IFS>=A OR A= 0 THEN PRINTCHR*<7): GOTO130
8C150 E=A
8C160 PRINT: PRINT "CHOOSE:(E)NTERDATA";S:HTAB22: PRINT "(D)ISPLAYDATA": HTAB8: PRINT "(L)OADFILE(S)
8C170 SAVEFILE(Q)UIT": PRINT
8C180 GETA: FORI=1 TO5: IFA<>MID*("EDLSG",I,I>: NEXT: GOTO160
8C190 ONIGOTO270,220,180,200: POKE34,0: END
8C1A0 INPUT "FILENAME:";A*: IFA*< > then PRINTCHR*(4)"BLOAD";A*: GOTO150
8C1B0 INPUT "FILENAME:";A*: IFA*< " THEN PRINTCHR*(7): GOTO150
8C1C0 GOTO330
8C1D0 47 F= 1: D= 0: FORP = 1 TO LEN(A*)
8C1E0 :CS= MID* (A*,P,1); IFF >N AND C* <" THEN RETURN
8C1F0 GOTO480: IF C* <>" THEN GOSUB520: V(F)= J + 16 * (D = 1): V(F)=D + 1 +
8C200 4F9 IFD> 0 AND C*= "" OR D = 2 THE N D=0: F= F + 1
8C210 #500 NEXT: IFD= THEN F = F - 1
8C220 510 RETURN
8C230 520 J= ASC(C*): J= J - 48 - 7 * (J > 64): RETURN
8C240 530 A= 0: INPUT A*: A*= LEFT* (A*,4): IFLEN(A*)=0 THEN RETURN
8C250 FORP=1 TO LEN<A*): C*=MID* (A*,P,1): IFC*< >" OR C*>9" AN D C*= "" OR C*> Z" THEN A= 0: RETURN
8C260 550 GOSUB520: A= A + 16 + J: NEXT: R ETURN
8C270 560 C = INT (B / 256): C = B - 254 * C - 255 *(C > 255) C = C - 255 *(C > 255)
8C280 570 NEXT: IFD= THEN F = F - 1
8C290 580 RETURN
8C2A0 590 PRINT "FROMADDRESS": GOSUB530: IF S > A OR E < A OR A= 0 THEN B = 0: RETURN
8C2B0 600 B= S + B: INT ((A - S) / B): R ETURN
8C2C0 610 PRINT "DISKERROR": GOTO150
```
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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

```basic
10 C = 0: FOR I = 768 TO 768 + 68: READ 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 POKE 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, 139, 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, 281, 58, 144, 2, 233
170 DATA 57, 141, 1, 4, 138, 74
180 DATA 74, 74, 74, 41, 15, 9
190 DATA 48, 281, 58, 144, 2, 233
200 DATA 57, 141, 0, 4, 104, 170
210 DATA 169, 141, 96
```

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 109 for details.
Talking Rabbit Teaches Children
The Learning Company has introduced Reader Rabbit, an educational software program for children ages 5-7, using digitized speech technology that produces human-quality speech, without extra hardware.

Four games teach children the basics of early reading, spelling, and vocabulary. The program includes a vocabulary of more than 200 three-letter words and is designed to build thinking, problem-solving, and analytical skills.

Reader Rabbit is part of a series of educational software programs for children ages 4-14 and is available for the Apple II+, IIc, and IIe at a suggested retail price of $39.95. A School Edition for the Apple IIgs is available for $79.95 and without speech for $59.95. Each School Edition includes a program disk and a backup disk, a teacher's guide, blackline masters with student activities, and a scope-and-sequence chart.

The Learning Company, 545 Middlefield Rd., Suite 170, Menlo Park, CA 94025
Circle Reader Service Number 150.

Thunderscan for Apple II replaces the ribbon cartridge in the ImageWriter for easy scanning. Images can be saved for use with such programs as PaintWorks Plus and Deluxe Paint II.

Thunderscan for Apple II
Thunderware has released an Apple II version of Thunderscan, a scanner which transfers any image on paper into an Apple II computer, where it can be modified with a computer painting program or combined with text in a word processor. The scanner has previously been available for Macintosh computers.

Thunderscan is an optical digitizer that fits into Apple Computer's ImageWriter printer in place of the ribbon cartridge. It scans images line by line as they feed through the printer. Images produced by the system can be used with programs that accept standard Apple II screen files.

The program runs under the ProDOS operating system and works on any Apple IIe, IIc, or IIgs computer with an original ImageWriter, a wide-carriage ImageWriter, or an ImageWriter II. Thunderware recommends a second disk drive, a 3 1/2-inch

HyperCard Stackware Head
Activision has announced Focal Point and Business Class, two of the first Stackware programs for Apple Computer's HyperCard, a personal information toolkit for the Macintosh.

Focal Point is a time- and information-management system that features a daily appointment calendar, address cards, outgoing and incoming phone logs, a spreadsheet, graph and invoice generator, phone dialer, and other desktop accessories. The program allows the user to search for data between features, transfer information back and forth, and create custom accessories. An applications launcher allows for jumps between any other Macintosh applications or between documents. Suggested retail price is $99.95.

Business Class turns the Macintosh into a powerful desktop travel-planning tool that provides access to helpful and practical travel facts on countries around the world. Travelers have access to currency exchange rates, transportation schedules, the current time, climate, holidays, tipping, customs, language, and much more. A built-in telephone interface allows connection with phone reservation systems of airlines, hotels, and car rental agencies. The program's customization and linkage allows the traveler to print out complete itineraries, maps, and other travel documents. It has a suggested retail price of $69.95.

Activision, P.O. Box 7286, Mountain View, CA 94039
Circle Reader Service Number 152.

Apple CAD System
Learn CAD basics on the Apple II with Hearlhy & Co.'s discoverCAD. This entry-level CAD package runs on any Apple II with two 5 1/4-inch disk drives, 128K RAM, an extended 80-column card, and an AppleMouse.

With the AppleMouse you can use Mac-like pulldown menus to select commands and draw virtually any mechanical, architectural, or electrical drawing. Features include zoom, pan, autodimensioning, draw text, move, mirror, and rotate copy. There also is a grid-locking system and 128 layers to achieve different line weights and multicolored plots.
discoveryCAD has printer dump capabilities and will automatically drive the Houston Instrument, Hewlett Packard, Roland, and Apple plotters. Price is $209.00.

Hearthly & Co., P.O. Box 869, Springfield, OH 45501
Circle Reader Service Number 153.

AppleWorks And Desktop Publishing
The Q-mar group has added desktop publishing capabilities to AppleWorks with Publishing Company, which uses macros to add layout functions such as columnar format, justified columns onscreen, text wrapping into columns, and other layout tasks.

The macros are designed for the three available AppleWorks macro programs: Super MacroWorks by Beagle Bros, Key Player by Pinpoint, and AutoWorks by The Software Touch. The program does not require any rebooting, and it uses AppleWorks data.

The publisher recommends the addition of a font downloading program for the Apple II, such as FontWorks from The Software Touch, Print Quick by Third Wave Technologies, or Power Print from Beagle Bros, which adds more power, including the ability to change fonts within a publication.

The program is currently available for Super MacroWorks macros and will soon be available for Key Player and AutoWorks. Suggested price is $24.95.

The Q-mar group, 5677 Oberlin Dr., San Diego, CA 92121
Circle Reader Service Number 154.

AppleWorks-Compatible Laser 128 EX
Video Technology Computers has introduced the Apple-compatible expanded Laser 128 EX, a transportable personal computer that offers a built-in triple-speed processor that's keyboard selectable at 1 Mhz, 2.3 Mhz, and 3.6 Mhz.

The computer's built-in RAM has been expanded to 192K and is expandable to 1 megabyte via a fully-sOCKETED internal RAM board, enabling it to recognize AppleWorks software.

The Laser 128 EX still packs the features found on the original model, including a built-in 5/4-inch disk drive, but a universal disk controller has been added to support either a 3½-inch or 5/4-inch external drive. A new card cover for the expansion slot has been added to allow an additional card to be plugged in without losing portability.

Other features include 40/80 column text displays, 16-color capability, double-high-resolution graphics up to 560 X 192, mouse interface, parallel and serial interfaces, modem interface, numeric keyboard, and expansion slot.

Suggested retail price is $579.00.

Video Technology Computers, 400 Anthony Trail, Northbrook, IL 60062
Circle Reader Service Number 155.

Legal Documents On Disk
Common legal documents can be prepared at home with Microlawyer by Progressive Peripherals & Software. The disk library is designed to work in conjunction with your word processor and can save attorneys' fees. Attorneys can also use the disk as a library of common forms.

Over 100 documents are included in the library, which is divided into personal, business, and corporate sections. Documents include: power of attorney, premarital agreements, leases, real estate contracts, wills, and notary public forms. All forms were written by an attorney, and the manual included with the software is written in clear English, not legal jargon.

Progressive Peripherals & Software, 464 Kalamath St., Denver, CO 80204
Circle Reader Service Number 156.

Mac-Laser Videodisc Connection
The Voyager Company has announced a new product line to support HyperCard, which allows users to connect a Macintosh to a laser videodisc player. Laserstacks are HyperCard stackware that control laser videodiscs, turning still photos and motion pictures stored on many existing videodiscs into visual databases.

The first title to be released will be The National Gallery of Art Laserguide, which is designed to work with The National Gallery of Art disc. The user can design a tour of the National Gallery of Art in Washington D.C. Works of art can be organized and then presented according to categories, including artist, nationality, school, date, medium, and subject.

The suggested retail price is $49.95. The videodisc retails for $95.00. Other titles to be released later this year include: Apollo 17: Last Mission to the Moon, Vincent Van Gogh, and The BioSci Disc, which is a visual library for the study of biology. The corresponding videodiscs are also available.

The Voyager Company, 2139 Manning Ave., Los Angeles, CA 90025
Circle Reader Service Number 157.

Understanding The Constitution
Mindscape has announced Understanding the United States Constitution, a new software package for Apple II computers.

The program is designed to help students understand the meaning of the Constitution of the United States. It allows students to test their knowledge of the Constitution, to learn about the political system, and to expand their range of civic awareness. It is designed to help students get ready for the Constitution test that is required in some states and to prepare for the U.S. citizenship examination. The flip side of each disk contains a Spanish-language version of the program.

Understanding the United States Constitution has a suggested retail price of $49.95.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062
Circle Reader Service Number 158.

MultiScribe Desk Accessories
StyleWare has released MultiScribe Desk Accessories for online use with its MultiScribe 2.0, a Macintosh-like word processing program. The package features several accessory programs, which can be installed on a pull-down menu and called from MultiScribe.

The accessories include a full scientific calculator, which provides users with trigonometric functions, memory, inverse functions, and all math functions. A clock lets users time-stamp MultiScribed documents in their day-to-day notepad. A control panel provides capabilities as well as up to eight sets of eight macro sequences, which allow users to reduce multikeystroke passages to a single keystroke. A puzzle is also included to provide a break from work.

Suggested retail is $39.95.

StyleWare, 5250 Gulfion, Suite 2E, Houston, TX 77081
Circle Reader Service Number 159.

Cigarette-Lighter Adapter
Roger Coats has introduced a cigarette-lighter adapter that allows the Apple IIc to be used in an automobile with a 12-volt negative ground electrical system. The adapter features a ten-foot cord with a two-color LED to indicate safe power status. If power is incorrect or reversed, the LED glows red. A DIN plug at one end and a cigarette lighter plug with power status indicator at the other allows

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**Cotton Tales For The Apple II**

MindPlay has released *Cotton Tales*, an introduction to word processing and desktop publishing for beginning readers. This easy-to-use word processor features writing with 192 pictures and 616 words. Cotton, the friendly "bunny" cursor, hops along to help youngsters scroll, insert, copy, and delete. Pictures and menus guide children through the picture and word libraries and disk utilities.

A Challenge Upgrade option allows a parent or educator to enter 168 additional words into the library, select specific pictures and words for use, and allow children to type if desired. A worksheet function is available for creating worksheets with *Cotton Tale* graphics. Printing options include color printing, a picture-to-text translator, and adjustments to printing layout and size. The Home Edition sells for $39.99, while the Teacher's Edition (with backup disk) is available for $49.99.

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