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DECEMBER 1984

VOLUME 2
ISSUE 12

THE INDEPENDENT GUIDE FOR **APPLE** COMPUTING

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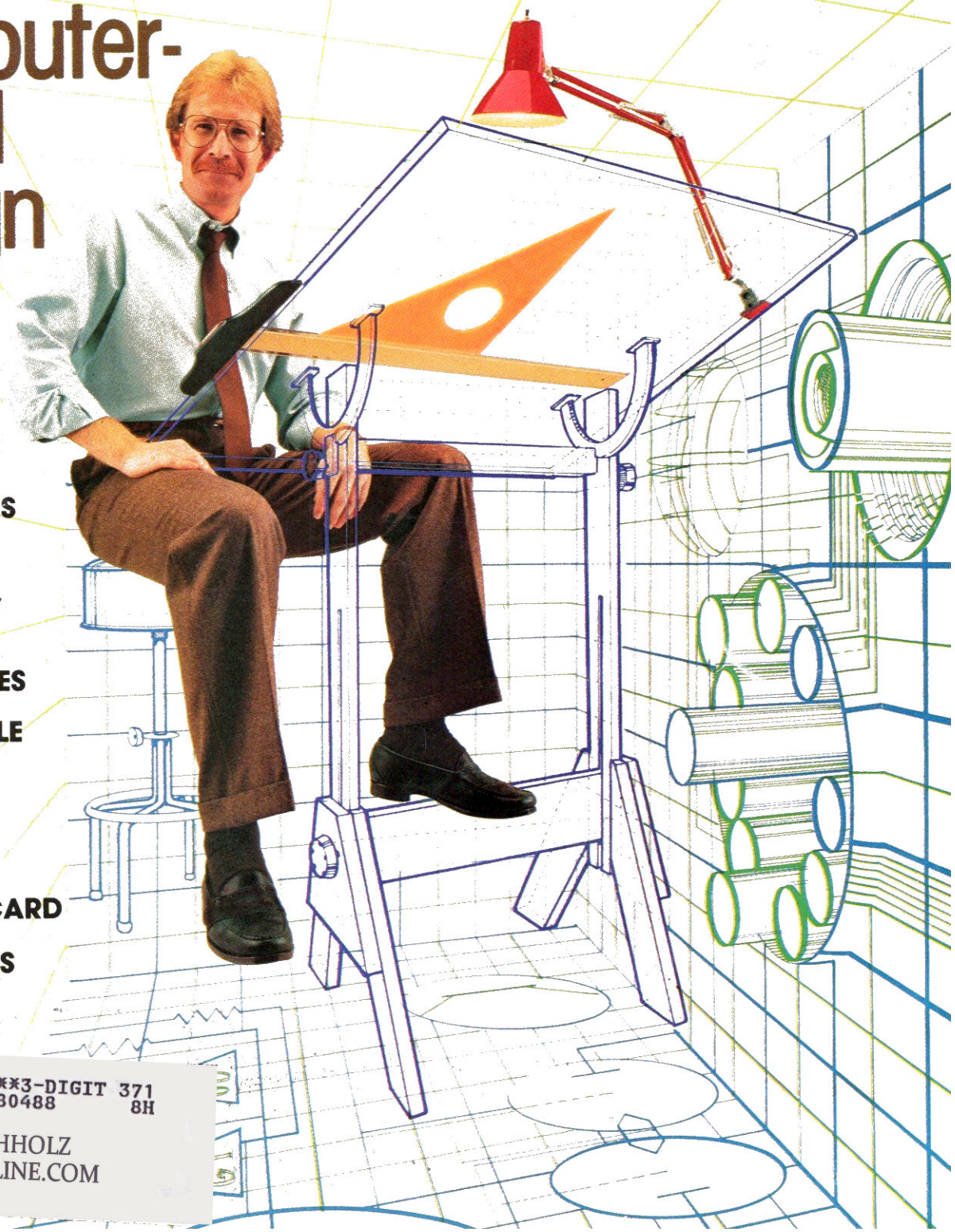

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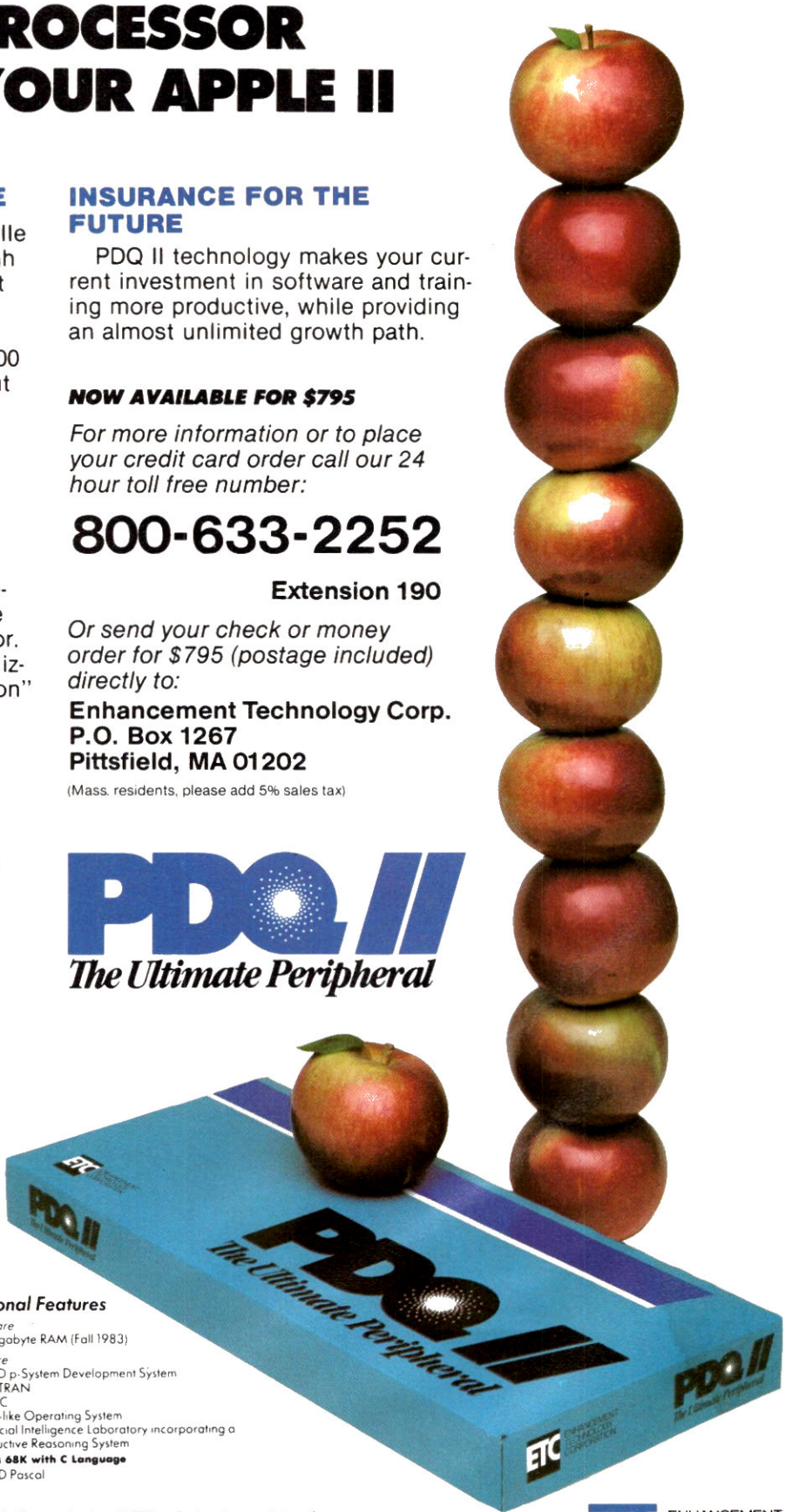

PDQ II SYSTEM SPECIFICATIONS

Standard Features

Microprocessor
- 16/32 bit MC68000
- 10 MHZ

User Memory
- 256K Bytes RAM

Integrated Functionality
- Multiple printer/communications buffering
- Pseudo-disk operations
- Track buffering (p-System)

ETC Software
- ETC MC68000 Assembler
- ETC MC68000 System Monitor
- ETC p-System (version IV) to Apple DOS Interface Utility

Languages and Software Systems Supported
- Applesoft BASIC Compatibility & Speed up
- Apple DOS 3.3

Optional Features

Hardware
- 1 Megabyte RAM (Fall 1983)

Software
- UCSD p-System Development System
- FORTRAN
- BASIC
- Unix-like Operating System
- Artificial Intelligence Laboratory incorporating a Deductive Reasoning System
- **CP/M 68K with C Language**
- UCSD Pascal

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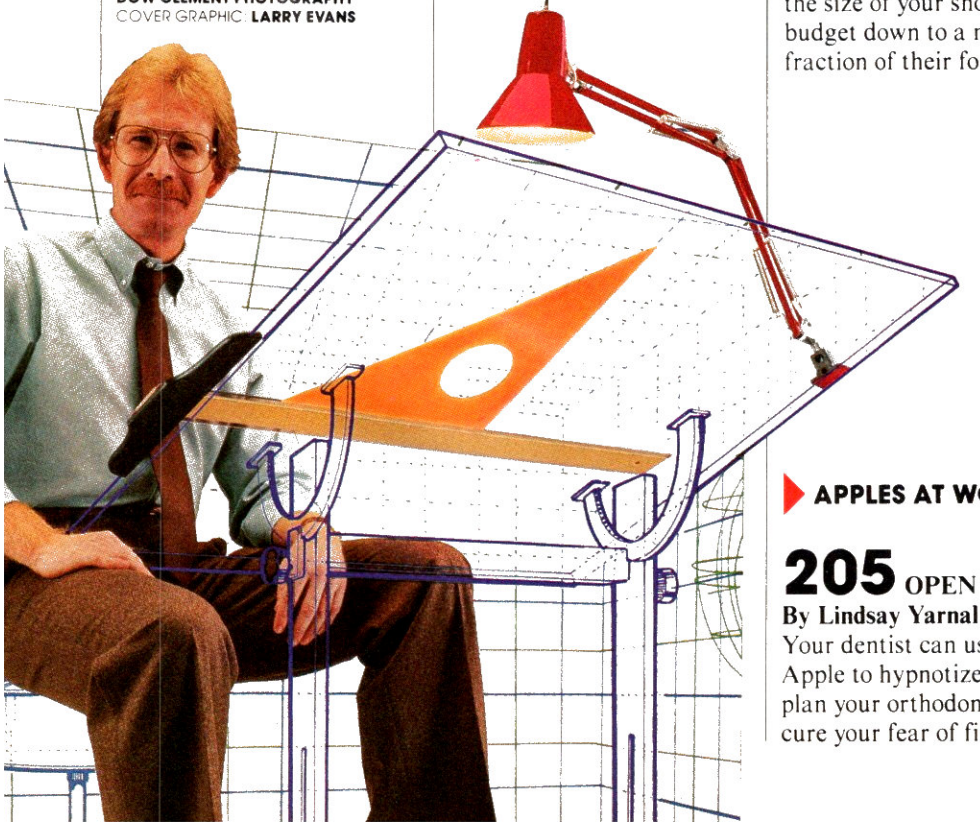

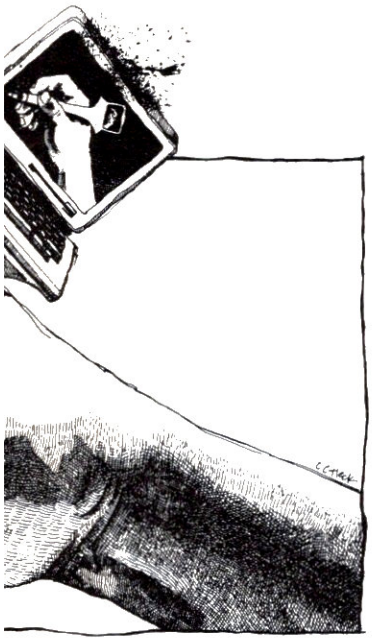

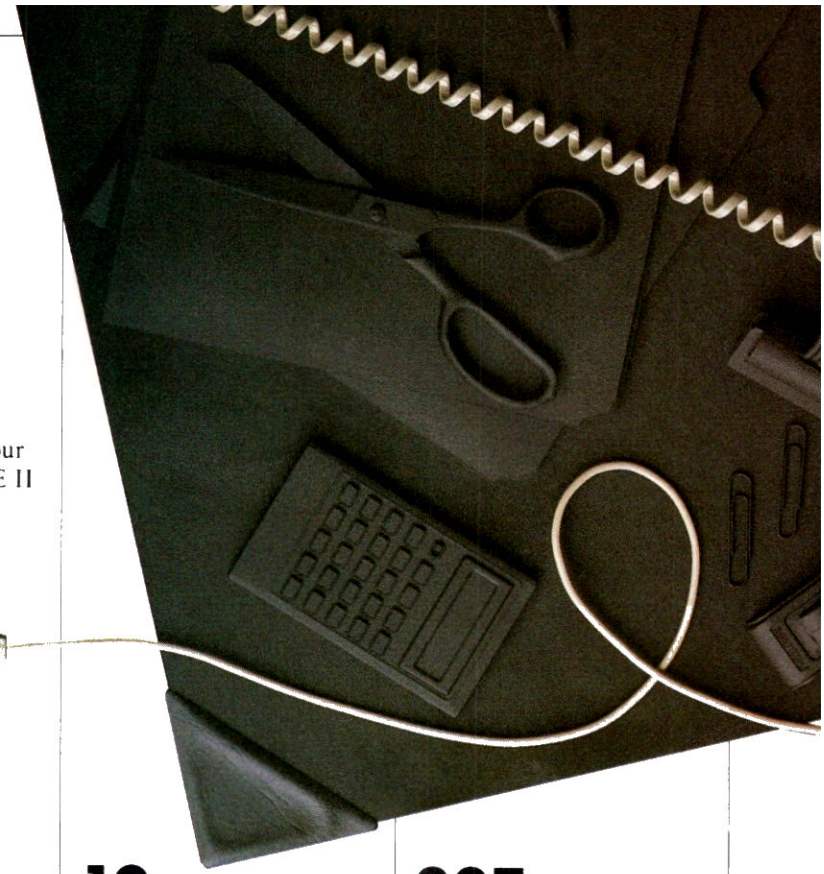

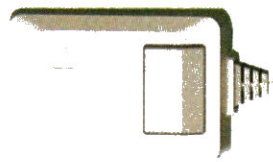

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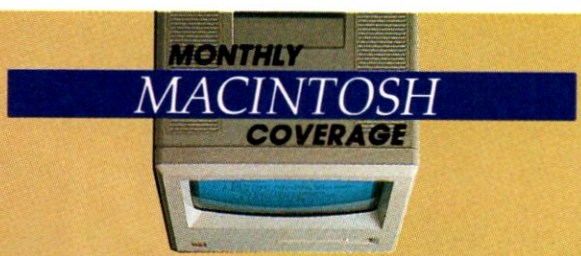

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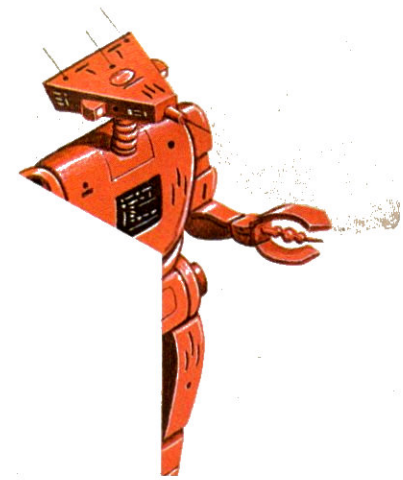

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It's the best 300/1200 baud 212A telephone modem for your Apple® II, II+, and IIe. "Best" because it's the easiest to install and use, provides more useful modem features for your money, and lets you add software capabilities as your needs grow.

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ProModem 1200A offers you the best price-to-performance modem available with Auto-Answer and Auto-Dial, Programmable Intelligent Dialing, Built-in Speaker with Volume Control, Help Commands, Extensive Diagnostics, and more.

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(1) ProModem 1200A Apple Card Pack, complete with on-board software and all necessary hardware
List Price: $449

HAYES

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(2) Serial Card
(3) RS-232C Cable
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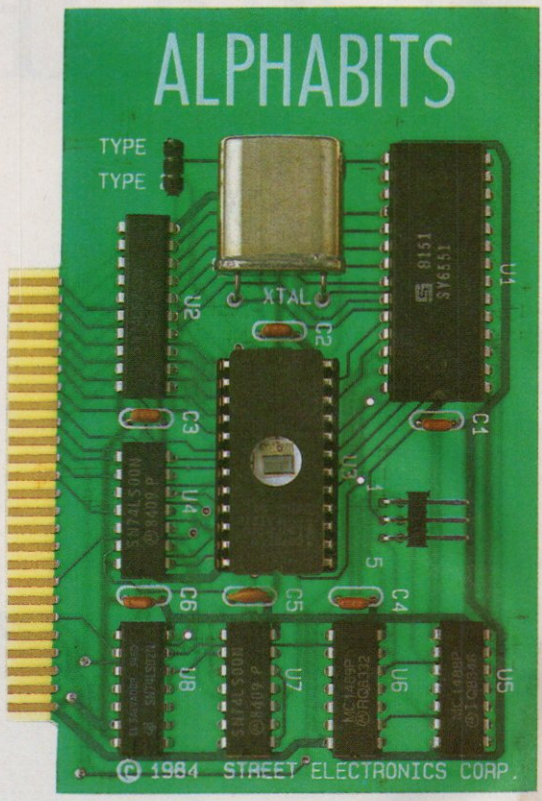

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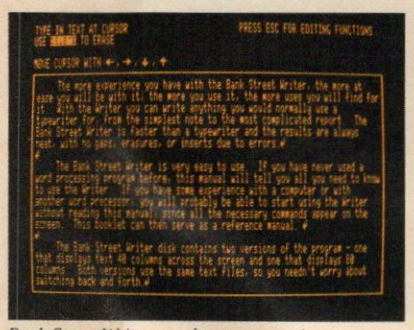

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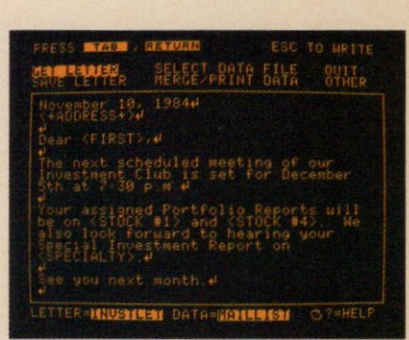

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LIFY! SIMPLIFY!"

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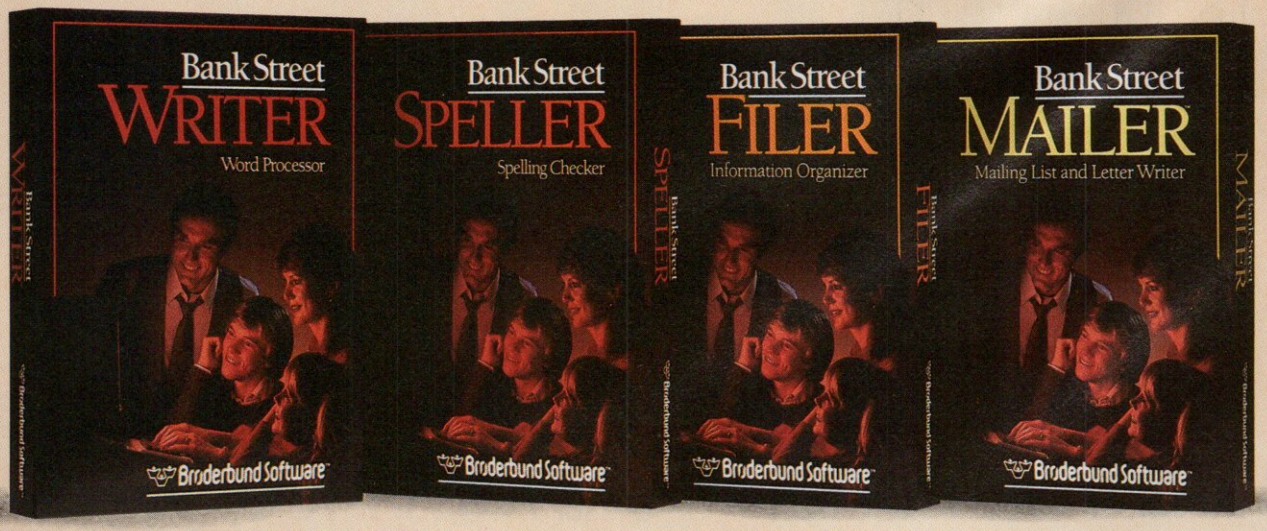

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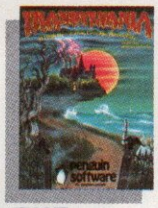

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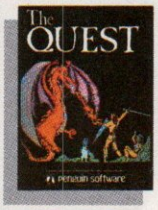

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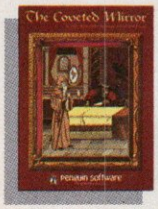

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NON-STOP ACTION . . .

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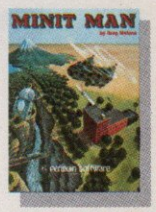

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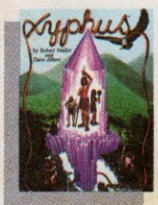
MIND-BOGGLING FANTASY . . .



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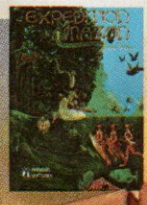

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CIRCLE 147 ON READER SERVICE CARD

EDITORIAL
A MESSAGE FROM MAGGIE

The Year in Review

In spite of the dire warnings of George Orwell's book, the specter of a grim 1984 never came too near to us, fortunately, and in many ways, 1984 was a banner year. Although the year had its ups and downs, especially a bleak summer-sales season, Apple Computer, Inc., came out ahead. 1984 was a particularly busy year for the people at Apple. They tried to keep journalists and IBM guessing and equally as busy with three major product announcements, the Macintosh in January, the IIc in April, and the Macintosh 512K in September.

After a sensational and splashy start, the Macintosh fared pretty well in 1984, with as many as a quarter of a million units sold by year's end. 1985 will be the true test of the Macintosh's success, though. Much of that success depends on the anticipated flood of new software packages, which will help to make the Macintosh functional for many applications. Like the Apple II, the Macintosh has inspired a whole new generation of independent software developers. These developers are facing new obstacles in a tougher and more mature marketplace, but if you're in the betting mood, the Macintosh looks like a good bet.

Metamorphoses

Like the Apple IIc, whose external design is a slimmer, more attractive version of the IIe's, Apple Computer has gone through a metamorphosis. From improved and strengthened relations with dealers, to a trimmer and fitter payroll, to a more humble and less arrogant attitude, Apple has what it takes to be the premier personal-computer company.

New products and new images are not everything, though, and the Apple IIe's absolute and steadfast refusal to die proves this. It seems to me that no matter how it's bundled or priced, the Apple II will endure.

Apple Computer is not the only entity that has gone through transformations this year. *A+* has grown and developed with the market, too. Thanks to you, we have catapulted from being the last entrant in a crowded field to becoming the number 1 magazine for people interested in all aspects of Apple computers and their related products and services.

The *A+* staff members you see in this picture have worked together during the last year to attain our goal of bringing you the most useful and insightful articles we can every month. In our effort to pack even more information into every page of *A+*, we are planning a wide spectrum of coverage for the next year.

Most important, though, we want to thank you for your interest in *A+* and say that we have thoroughly enjoyed serving you and are looking forward to an exciting 1985.

Holiday Wishes

Finally, as the days darken into winter nights and seasonal sounds and smells fill the air, the staff of *A+* would like to take this time to wish you the happiest of holidays. We thought you would get a kick out of seeing the faces behind the magazine, thus our season's greetings card to you.

So that you can connect names to faces, I'll introduce the staff from the outer circle to the inside circle, starting with me. (I'm the one in front, by the Macintosh). Going clockwise, starting from behind me to your left, we have Fabian Cooperman, Candace De Santis, Fred Davis, Judy Gosse, Peter Tucker, Peter Phillips, David Ramberg, Ruth Ramberg, and Leslie Steere (she is standing next to me on my right, in case you're lost). In the inner circle, I'll start with the lady right behind me, Marjorie Gae Brandon, who recently gave birth to *A+*'s first baby; directly behind her is Delores Huajardo, to Delores' right is Eva Langfeldt, and in front of Eva is Jane Willson.

We hope that 1984 was a good year for you, that your holidays are filled with happiness, and that the new Year brings you all that you wish. ✚

Maggie Canon

MARTINELLI PHOTOGRAPHY

What made over 100,000 Apple II owners fall in love with System Saver?

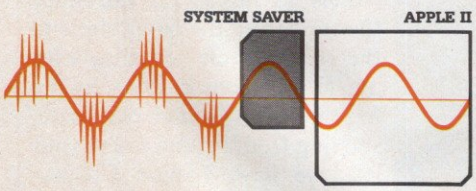
It's the most versatile, most convenient, most useful peripheral ever made for the Apple.®

System Saver® filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems.* Problems your System Saver guards against.

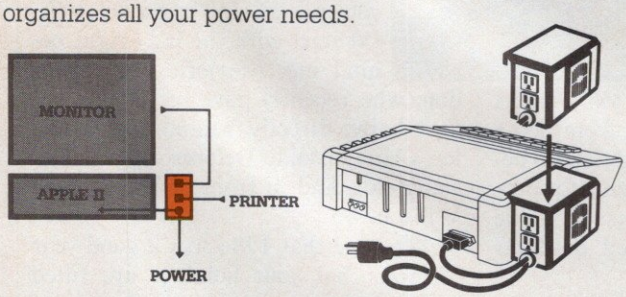
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

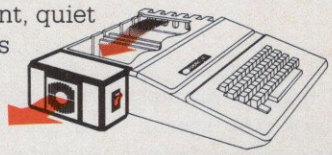


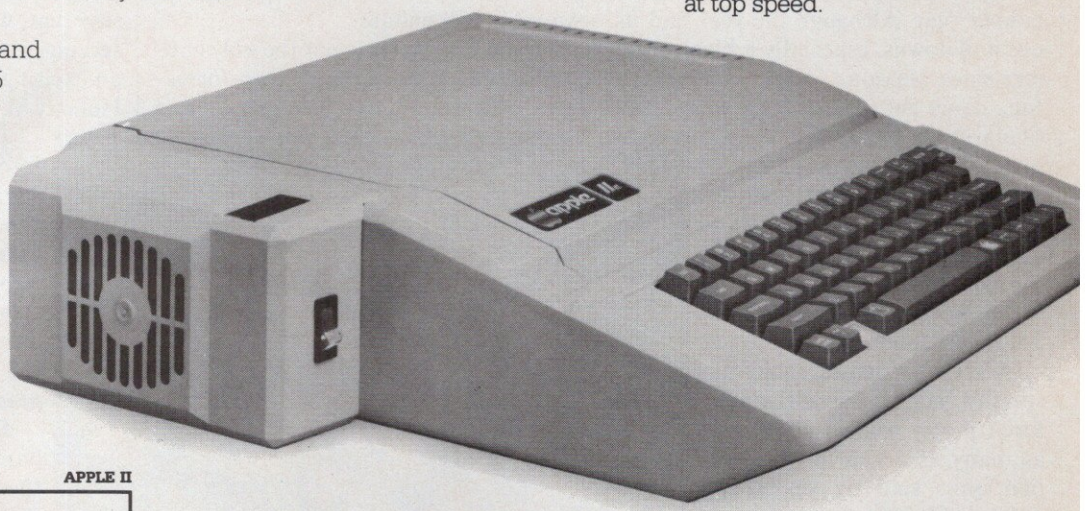
It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand

$89.95 at Apple dealers everywhere.

KENSINGTON MICROWARE

CIRCLE 134 ON READER SERVICE CARD

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*PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

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LETTERS TO THE EDITOR

HOME APPLICATION

Dear *A+*,

Your August editorial indicated that home application is a problem for a good number of potential computer users. I have a unique use for my Apple. Although I use it for most of the same domestic functions that other home users do (budget, word processing, spreadsheet, and games), I have another use for it, too.

I have hooked it up to the furnace for the heating season and to a fan and air conditioner for the cooling season.

The Apple, or any micro with access to its communication bus, is remarkably well suited to this application. I have read other articles about similar applications, but the functionality programmed in was little more than what a wall thermostat does. The computing power, speed, and flexibility of the microcomputer allows not only complex direct control but also text and graphic display of current and historical data. It can look at trends and predict what will occur in the near future. It can also learn from its past prediction errors and be self-adaptive, getting better with time and changing with seasonal fluctuations.

All these capabilities have been built into my programs, which have been running for the past two years. The result is greater comfort at reduced operating cost.

Peter Payne
Wheeling, IL

Thanks for the input. Anyone else out there with interesting home applications?

LEARNING ENGLISH

Dear *A+*,

Congratulations on an excellent article, "Multilingual Apples," in the September issue. Learning a foreign language can be tedious work, but an Apple makes the process much more palatable.

A language that was, understandably, missing from your "Polyglot Software" chart, however, is English.

The Regents/ALA Company is the pioneer in English-as-a-second-language software. We have programs to help non-native English speakers learn grammar and improve their vocabularies, and word games to stretch verbal skills.

Thanks for this informative article!

David A. Tillyer
General Manager
The Regents/ALA Company
New York, NY

A+ IS 'USER-FRIENDLY'

Dear *A+*,

I recently purchased an issue of *A+*, and I am pleased to say it is a first-rate magazine. Your articles are extremely well written, informative, interesting, and—most of all—useful. In addition to reading *inCider*, *Creative Computing*, and *Nibble*, I will now regularly buy *A+*. In comparing *A+* with the other magazines mentioned above, your magazine is a lot more devoted to articles for users, whereas the others are aimed mostly at advertising. To sum up, your magazine is just great!

David Chu
Sydney, NSW, Australia

Dear *A+*,

I would like to thank you for putting out a fantastic magazine. I'm sure you must receive many letters of this type telling you how great *A+* is, but I don't care—I'm still going to tell you. I have read and gone through almost all of the Apple magazines, and sure, they are OK. But yours is what one might call "user friendly." It tells me everything I need to know about education, software, hardware, new products, etc. And since I am fairly new to Apple computing and also have a limited software library, I need all the news I can get. Your magazine is truly the best! Keep up the great work!

David Grenham
West Hartford, CT

MACTEP

Dear *A+*,

Thank you very much for helping me debug the MacTEP program in your May issue. From my call to *A+*, I was able to figure out exactly what the problem was. I entered that program immediately upon receipt of the July issue, and after chasing down a few of my own typos, I had it up and running.

In regard to the MacTEP program, I would like to say that I am *very* pleased with the way it works. Programs like that are more than worth the cost of the subscription. I'm looking forward to more! Please keep them coming!

Jon S. Canale
Bay Village, OH

MAC SECTION VALUED

Dear *A+*,

In spite of the fact that I am a new subscriber and that I have only received two issues of your magazine, I am enthusiastic about it. I fully agree with other readers who have written to tell their appreciation for *A+*. I would especially like to express my thanks for the section on the Macintosh and the Lisa. Few other magazines have sections on the Macintosh, and you clearly beat the competition. *A+* is just right for me—not overspecialized on one model, but presenting a nice spectrum.

Isabel Kloer
Oklahoma City, OK

Dear *A+*,

I wish to thank you and your staff for two things—an excellent magazine and extremely prompt, courteous service.

I discovered your magazine with the June 1984 issue and was instantly impressed to find a publication devoted to Apple owners of reasonably balanced levels of expertise. I was also pleased to see that you intend to cover the Macintosh and Lisa series, when others have decided to limit themselves to the II series. This is important to me because when I upgrade in two or three years, I will almost certainly wish to have a

computer based on the 68000 microprocessor. The upshot is that I immediately subscribed, whereas I waited several months before subscribing to other computer magazines.

As my first issue was in the middle of your dBASE II tutorial, I wrote to get either back isues of *A+* or copies of the installments of the tutorial that I had missed. I was very pleasantly shocked to have all seven copies delivered to me in the mail one week after I requested them. Such service deserves recognition.

Thank you again.

Michael Pitts-Campbell
Banning, CA

MARKET ANALYZER

Dear *A+*,

Since I wrote the article on N-Squared Computing's Market Analyzer (*A+*, August 1984), I have received from Norman North of N-Squared an updated and enhanced version that your readers will be interested in hearing about. The quickest and easiest method to describe the many enhancements is to list them.

1. It is compiled—runs three to four times faster.
2. You can look at any segment of data—limited only by the amount of data you have (i.e.; if you have five years of daily data, you can look at and analyze any 52-, 70-, 104-, or 208-day segment of it).
3. On-screen exponential smoothing (moving averages) are available on either plot with no limit to their number.
4. The cursor can read not only the data but also the value of the last moving average.
5. The program supports the Printographer program by Southwestern Data Systems, which allows a hi-res-graphics printing capability for any type of graphics-printer/interface combination. It also allows many other printing capabilities, such as magnification (up to nine times) and the ability to move the picture anywhere on the page.
6. The Printographer also allows the program to be used with the Apple IIc and/or the Imagewriter or Scribe printers.
7. A data diskette can be initialized from the main menu without containing DOS (more usable space for data).
8. Dated grid lines are available for instant time-frame recognition.
9. The program will automatically sense and read data that is in the Computrac format; Dow Jones data; and, of course, N-Squared data.
10. It has automatic scaling override for printing multiple charts with the same vertical axis.
11. Full technical-analysis-charting techniques are available for single- or double-plot analysis.
12. An interface program is available at a nominal cost for complete data retrieval and manipulation among the various database services.

If the package I reviewed for *A+* was good, the latest version has to be considered a valuable and unbelievable upgrade for the same price.

G.L. Morris
Dallas, TX

CORRECTION

Dear *A+*,

The cover story in the June 1984 issue of *A+* had a mistake on page 33 about the LCD screen. It said the screen was 11½ inches high by 6 inches wide. It is actually 6 inches high by 11½ inches wide.

I would like to compliment you on the News+ column. It contains some of my favorite reading.

Dallas C. Gibbs
St. Louis, MO

END ALL YOUR SPELING PROBLEMS

THE SENSIBLE SPELLER™ WON'T LET MISSPELLINGS GET AWAY!

This unique software program, a virtual electronic dictionary, catches spelling mistakes in your writings. It actually displays misspelled words in context, suggests the correct spelling, and allows immediate replacement of misspelled words with correct ones. It derives its huge, 80,000-word vocabulary...which is all on disk... directly from the official Random House Dictionary.

Sensible Speller is friendly and fast, taking only a minute or two to correct a ten-page document. It provides room on disk to add thousands of your own words. It is compatible with nearly all Apple word processor programs* and runs on all Apple //c, //e, II+, and Apple-compatible computers. Yes, Sensible Speller is the "best of its kind," as stated by Softalk Magazine in its March, 1984 issue.

Sensible Speller is available for $125 in either the "IV"* or ProDOS version at your dealer or you may order it direct, enclosing $1.25 for shipping. Visa/MasterCard/Check/COD welcome! And...send for a free brochure on all Sensible Software products.

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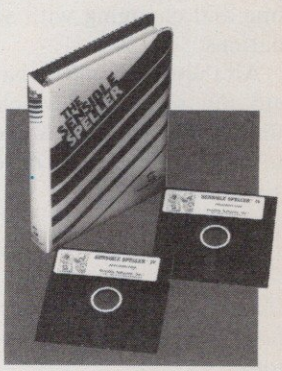

*It works with all the following word processors, with owners of trademarks indicated in parentheses: DOS 3.2 & DOS 3.3-AppleWorks & AppleWriter, all versions (Apple Computer, Inc.); Bank Street Writer (Brodebund); Format II (Kensington Microware); HomeWord & Screen Writer (Sierra On-Line Inc.); Word Handler (Silicon Valley Systems); CP/M-Wordstar (Digital Research Corp.-Micropro International); PFS: WRITE (Software Publishing, Inc.); and others. All features are not available with CP/M, PFS: WRITE & Word Handler.

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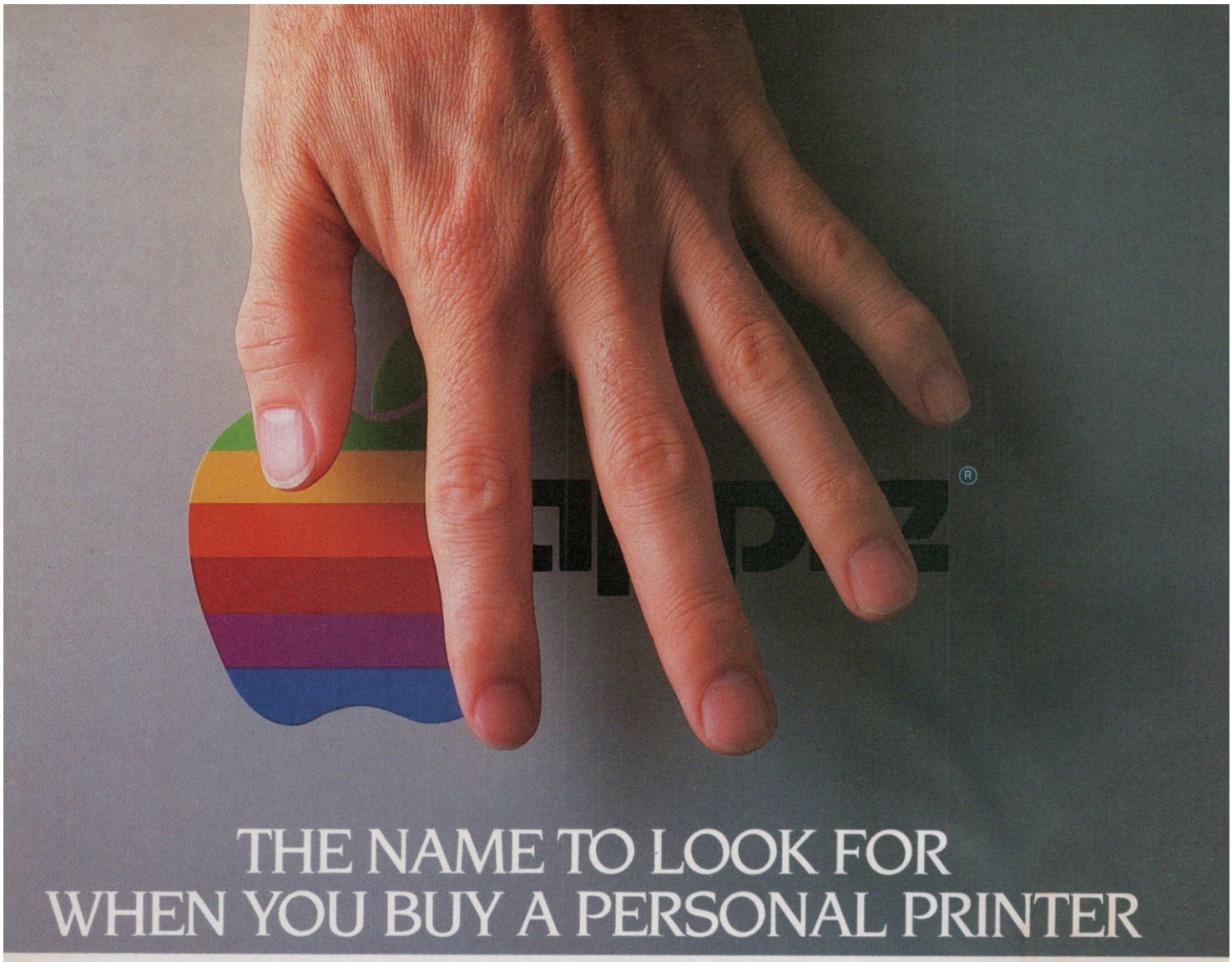


THE NAME TO LOOK FOR WHEN YOU BUY A PERSONAL PRINTER

ISN'T APPLE®.

It's Okidata. If you're buying an Apple printer to go with your Apple computer, we're sorry to disillusion you, but that printer isn't really an Apple down to the core.

In fact, peel away the logo glued on the front and you have a printer made by some other company that just wears the Apple name.

We tell you this because having the right printer is very important. (Without it, how are you going to get all that valuable information that's up on the screen down on the paper?) So, when you buy you should know what you're getting, and with an Okidata you know you'll be getting the very best printer there is.

We live, sleep and breathe printers. We specialize in building printers . . . seven different printer models to be exact. (Apple only gives you four.)

We make fast printers. Apple's speed stops at 120 characters per second in text. But that's where Okidata's speed starts . . . 120 up to 200 characters per second. That's three pages in just one minute.

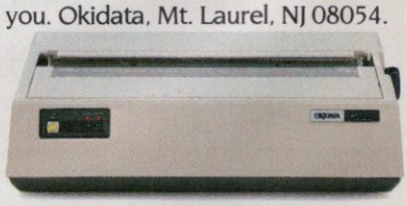
We make versatile printers. Okidata gives you three print modes; data processing, enhanced/emphasized and correspondence. (You-know-who only gives you two.) Our letter quality is as good as most daisywheels at twice the speed of an Apple. We print all kinds of graphics and charts, and even let you print custom typefaces and symbols.

Mixing Apples with Oki's. If you're wondering how compatible your Okidata will be with your Apple computer, the answer is "completely." And that includes the Macintosh™ as well! Okidata is fully compatible with all popular software packages and personal computers. In fact, with Okidata's unique Plug 'n Play™ kit you can be hooked up to your Apple and printing in virtually minutes.

And if you're wondering about service, it's available nationwide through Xerox Service Centers. Of course, chances are you won't need it. Okidata has the best reliability record in the industry, with a warranty claim rate of less than 1/2 of 1%.

Select, don't settle. So, just because you pick an Apple, don't think you have to buy the whole orchard. Pick the printer with the name that's come to mean performance. Okidata.

Call 1-800-OKIDATA (609-235-2600 in New Jersey) for the name of the Authorized Okidata Dealer nearest you. Okidata, Mt. Laurel, NJ 08054.



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In the 92 seconds it
find any file you need

Ampex 20 MB hard disk with 25 MB tape backup.

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takes to read this ad, on our backup streamer.

In the 1 hour, 4 minutes other streamers take, you could call your broker. Linger over coffee. Wade through the Wall Street Journal. And read this PC Megastore™ ad too. So take the time. You'll more than make it up with a PC Megastore hard disk and tape hooked to your IBM-PC* or compatible, Apple II or IIe,† because all the files you need–both current and archive–will always be right where you need them. Just a keystroke away. The secret? Only Ampex backs up a 20 MB hard disk with another 25 megabytes* of addressable storage–a unique, bootable streamer with cache memory. That not only means you can address a file in 92 seconds, you can backup files offline just by touching a couple of buttons. Without tying up your computer. Your time. Or a small fortune in floppies. (In fact, our 45 megabytes of available storage cost about half the price per MB of other hard disks.) So consider your time, money and convenience. And our quality. The PC Megastore system is backed by a full year warranty from Ampex, a company known for manufacturing quality computer peripherals for over 20 years. Take a moment. Call 800 421-6863, or 213 640-0150 in California. Or write: Ampex Computer Products Division, 200 N. Nash St. MS M-11, El Segundo, CA 90215. We'll give you a dealer's name so you can buy a PC Megastore system. Then in no time at all, you'll make up for the 92 seconds you spent reading this ad.

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*PC Megastore is upgradeable and comes in four models: 20 MB with 25 MB tape, 10 or 20 MB disk, or 25 MB tape.

CIRCLE 351 ON READER SERVICE CARD

A+ DISPATCHES

COMPUTERS IN SCHOOL TO STAY

More than a third of all college students will own personal computers by 1987, according to a new study by Talmis, Inc., a Chicago market-research firm specializing in education. From 1982 to 1983, the number of college students with personal computers tripled, from 250,000 to 750,000. Colleges are beefing up their own purchases of microcomputers, too, from 190,000 last year to about 500,000 in 1987.

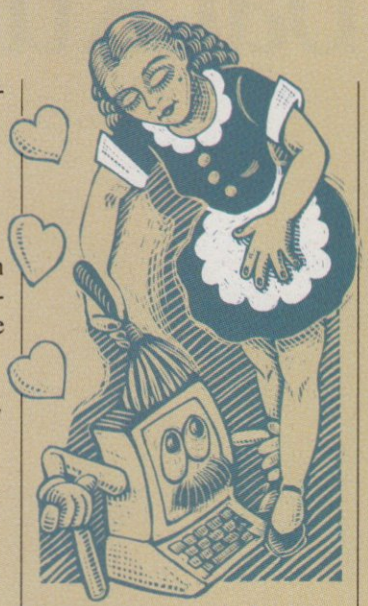
Elementary and secondary schools also feel the computer boom—a study by Mazer Corporation speculates that the number of microcomputers in grades K through 12 will jump from 333,000 last year to 1 million in 1987.

Strangely enough, however, yet another study shows that most students probably encounter computers first at home, rather than in class. The School of Education at Stanford University surveyed 12 schools in the San Francisco Bay Area and found that one in three high-school students used computers at home or with friends, but only one in eight had taken school computer courses. (This may be related to another finding that only 7 out of every 80 faculty members knew how to use computers.)

But it wasn't strange at all to find that a quarter of the students polled in this computer-intensive silicon center had already used a computer before high school. Hey, you think kids got nothing better to do than watch "Star Trek" reruns all afternoon?

YOUR COMPUTER'S MID-LIFE CRISIS

Machines don't age, eh? Don't bet on it. It's only now that computers have been around for more than a couple of years that we're seeing the ways a computer's arteries can figuratively



harden—cataracts begin to cloud the monitor, the keyboard develops a gentle palsy, the joystick sticks, and the disk drives sag.

But you can stave off your Apple's mid-life crisis a little longer by going through a few basic maintenance steps, says Erik Sandberg-Diment of the *New York Times*. You can't send your computer out to jog a few laps around the track every morning, but you *can* try these tactics:

- Seek and destroy dust. Dust is to computers what plaque is to teeth and arteries: it builds up and eventually damages the host surface. Vacuum your keyboard (gently!), and don't miss the spots around the outside of the disk drives, near the cooling slots and exhaust fans, and the assembly seams.
- Don't forget your printer as long as you're in the dust-seeking mode. A can of compressed air is better than the blower setting on your vacuum cleaner. Clean printing elements individually.
- Your older monitor may develop the equivalent of wrinkles, "visual echoes," if you leave it on too long. That's because the electron beam producing your monitor's image eventually etches an image into the phosphorus of the screen. It's better not to switch your computer off and on if you step away from it for a few moments, but the opposite holds true for the monitor. Let it get its beauty sleep.
- Finally, investing in a dust cover will save you vacuuming time. *Don't* put an electronic air purifier, or ionizer, in the same room with your computer whether your computer's covered or not. The ionized air particles will still cling to your machine, though in fewer numbers, and it takes more than Formula 409 to dislodge those dust motes.

APPLE OFFERS IIc AS SOLUTION TO IIe DROUGHT

Recent cuts in the price of the Apple IIe have backfired somewhat. So many educators want to take advantage of Apple's special low, low price for schools that the line for IIe's loops around the block.

What Apple has done, at this writing, is to offer schools holding onto back orders dated before August 13 a chance to purchase the Apple IIc computer instead, but at the same magnificent price ($850, as compared to the usual price of $1400 for the IIe and the educators' price of $997 for the IIc).

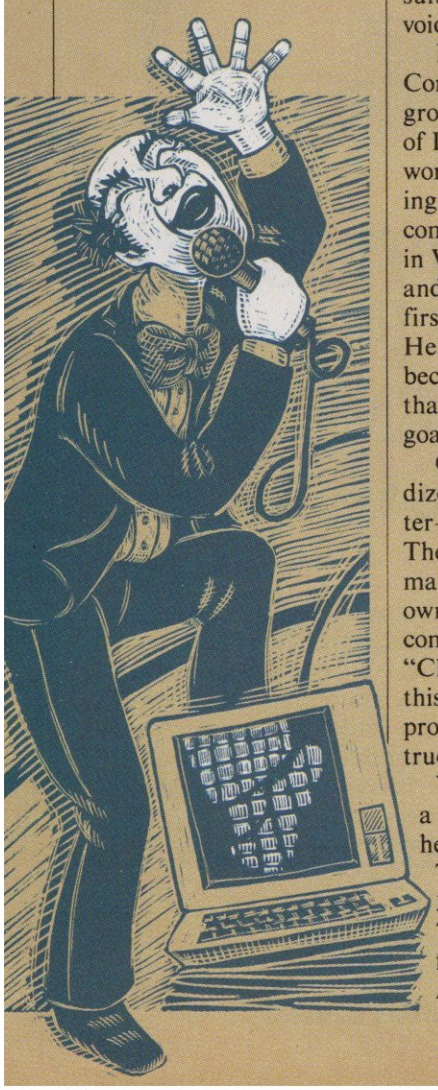
This approach helps and hurts the affected schools,

since many chose the IIe because of all the peripherals designed for it; also, not all of the IIe software runs on the IIc.

Mike Mount, education sales manager at Apple, emphasized that this was *not* a disguised IIc promotion. Schools that ordered IIe's after August 13 simply have to wait in line with the rest of us.

A LAUGH A NANOSECOND

Ford Motors has decided to emulate the concept of "user-supported software"



and will be giving out *free cars*. You get a car, you ride around in it for a while, and then you send in however much you think it's worth. Just send them your name and address and a *very* large box.

This joke and more, much more, is available on what's billed as "America's First On-Line Computer/Comedy Newsletter," or Comedy by Wire. Professional stand-up comedian and writer William Coronel decided there was a void of comedy in the computer community, and who better suited than he to fill that void?

In his on-line biography, Coronel claims to have grown up in the cornfields of Los Angeles and to have worked with such glimmering, shimmering stars in the comedy firmament as Robin Williams, Robert Kline, and other comedians whose first names begin with R. He says his goal in life is to become so spiritually free that he doesn't have to set goals for himself.

Coronel partially subsidizes the electronic newsletter—which you'll find on The Source on-line information service—with his own earnings as a stand-up comedian. Says Coronel, "Chances are that when this newsletter becomes profitable, I'll get hit by a truck and die."

You can bring this man a step closer to "comedy heaven" by contacting The Source at (800) 336-3366 or (707) 734-7500 in Virginia, and ask for Comedy by Wire. Accept no substitutes!

THE MOON'S A BALLOON, THE WORLD'S A COMPUTER

Did the universe begin not with a bang, but with a byte?

That's one viewpoint now percolating through scientific circles. At a conference sponsored by the research company Thinking Machines, Inc., held near Boston late last summer, scientists from assorted disciplines gathered to ponder the possibility that the structure of atoms and molecules, the neural pathways of our brains, and all the other physical processes and events we currently think of as "chaos" may best be studied as components of some unimaginably huge computer.

Joseph Traub, a computer scientist at Columbia University in New York, said that information processing is superseding mechanics as our basic pattern for understanding the universe.

Traub told the *Los Angeles Times*: "In the history of science we've always had some kind of model to explain the world. After Newton, it was masses and springs . . . But computer concepts are now being used to build models in physics and biology.

"For the next few decades, the computer is going to be the paramount paradigm used to build models. It's going to dominate our lifetimes."

Not that this "computer of computers" is anything like an Apple, or even a Cray 2, you understand. It's that the sheer complexity of the universe seems to arise from simple rules applied to simple building blocks—nucleotides in DNA, atoms in a rock—and that the process operates strikingly like a computer does. It's all in how you organize the information.

In fact, even though our current level of mathematics couldn't begin to crack the code, Thinking Machines scientist Daniel Hillis speculates that "maybe chaos is really a computing machine."

Yes, but is it IBM-compatible? +

CRIS MORTENSEN

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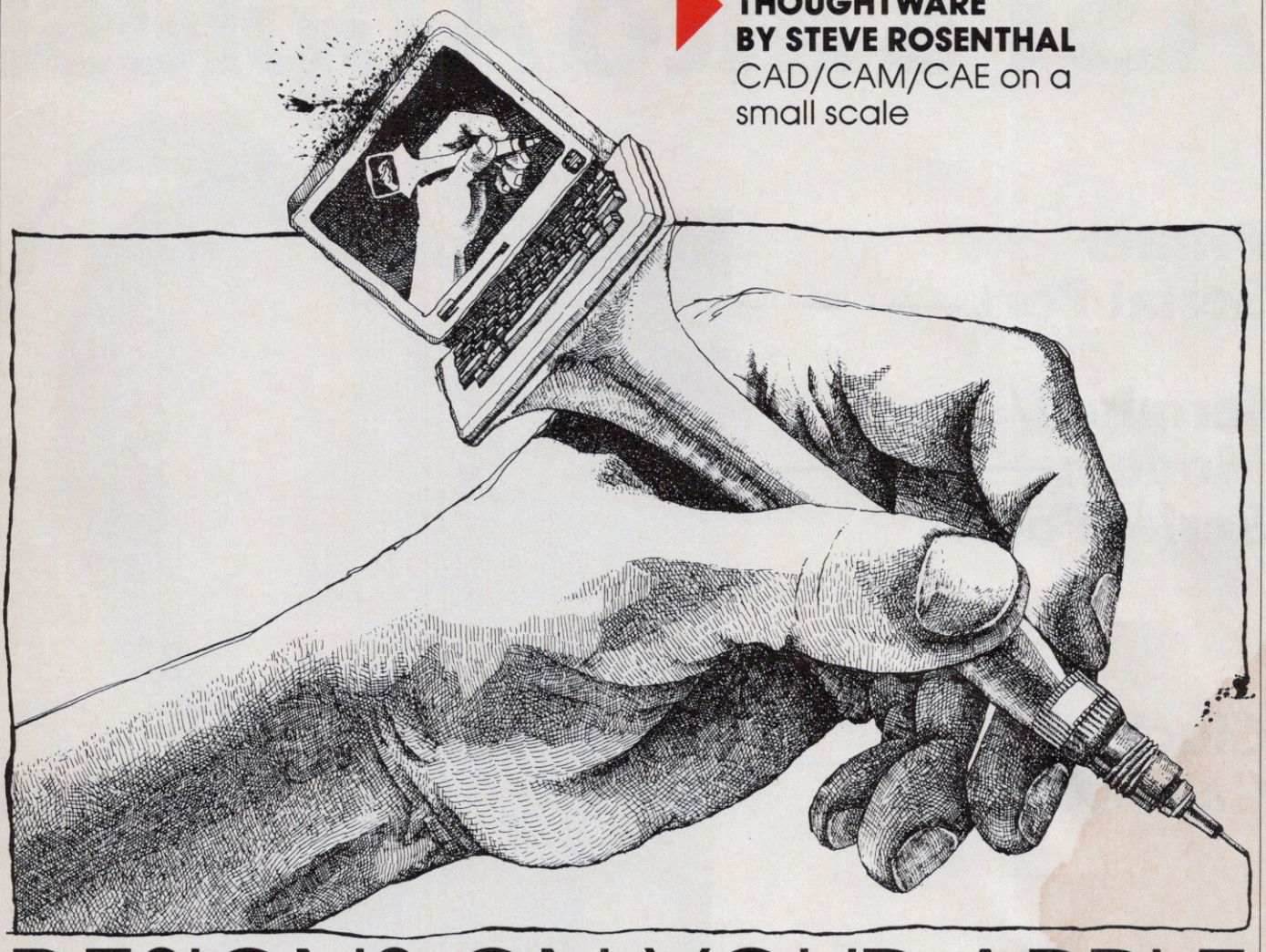
THOUGHTWARE
BY STEVE ROSENTHAL
CAD/CAM/CAE on a small scale



DESIGNS ON YOUR APPLE

A personal computer such as the Apple can help you produce accurate plans and diagrams, even if you can't tell a straightedge from a protractor. Just as word-processing software helps you turn out documents faster and more accurately than you can manually, computer-aided design (CAD) systems harness computers to help you create, edit, and verify technical drawings more speedily and precisely. The process is important in a range of fields, including circuit design, architecture, mechanical engineering, and a host of other pursuits that depend on accurate two-dimensional images.

Unlike with word processing, however, sheer computational power does count in CAD, so you'll have to match the computer with the scale of the job. If you want to design a simple burglar alarm or figure out what your back yard would look like with four shade trees in the corner, all you need is an Apple and the right software. On the other hand, if your job is designing jetliners, you ought to invest in a larger machine. Considering the performance compared to the cost, though, you may be pleasantly surprised by what even a vintage Apple II can do.

The Apple can help you produce accurate plans and diagrams, even if you can't tell a straightedge from a protractor.

You don't have to start with a full-blown dedicated CAD system to see what all the excitement is about. At the simplest level, even the Applesoft BASIC language has some graphics features that show you CAD's most primitive features. At the other extreme, you can build a CAD system, costing thousands, around an Apple IIe.

In general, all CAD systems produce two principal types of drawings: *schematic* and *scaled*. Schematic drawings are sort of like the desktop on the Mac and Lisa—they use iconic images to represent objects or processes in the real world. The icon signifies the object, but it may be quite different in size, shape, and orientation. The figures that stand for transistors or integrated circuits in electronics diagrams are good examples.

Scaled drawings, on the other hand, show the object's true physical shape, attempting to preserve a strict geometrical correspondence between image and object. With a scaled image, a line segment twice as long as another segment indicates that in the real world the corresponding edge is twice as long

CATHY HECK

AST's into Apples!

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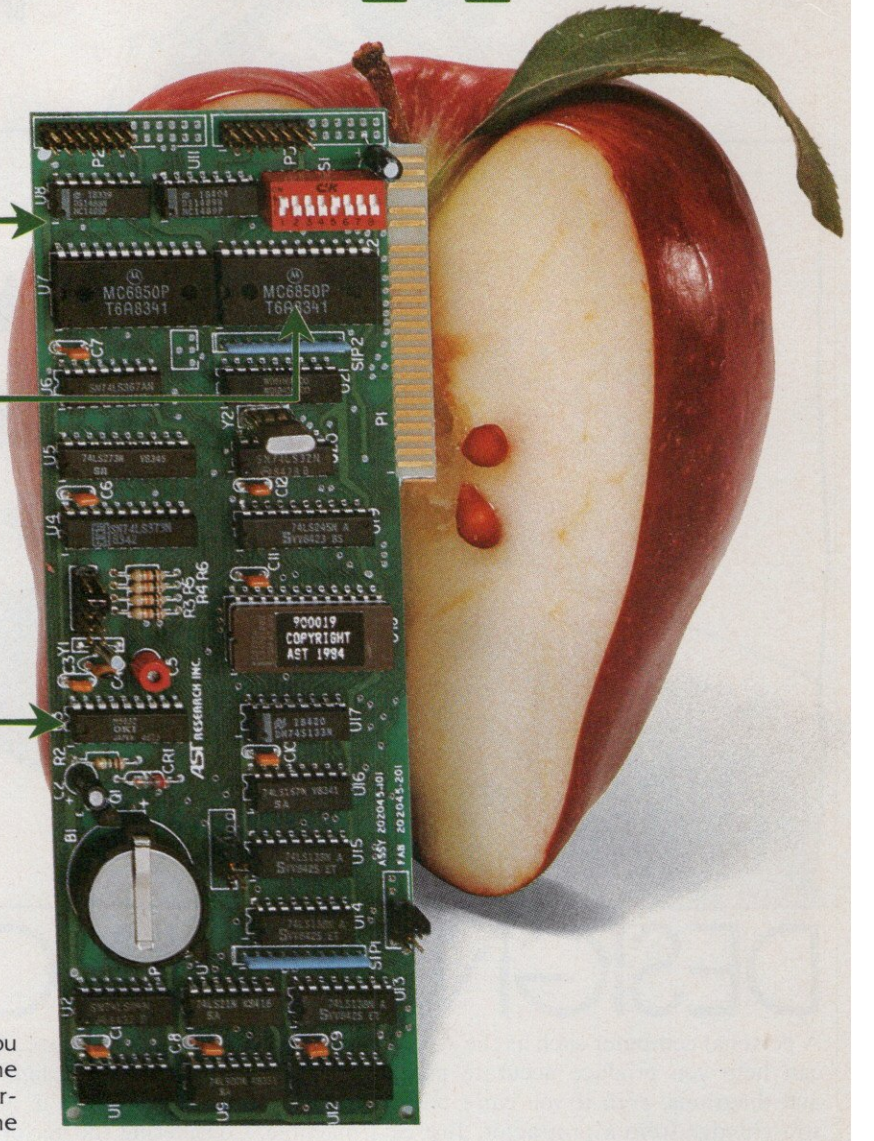

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The printer serial port gives you the ability to access letter quality printers. Using the terminal/modem serial port you can communicate with others via a telephone modem or hook up another terminal. And no matter how you use your Apple IIe, the clock/calendar is silently ticking away, providing you with the accurate date and time even when your computer is turned off.

Interested? Wait, there's more. Multi I/O is easy to use and plugs into any of the slots typically designated for one of its three functions. Putting three functions on one card reduces power consumption so you won't have to spend any additional dollars on auxillary power. And if you compare prices, you'll find that for a few extra dollars, Multi I/O will provide you with three functions instead of one!

So, there you have it, another innovative product from AST. We've set the standard once, and we'll do it again by bringing you the type of quality you expect, but at a very low price. Visit your local computer retailer today, or contact AST Research for a dealer near you.

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CIRCLE 323 ON READER SERVICE CARD

(or has some similar but more complex proportional relationship when the line represents a perspective or three-dimensional drawing). Scaled drawings are the kind you see in blueprints, parts specifications, maps, and floor plans.

Your Apple can help you figure out electronic circuits schematically. You can choose from a variety of programs, ranging in power from The Learning Company's Rocky's Boots (an educational simulation designed primarily to teach how electronic logic works) through Spectrum Software's MicroCAP (a complete circuit-analysis program for analog circuits consisting of up to dozens of individual parts).

The big advantage of computer-based systems is the ease with which you can replicate and modify existing elements.

In most of these electronics applications, the computer and software don't stop at just helping you draw the circuit diagram. Adding elements from computer-aided engineering (CAE) to computer-aided design, the system acts as a specialized database, report generator, simulator, compiler, and presentation package, all rolled into one.

For the drawing stage, the big advantage of computer-based systems is the ease with which you can replicate and modify existing elements. In drawing schematics with most CAD packages, you can pick from an existing library of circuit elements or create library elements of your own. Then you can make copies of those items, placing them in your drawing as you need them. If you make a mistake or want to try out a change, you can erase parts of the diagram, add new lines, or even start over.

For the analysis stage, the package models the operation of the elements that you've combined to form the circuit. Without so much as warming up a soldering iron, you can get a good idea of whether your circuit produces the proper outputs or sticks permanently at some erroneous level.

When you have a circuit working the way you want, the more complex packages will tell you how to wire it. Using database-like subsystems, these programs produce a list of every pin and connection in the circuit, along with a list of all wires leading into and out of that point (called a netlist).

Last, the package can draw out charts, diagrams, and graphs of all the simulations. Because scale is not important for this type of drawing, a printer with a graphics card will do, but you'll get the best results if you use a plotter rather than a printer.

Software authors are now creating Apple-based CAD/CAE systems for many schematic systems other than electronics (see the CAD/CAM/CAE chart in this issue). Among them are plumbing, industrial hydraulics, and a host of other fields that make extensive use of schematic diagrams.

A Question of Scale

Scaled-drawing systems for Apple-size computers also cover a wide range of complexity. At one end of the spectrum, you have simple paint programs with optional grid lines and, at the other end, systems that can accomplish tasks that required a large mainframe a few years ago.

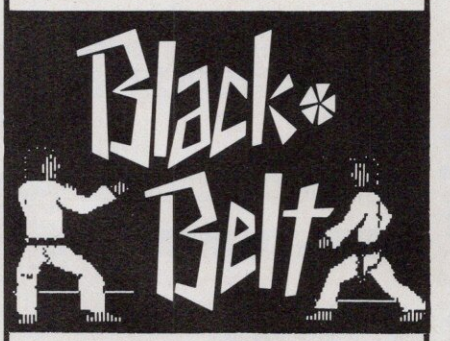
Paint programs merely draw lines and fill in areas right on the screen in response to your inputs with a mouse, light pen, joystick, or other controller. Some programs accept inputs from digitizer tablets or video digitizers, so you can also trace existing material or add video images to your drawings.

Just like editors that operate on the "what you see is what you get" philosophy, paint programs store and work with your diagram as an actual screen image, so you see exactly what you're doing. On the other hand, these programs can't accept or remember details smaller than the finest dot on the screen (up to 1024 × 1024 dots for the Apple II with special cards such as the Number Nine RGB card and up to 512 × 342 dots for the Macintosh).

Paint programs merely draw lines and fill in areas right on the screen in response to your inputs.

With a paint program, you have to do almost all the geometric work yourself. The program, at best, can create straight lines or smooth curves, but it knows nothing about perspective, shading, hidden lines, or three dimensions. A trained draftsperson can often do the job faster and better with a pencil and paper. On the other hand, a paint program lets you turn out useful drawings

EARTHWARE
PRESENTS



Programming by Kevin Ryan

Black Belt is a challenging arcade game of the martial art, taekwondo. The Mockingboard sound and speech synthesizer, joystick and keyboard combine for both fun and learning. Championship sparring rules and the disk's practice section teach you the forms. Designed with input from professionals, **Black Belt** is a skill game in which brutality and rule infractions affect score.

The one-person game has a built-in artificial I.Q. rather than random generator. Instruction booklet included. Apple][computer, 48K, one disk drive, and joystick required. Mockingboard is optional, but adds exciting dimension. Suitable for ages 9-90.

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Software			Call

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MISCELLANEOUS

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Chalkboard, Power Pad (Requires Kit)	$ 100	$ 73
Digital Res., CP/M Gold Card (w/64K)	$ 495	$ 359
* Expand 64K Gold Card to 192K	$ 325	$ 239
Kensington, System Saver Fan	$ 90	$ 65
Key Tronic, KB200 Keyboard (II+)	$ 298	$ 219
Koala, Touch Tablet w/Micro Illustrator	$ 125	$ 85
Kraft, Joystick (Ap II/II+)	$ 65	$ 49
Paddle(Ap II/II+)	$ 50	$ 39
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***Microsoft**, Z80 Softcard (+ or e)	$ 345	$ 235
* Z80 Softcard Premium(IIe)	$ 395	$ 275
***Orange Micro**, Grappler Plus (e or +)	$ 149	$ 119
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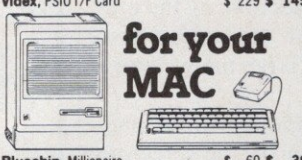
Buffered Grappler Plus, 16K	$ 239	$ 179
Paymar, Lower Case Chip, Rev. 7 (II+)	$ 50	$ 19
***PCPI**, Applicard, 14 features 6Mhz	$ 375	$ 275
RH Electronics, Super Fan II	$ 75	$ 59
***Titan/Saturn**, Accelerator II	$ 599	$ 399
Transend/SSM, AIOII, Serial/Para I/F	$ 225	$ 169
TG Products, Game Paddles (II+)	$ 40	$ 29
Joystick (II+)	$ 45	$ 29
Tracball	$ 40	$ 26
Videx, PSIO I/F Card	$ 229	$ 145



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***Ashton-Tate**, dBase II (Req CP/M 80)	$ 495	$ 269
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of simple regular objects, even if you've never learned to draw a right angle.

A 2-D (two-dimensional) drawing package lets you produce the same kind of image that you might with a paint program, but you go about it in a different way. Instead of drawing directly on the screen, with this type of program you give the computer a set of instructions for what you want done, which, in turn, drives the software to draw the specified image.

Because the computer translates the instructions into an image in a 2-D program, you can specify objects by their dimensions and location and have the program put them on screen, instead of trying to make everything line up yourself. The computer can make lines of any specified angle, curve, or shape and keep all elements precisely positioned.

In addition, because the image is not stored entirely in the screen memory, you can work with scales and details that would not fit in a paint program. You can enter far more information than what fits on the screen, using the free space in the main memory and, in the case of some programs, on disk. The image you see on the screen is derived from your instruction list and often contains only a small part of the total available information.

Because the image is not stored entirely in the screen memory, you can work with scales and details that would not fit in a paint program.

As another result of this separation between image construction and presentation, 2-D drawing packages are more flexible than others. You can scale objects (make them proportionately bigger or smaller), translate them (move them up and down or sideways), or rotate them. If you want to look at one region of the drawing more closely, you can zoom in. If you want an overview, you can zoom out. If the screen is showing only a portion of the diagram and you want to see another one, you can pan across or up and down to the correct spot.

When you change the scale or view on a 2-D program, objects that are off the screen are not lost from memory. With a paint program, if you squeeze an image horizontally until you have lost some level of detail and then expand the image again, you can't retrieve the details. With a 2-D program, if you compress an image and lose details, the details return when you expand the image again.

Last, because 2-D software can turn the instructions for drawing an image into the commands a plotter needs or into the commands that display it on the screen, a 2-D program can produce hard-copy output with as much detail as is present in the original input, rather than only what can fit on the screen.

A 2-D program can produce hard-copy output with as much detail as is present in the original input.

Three Dimensions

Most of the interesting design problems in the real world involve three dimensions, not just two. A CAD system for professional use generally employs 3-D (three-dimensional) methods, which allows it to work on either two- or three-dimensional objects. Naturally, just as on a paper diagram or picture, three-dimensional objects appear two-dimensional, but a series of visual conventions indicates the missing dimension.

Two major differences mark the step from CAD packages that draw in two dimensions to the more advanced programs that draw in three: The 3-D packages handle hidden lines and they provide perspective. Hidden lines are the edges and surfaces of a three-dimensional object that you don't see because some other plane or object is in the way (on a two-dimensional image, all lines are always visible). Perspective is the seeming foreshortening of certain lines that occurs with three-dimensional objects and that must be reproduced in a two-dimensional rendering of such an object if it is to look 3-D.

Hidden-line removal is the more difficult task, and many programs for Apple-size computers omit this feature. Instead, they present drawings of solids as "wire frame" models showing the edges as lines and the surfaces as transparent. Because you can see through the transparent parts, and since lines that overlap simply are superimposed to form a single line at the intersection, there are no hidden lines—and no prob-

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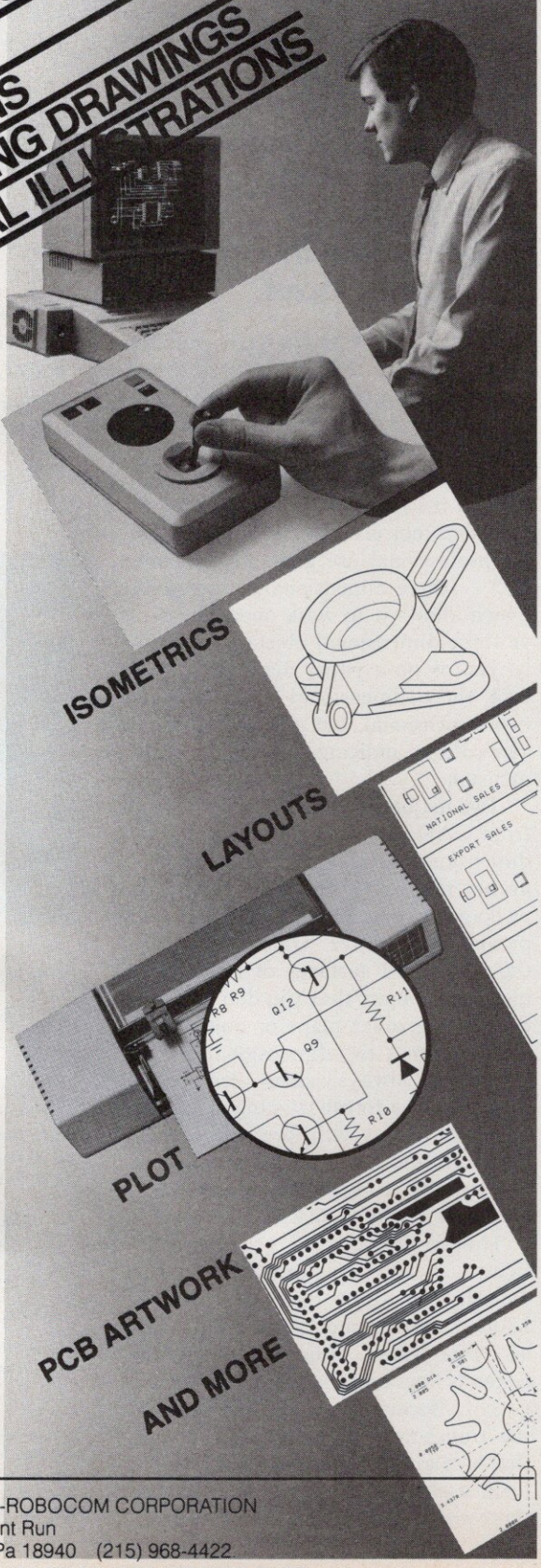

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lem with their removal. Programs that show solids as solids, however, must calculate whether each edge and surface is visible, a slower and more complex process.

Perspective drawing is easier, and most Apple 3-D drawing and CAD packages include this feature. Using a set of trigonometric transformations, these systems can figure out what the apparent length and angle of a line or segment should be, based on the viewing angle and true position.

Whether wire-frame or solid, or two- or three-dimensional, CAD systems for scaled drawings often offer many of the database and reporting features that those intended for schematics do. In addition to producing properly scaled drawings, most systems let you annotate your diagrams with text, combine two or more drawings, or temporarily superimpose them in layers.

It may not be long before you can sit down and do some serious design work on your Mac—such as designing your next computer.

Apple's CAD Future

The cost of big, commercial CAD systems for designing large buildings or complex chips such as microprocessors runs into the hundreds of thousands of dollars, equivalent to the price of a score of Apples and their software.

If you look at CAD/CAM/CAE on Apples, you'll find that most new personal-computer software has already outgrown the memory size and power offered by the eight-bit processors used in the Apple II family. What these new programs need is more memory, finer screen resolution, and a more powerful processor.

If you look at the Lisa and the 512K Macintosh, compared with the Apple II family, that's exactly what you find. The large and growing number of Macintoshes should give software authors the incentive they need to produce CAD programs for these machines. The capabilities are there, and some rumored developments at Apple should make the Mac an even better graphics machine. It may not be long before you can sit down and do some serious design work on your Mac—such as designing your next computer. +

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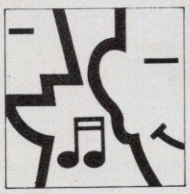

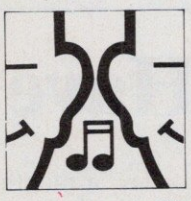

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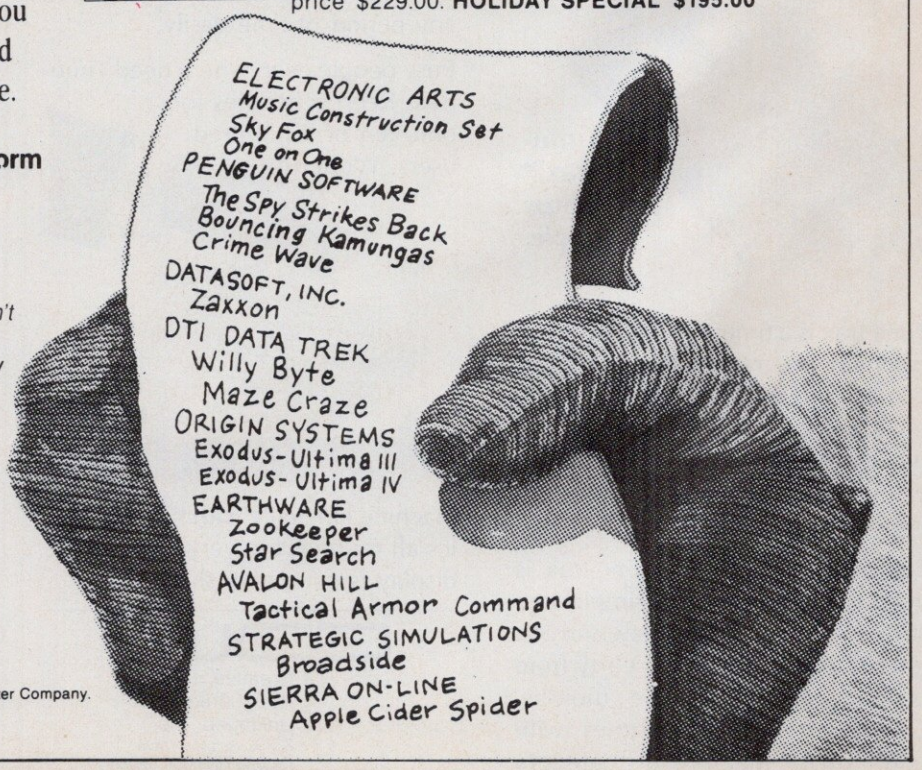

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CIRCLE 359 ON READER SERVICE CARD

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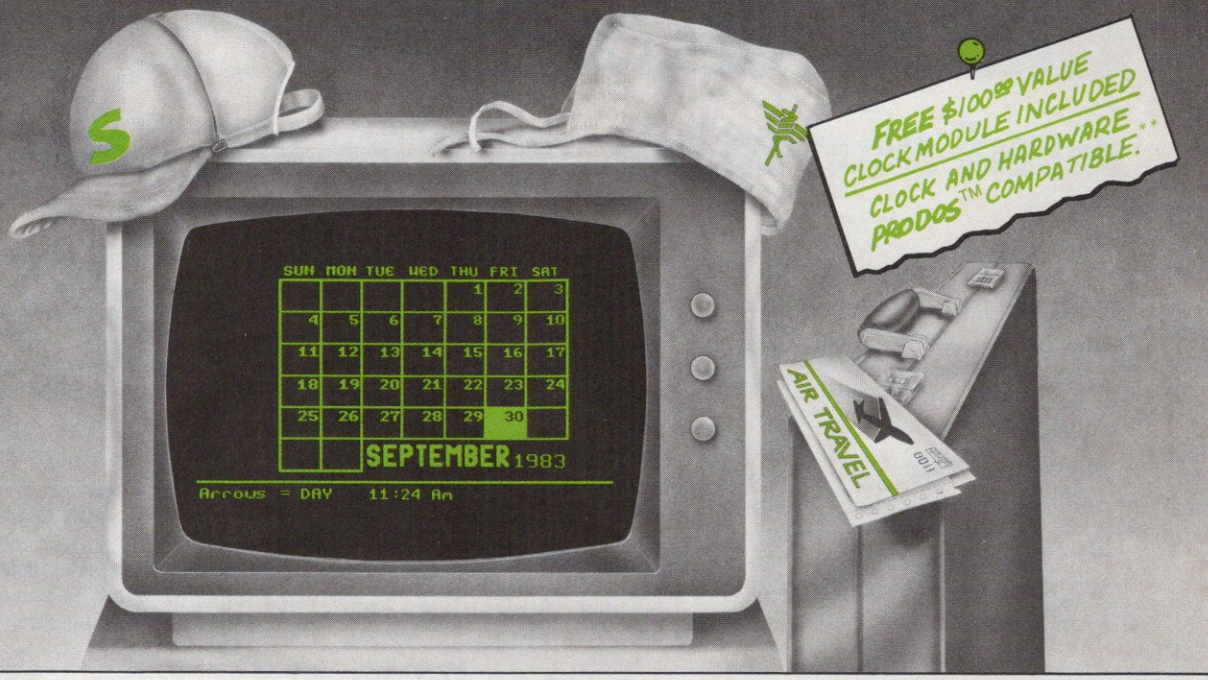

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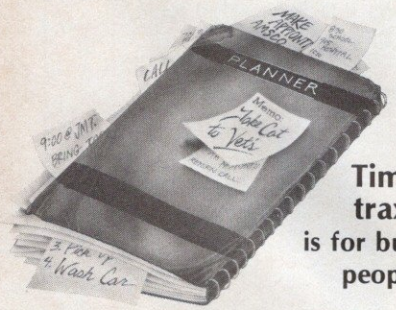

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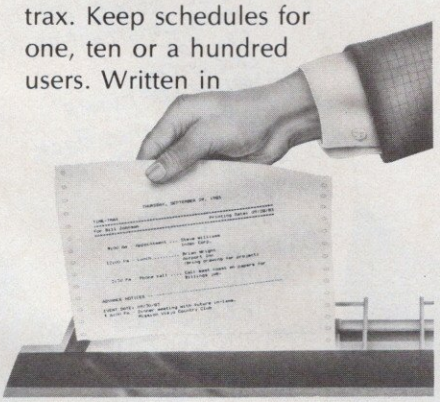

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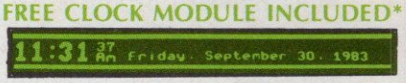

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CAD/CAM

▸ APPLEWORDS
BY STEVE ROSENTHAL

A short glossary

CAD/CAM or CAD-CAM
An acronym for computer-aided design/computer-aided manufacturing. The term covers a range of systems that use computers to help in the design of electronic or mechanical products and in the transfer of that information.

CADD
Abbreviation for computer-aided design and drafting.

CAE
See computer-aided engineering.

COMPUTER-AIDED DESIGN (CAD)
A system for using a computer to assist in creating electronic circuits or mechanical products. You create the design as a drawing or set of drawings on a video screen, using graphics commands to make lines, boxes, curves, and other elements. For best results, the output is sent to a plotter not a printer.

Most CAD packages include software for interactive drawing, databases for parts, and often rule-checking programs that test to make sure the design follows specified practices. CAD systems that emphasize additional design and engineering tools are known as computer-aided engineering (CAE) systems; systems that emphasize finished drawings are known as computer-aided-design-and-drafting (CADD) systems.

COMPUTER-AIDED ENGINEERING (CAE)
The use of computers to help engineers create, specify, and debug products. The term is used for computer-aided design (CAD) systems that provide additional engineering tools, such as programs that simulate the operation of an electronic circuit or the stress distribution of a steel beam.

COMPUTER INTEGRATED MANUFACTURING (CIM)
The complete linking of the design, manufacturing, and testing process through an exchange of computerized information. CIM starts with computer-aided engineering (CAE) and computer-aided design (CAD), produces the product with computer-aided manufacturing (CAM), using computerized numerical-control machines (CNC); then CIM tests the result with automated testing equipment (ATE). Apple's automated factory for producing the Macintosh contains many elements of CIM.

CONNECTIVITY
On electronic circuits, the number of circuit paths between two parts. If connectivity is high, it is helpful to locate the parts physically close together. Most computer-aided-engineering (CAE) systems for electronic design generate a connectivity list, showing all wires and other connections to each pin and junction in the circuit.

DIGITIZE
Turn an image into a list of coordinates. If you are going to work with an existing object, digitizing and entering its coordinates is the first step in the process of entering it into a computer-aided-design system. You can use a digitizing pad (including one made by Apple) for flat images. Three-dimensional objects require more complex input devices.

ELEVATION
A two-dimensional image representing an object as seen from the side. Users can create elevations in orthogonal (right-angle) drawings as well as in perspective.

ENTITY
In computer-aided design, an object—such as an arc, plane, or cube—that is a basic building block from which users can construct drawings. Entities can acquire assigned characteristics, and users can replicate entities and combine them into more complex objects.

FLOATING POINT
Systems that internally store object coordinates as floating-point (fractional) numbers. Although it takes longer to make calculations and draw images with this method than it does using only integers, floating-point numbers allow smooth scaling, zooming, and scrolling. Most CAD systems for eight-bit processors (including the Apple II family) use integer coordinates; many programs for the 16- or 32-bit machines (such as the Macintosh and Lisa) use floating point.

INTEGER-BASED
CAD and drawing systems that keep coordinates as integer numbers rather than as numbers with fractions. Integer-based systems are much faster and require smaller amounts of memory (just as Integer BASIC is smaller and faster than Applesoft), but they cannot do smooth scrolling, scaling, or zooming.

LAYER
A single-image plane that combines with other layers to make a composite picture. For example, on a design for a circuit board, one layer might show the traces on one side of the board, another layer the traces on the reverse side, a third layer the solder masking, a fourth the silk screen for labels, and a final layer the components.

PAN
Move the displayed part of a drawing from side to side or up and down. The image translates (moves) in space. Note that the panning motion in computer graphics and CAD is not the same as a pan in film and video, where a translation is done with a dolly cross or elevate, and a pan is a rotation from a single point rather than a translation in space.

SCALE
To make an object in a drawing proportionately larger or smaller. On integer systems, this operation must be done in fixed steps. On floating-point systems, scaling can be continuous.

SKETCH
To draw freehand on a computer-aided-design system. Strangely enough, this is harder to do on many of the large, expensive systems than on systems based on Apples (because larger systems use a more complex way of keeping track of images). When you actually create the drawing by changing the screen image itself, this operation is known as painting.

VIEWPORT
What the computer-aided-design world calls on-screen windows (sections of the screen showing different programs or different aspects of the data). +

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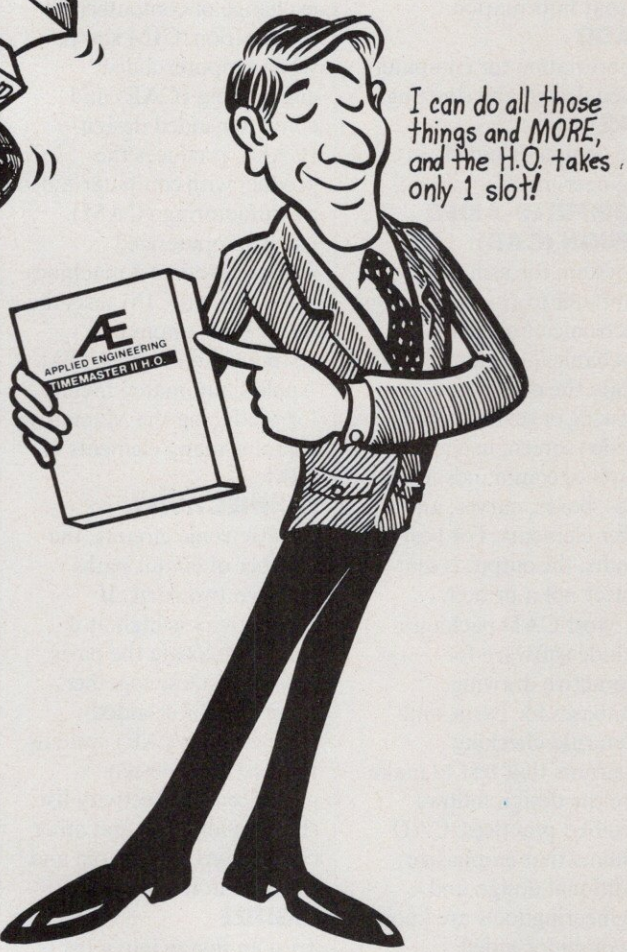

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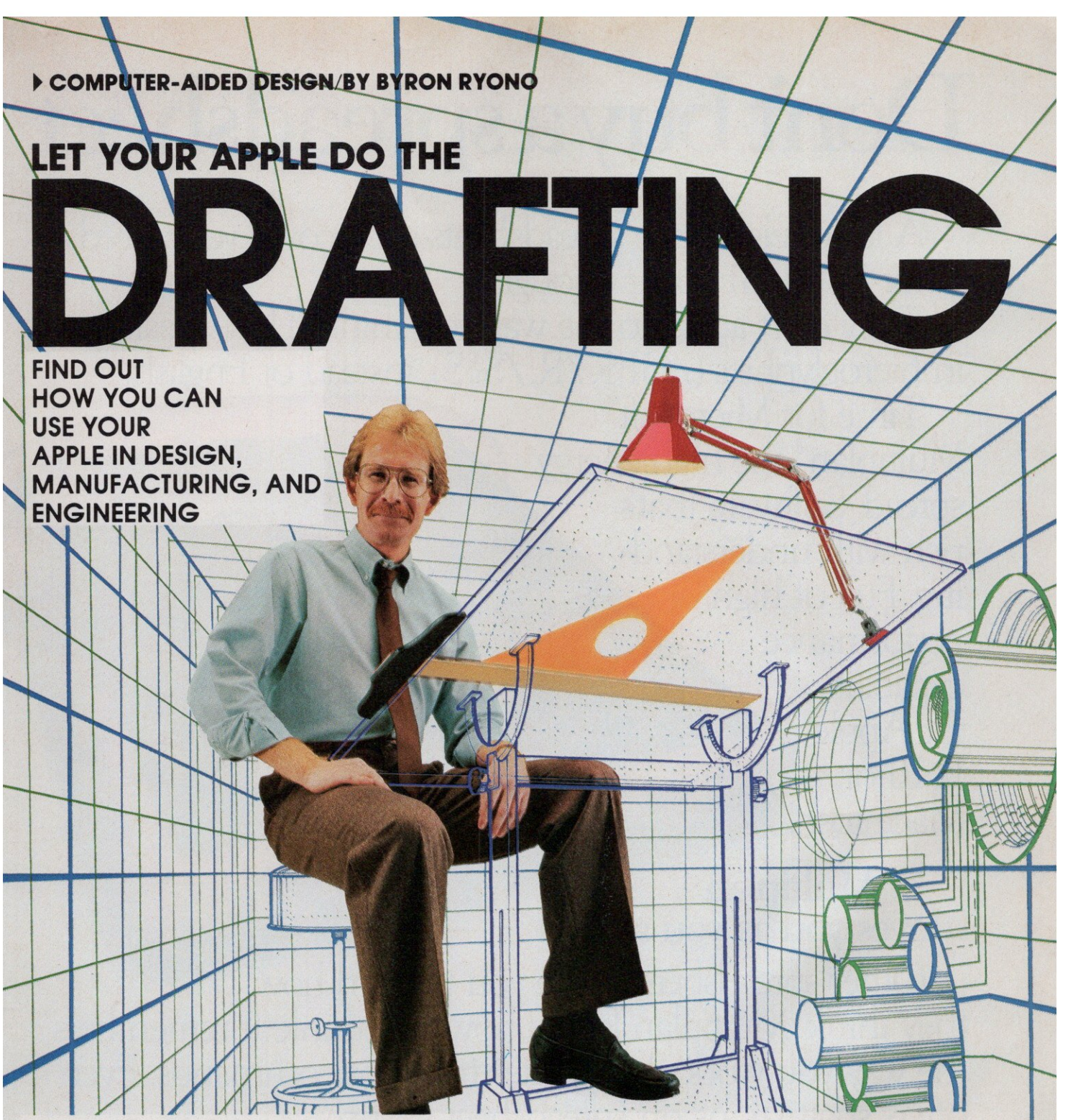

What do a floor plan, a steel beam, and earth exploration have in common? Would you believe Apple computers? An Apple can now have a hand in all three seemingly unrelated items. The common thread that ties these items together is the world of computer-aided design, computer-aided manufacturing, and computer-aided engineering—more commonly called CAD, CAM, and CAE. In all three areas, Apple computers are increasingly becoming workhorses that improve productivity.

CAD is the creation and manipulation of shapes, symbols, and objects in much the same way that word processors create and manipulate text. With CAD tools, you draw and design graphics for logos, schematics, floor plans, flow diagrams, and technical illustrations. As with text, you save, retrieve, edit, and move your images and produce hard copies of them.

CAD and CAM are often discussed in the same breath, since design is the first step that leads to the ultimate production of a manufactured part. Strictly defined, CAM includes a computer that drives a piece of machinery that actually produces the designed part.

CAE is also usually tied to CAD. In some cases, you draw experimental designs (CAD) first; then you analyze and test your design under conditions simulated by the computer (CAE). In other cases, you provide numerical information that CAE helps you evaluate and that you can use to draw an appropriate design (CAD).

In industry, Apple-based CAD/CAM/CAE systems usually perform a portion of the total design/manufactur-

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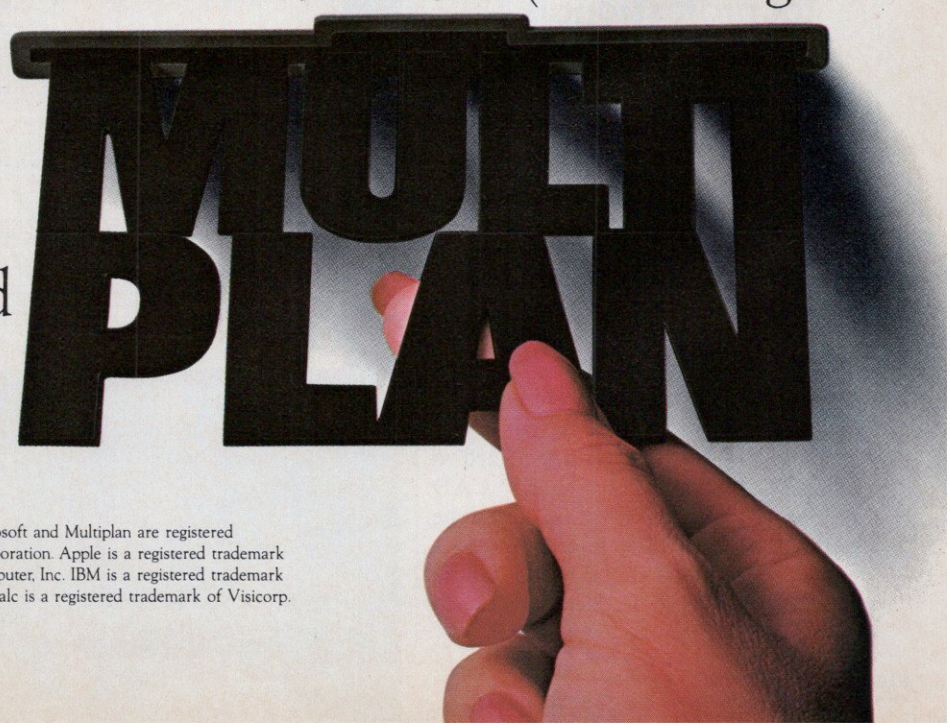

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ing/engineering process. Apples produce detailed drawings and/or reports that technicians use to manufacture anything from electrical circuits to concrete columns to ball-bearing mounts. In all instances, precision, detail, and flexibility combine to result in productivity gains for professionals in a wide range of industries.

CAD—Who, What, and Why

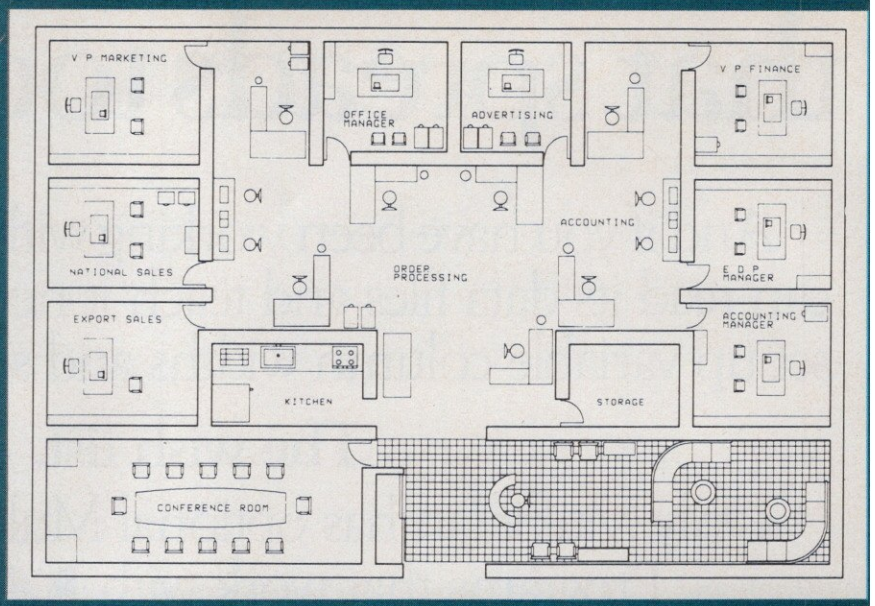
Peter Kendall is the marketing manager for Apple-based CAD products from Chessel-Robocom Corporation. About computer-aided drafting and design, Kendall says, "The types of people who use our system are architects, engineers, designers, manufacturers, draftsmen, educators who are teaching CAD, hobbyists, and graphics designers—just about anybody who has a need to create pictures for later reuse."

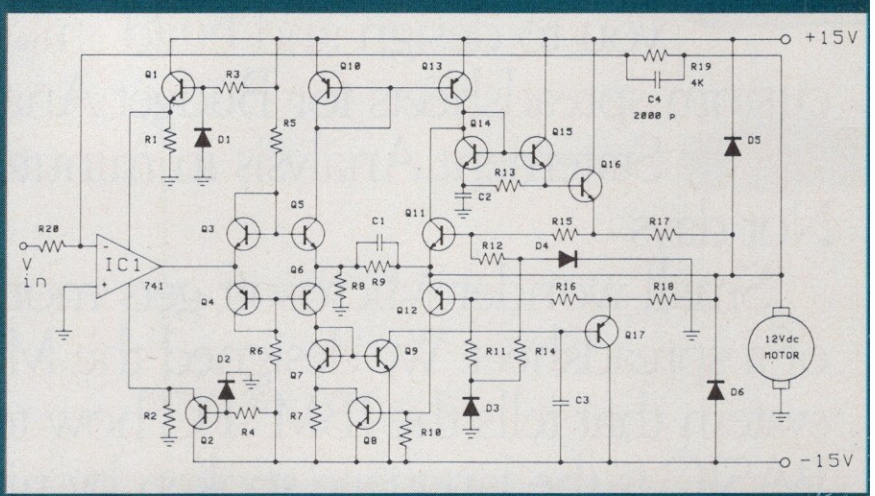
The ROBO System from Chessel-Robocom is an interactive drafting system that utilizes a custom precision joystick for drawing and provides high-quality hard copies and wide-body pen plotters.

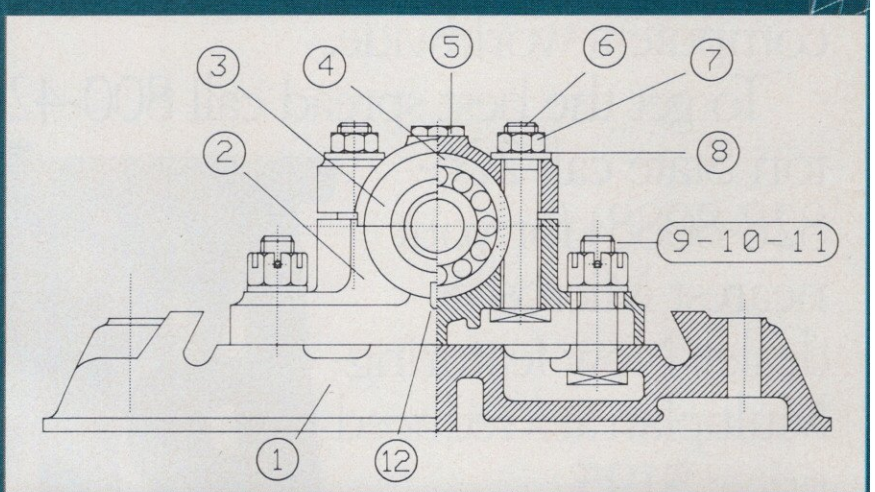
Kendall is quick to point out that microcomputer CAD tools are only part of the total design process. "I don't think that anybody who owns a microcomputer CAD system would recommend doing every single type of drafting task on a microcomputer. But when you talk about floor plans, space planning, construction detail, and all the kinds of routine drafting work that are common to any drafting task, CAD certainly can offer productivity gains."

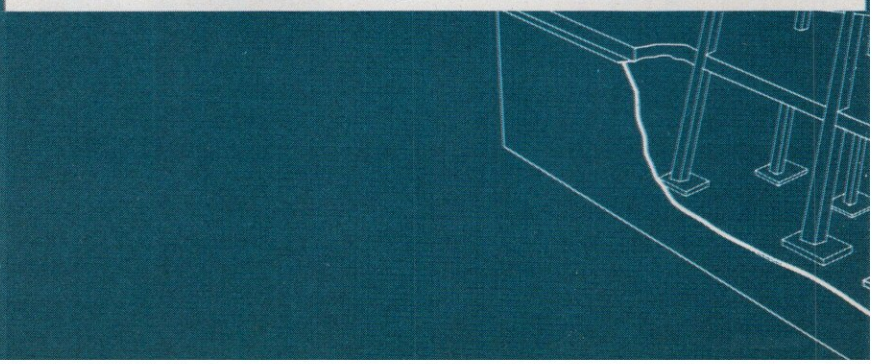
In all instances, precision, detail, and flexibility combine to result in productivity gains for professionals in a wide range of industries.

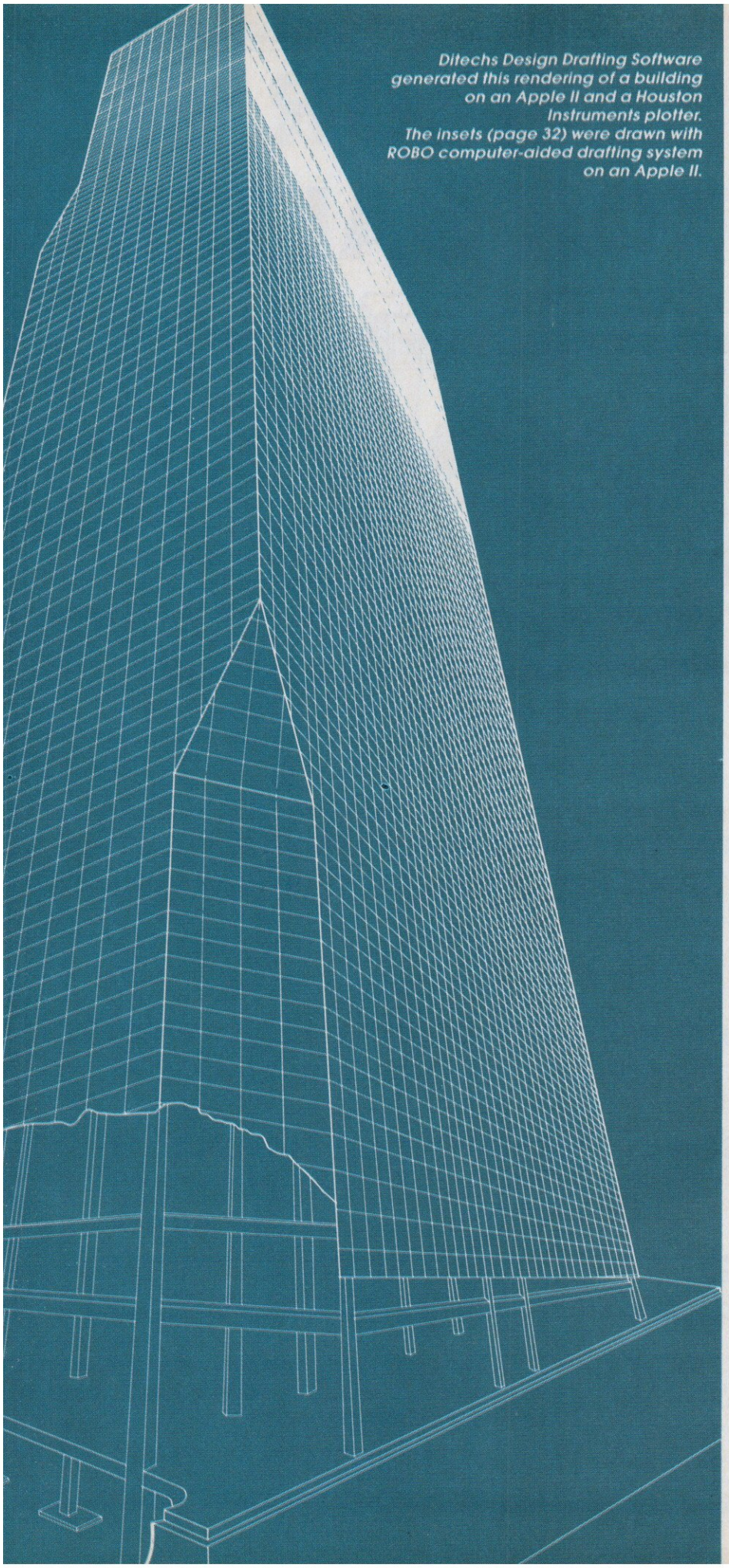
Today's CAD systems also boast attractive cost-to-benefit figures. Kendall explains, "The typical architect who buys a microcomputer-based CAD package is one who can't afford a $100,000 minicomputer-based CAD system that will do 95% of his job, so he settles for a $7000 microcomputer-based CAD system that does 80 or 85% of what he needs to do. He doesn't need the other 10% for the extra $90,000."











Ditechs Design Drafting Software generated this rendering of a building on an Apple II and a Houston Instruments plotter. The insets (page 32) were drawn with ROBO computer-aided drafting system on an Apple II.

One architect who agrees is Brian Johnston, president of Architects North. After 18 years in the business, Johnston recently purchased his first CAD system from Chessel-Robocom Corporation. "For my small firm, it's a must. A CAD system gives us a chance to be a little more creative and a little more time to do a few more things—maybe improve our profit margins."

Tom Barron also fits Kendall's description of a typical CAD user. As president of Heist Engineering, a chemical-engineering consulting firm, Barron uses CAD software from Ditechs to complement his written reports to illustrate them to clients. Barron explains, "The type of diagrams we do are chemical-engineering diagrams and process flowcharts that show the different vessels in a process, the pipes between them, and the pumps and compressors. A typical report of ours might be somewhere between 150 and 250 pages long, and we might have 50 figures in it."

'It takes the need away for everything that a normal draftsman has on his desk—the triangle, the T square, everything. He can throw away all his old tools.'

Because CAD is directly tied to drafting, draftspeople may be the group that benefits the most. According to Jim Atkins, draftsman/consultant/owner of Computer Drafting Services, his Ditechs CAD system is "an all-around drafting tool. It takes the need away for everything that a normal draftsman has on his desk—the triangle, the T square, everything. He can throw away all his old tools."

CAD/CAE and Building Construction

Consider for a moment all the work that goes into the construction of a building. CAD/CAE on Apples can perform many specialty jobs, including structural engineering and HVAC—heating, ventilation, and air conditioning.

Gerry Pardoen is an associate in Englekirk and Hart, a structural-engineering consulting firm. In organizing and standardizing the company's software tools, Pardoen recommended that

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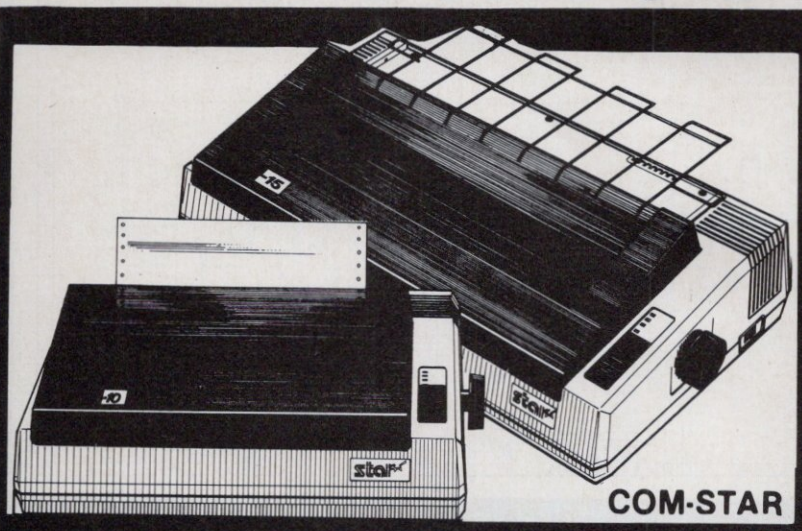

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the firm use Apples for its engineering-software needs. Why? Because, compared to more expensive specialized CAD hardware and software, as Pardoen emphatically states, "Apples provide much more bang for the buck."

On their Apples, Englekirk and Hart use structural-engineering software from ECOM Associates, Inc., whose offerings include steel-column and -beam design, reinforced-concrete-column and -beam design, flat-slab analysis and design, and general frame and truss analysis.

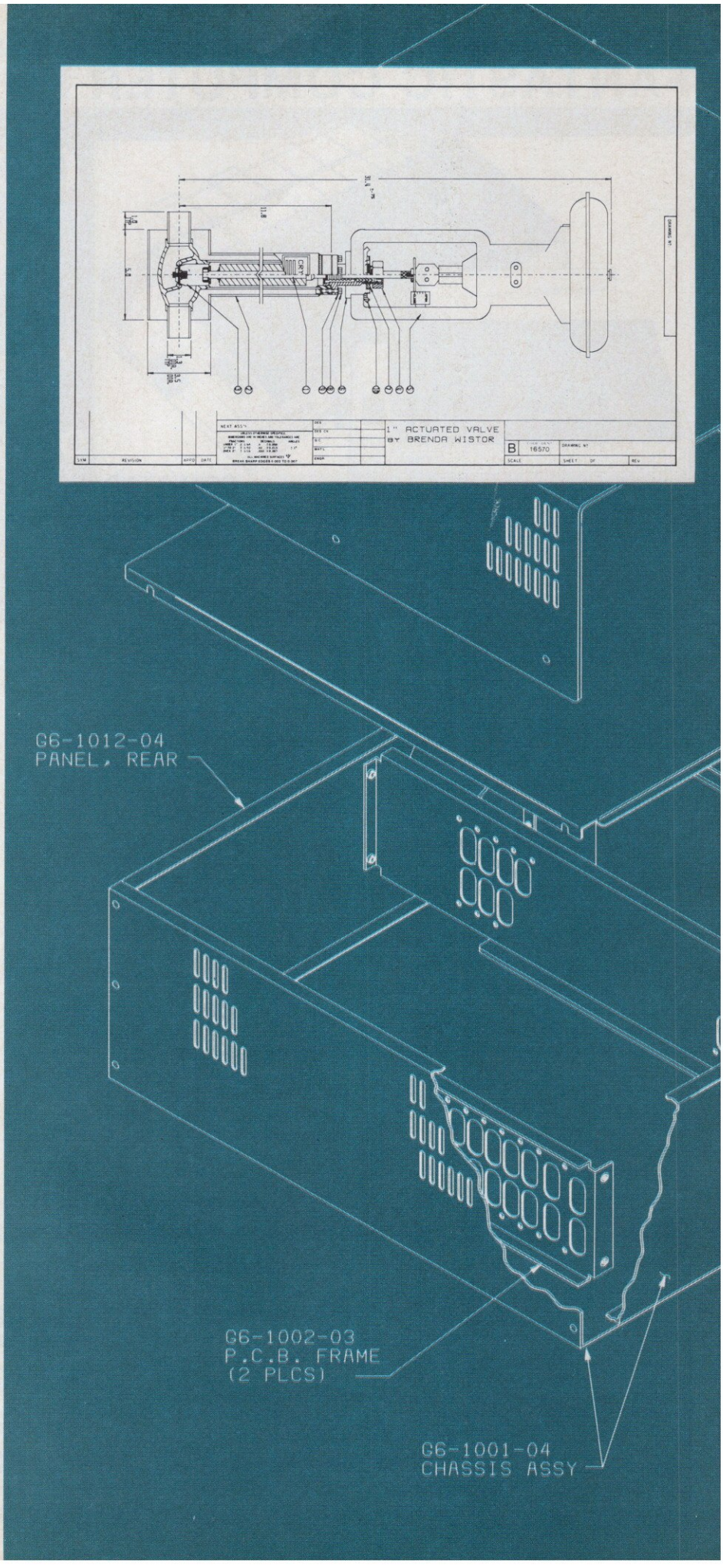
A typical design and engineering scenario begins with an expensive, specialized CAD/CAE workstation that determines a structure's seismic load requirements. Next, based on these requirements, Apples go to work designing specific structural components, such as slabs, columns, and beams, that conform to accepted building standards.

Brian Esser has capitalized on the ROBO System's custom-symbol-library feature. Symbol libraries are collections of objects that are predrawn and stored on disk for subsequent repeated use. As an engineer with Stove Plumbers Supplies, an industrial-automation and -plumbing supplier, Esser designs control panels that house all the components that control a building's environmental and safety conditions, including HVAC, smoke alarms, and lighting.

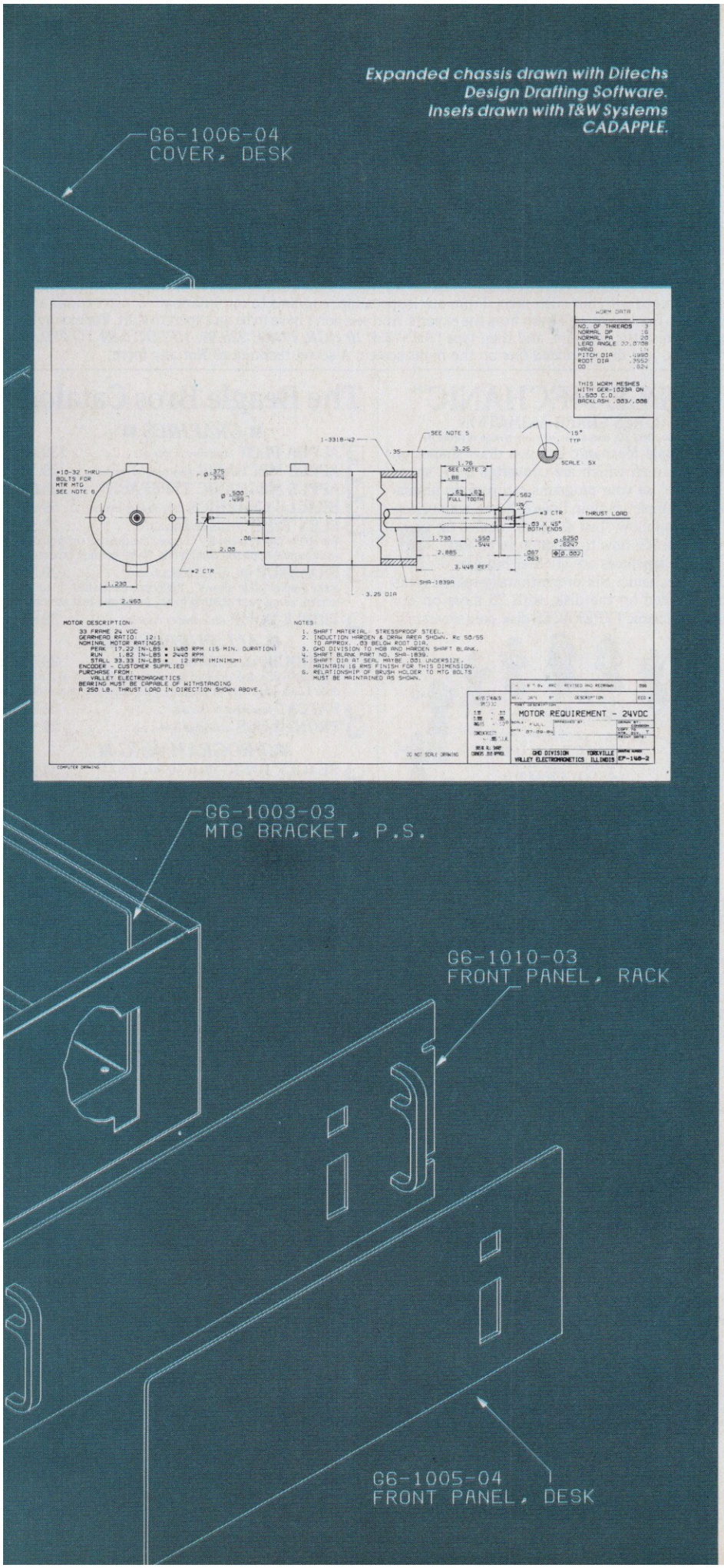
Apples go to work designing specific structural components, such as slabs, columns, and beams, that conform to accepted building standards.

Esser draws a control panel by retrieving components (from his own custom library of control components) that are appropriate for each building's requirements. Once all the necessary controls are on the screen, Esser relates, "I wire them, I end up with a functional diagram, and I print it. Then I take it home and build the panel."

For Esser, since every building's control panel is "similar to but never the same as the others," the ability to design control panels with his own library



Expanded chassis drawn with Ditechs Design Drafting Software. Insets drawn with T&W Systems CADAPPLE.



of components provides a definite edge.

Apple-Based Breadboards

Charles Groves, associate professor of engineering at the Colorado School of Mines, teaches senior-level design courses in advanced analog-signal processing. Groves and his students use Micro-Cap, an electronic-circuit-design and -analysis package from Spectrum Software. The circuits they are learning to design are signal filters for geophysical instrumentation used in earth exploration.

Groves describes Micro-Cap as a "computer-based electronic breadboard." Electronic breadboards are what circuit designers produce to test

Designers simply design their circuits and analyze their functionality right on the Apple. If modifications are necessary, changes are easy to make.

their designs. The breadboards require manual fabrication with a circuit board, electrical components, solder, wire, dexterity, and time. With a tool such as Micro-Cap, designers simply design their circuits and analyze their functionality right on the Apple. If modifications are necessary, changes are easy to make. Groves estimates that this Apple-based analysis takes one-tenth of the time required for a traditional pencil-and-paper analysis—again, a significant productivity gain.

Another Micro-Cap user is John Massey, who runs Electronic Innovators, an electrical-engineering-consulting firm. Without Micro-Cap, Massey says, he'd be down in the lab "using up parts and trying things that don't work." Not only does Massey save on materials and time, but he also saves on hardware and software costs. Specialized equipment for Massey's work sells in the $35,000-plus range. Instead, Massey designs his circuits on his Apple: "I play with it until I like it and then take the design down to the lab and build it."

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CAD systems use a combination of the keyboard and a precision joystick or digitizer to control function selection, text entry and placement, as well as the

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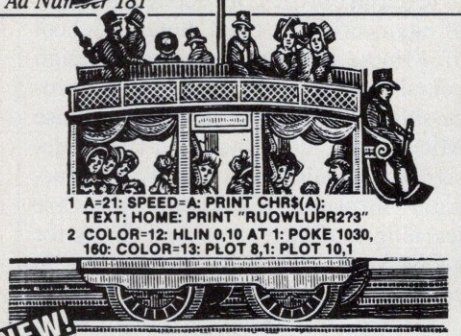

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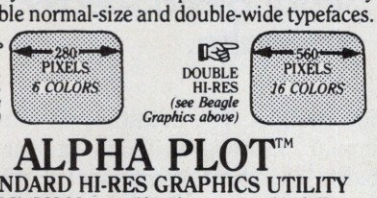

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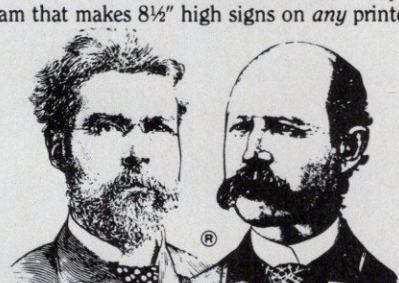

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- ❑ FRAME-UP (II+, IIe, IIc, DOS 3.3) 29.50
  Make Apple "slide shows". Keyboard controlled or unattended, using your existing hi-res, lo-res and text screens.
- ❑ TRIPLE-DUMP *(described in this ad)* 39.95

■ *ALL-PURPOSE* ■

- ❑ DISKQUIK (IIe or 128K IIc, DOS 3.3) 29.50
  Acts like half a disk drive in slot 3. Silent and fast as a hard disk. Load/save files in memory with normal commands.
- ❑ FATCAT *(described in this ad)* 34.95
- ❑ PRONTO-DOS *(described in this ad)* 29.50

■ *PROGRAMMING* ■

- ❑ BEAGLE BASIC (IIe or 64K II+, DOS 3.3) . . . 34.95
  Puts Applesoft in RAM so you can change it and add enhancements—new commands like if-then-ELSE, SWAP variables, GOTO/GOSUB-a-variable, TONE, HSCRN, etc.
- ❑ DOS BOSS (II+, IIe, IIc, DOS 3.3) 24.00
  Reword DOS 3.3 commands. Change "Catalog" to "Cat", "Syntax Error" to "Oops" or *anything*. Includes many meaty tips for altering DOS, including program "save-protection".
- ❑ DOUBLE-TAKE (II+, IIe, IIc, 3.3/Pro) . . . 34.95
  2-way scroll for Listings & Catalogs. Better List-format, fast variable+line number display, better renumber/append, auto line-numbering, instant hex/dec converter and more.
- ❑ GPLE (II+, IIe, IIc, 3.3/Pro) 49.95
  Edit Applesoft without cursor-tracing. Features insert & delete and fast search & replace. Make all keys be "function keys" to type anything you like (ESC-1 catalogs disk, etc.). Move DOS 3.3 out of main memory to add 10K of space.
- ❑ SILICON SALAD (II+, IIe, IIc, DOS 3.3) 24.95
  Over 100 utilities and tricks— hi-res program splitter, DOS killer, disk scanner, hi-res text imprinter, 2-track catalog...
- ❑ TIP DISK #1 (II+, IIe, IIc, DOS 3.3) 20.00
  100 tips on disk from Tip Books 1-4. Fascinating Apple programming techniques. Includes Apple Command Chart.
- ❑ UTILITY CITY (II+, IIe, IIc, DOS 3.3) 29.50
  21 utilities— List-formatter puts each statement on a new line, multi-column catalogs, invisible/trick file names, etc.

■ *GAMES* ■

- ❑ BEAGLE BAG (II+, IIe, IIc) 29.50
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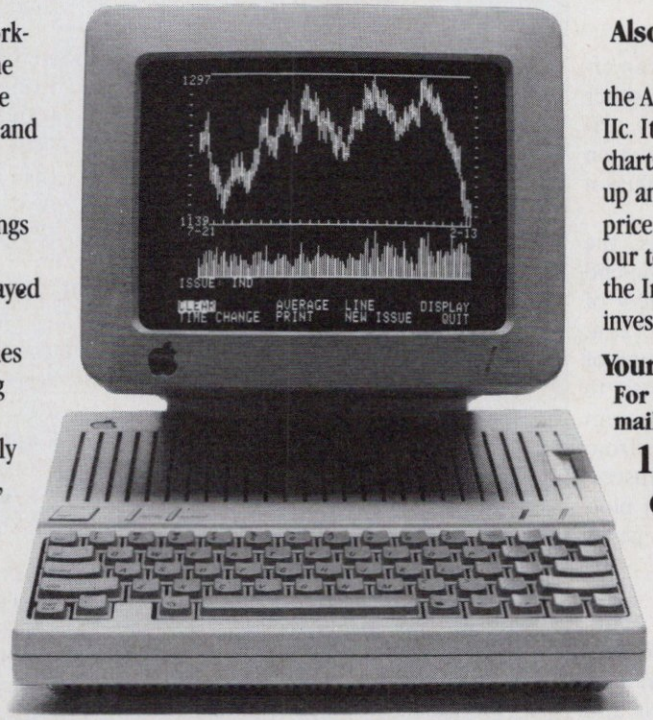

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A+-12

*The chart in this ad (and, incidently, in most Apple ads for the IIc) is a Price and Volume bar chart that shows the performance of the Dow Jones Average over a six-month period. You can also construct Moving Averages and Trend Lines.

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CIRCLE 225 ON READER SERVICE CARD

actual drawing itself. A digitizer is an electronic drawing pad that facilitates CAD activities. Digitizers such as the Houston Instruments Hi-Pad are typically controlled with mouse-like pucks; a mouse by itself is not a preferred input device because of its difficulty with fine detail and precision accuracy.

Display choices start with standard-resolution monochrome monitors and range up to high-resolution color monitors that require special graphics cards such as the Number Nine Board from Number Nine Computer Corporation (see *A+*, August 1984, pages 68–71). The intended application dictates the display requirements. CAD is best suited to high resolution, and color is an effective enhancement. On the other hand, CAE programs that focus primarily on calculations and simulation usually run on standard-resolution monitors.

Apple-based CAD/CAM/CAE tools offer many possibilities for you to communicate more effectively and to be more creative and more efficient.

Dot-matrix printers such as the Imagewriter fulfill the needs of low-end output. On the high end, a variety of single-pen and multipen plotters (2, 4, 6, or 8 pens) accommodate a range of paper sizes from 8½ × 11 inches to 24 × 36 inches. The ROBO System uses a variety of plotters available from Hewlett-Packard and Houston Instruments. The output quality of pen plotters is outstanding (see figures on pages 32-37).

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CAD/CAM/CAE on Apple II-series computers provides productivity gains for a wide range of professionals by alleviating many of the tedious and time-consuming tasks that are basic to design, manufacturing, and engineering. If your work routinely involves the creation of detailed drawings and/or engineering calculations, Apple-based CAD/CAM/CAE tools offer many possibilities for you to communicate more effectively and to be more creative and more efficient at a reasonable cost. +

▶ PRODUCT INFORMATION

CAD SYSTEMS

Ditechs 800E Drafting System
Ditechs
470 North Wiget Lane
Walnut Creek, CA 94598
(415) 930-8762
List Price: $7500
Includes: Apple II, II Plus, or IIe; two disk drives; monitor; digitizer; plotter; software; installation; and training.
CIRCLE 502 ON READER SERVICE CARD

ROBO System
CAD-I Interactive drafting system (including precision joystick)
CAD-II (same as CAD-I, with automatic dimension and 128K memory expansion board)
Chessel-Robocom Corporation
111 Pheasant Run
Newton, PA 18940
(215) 968-4422
List Price: CAD-I, $1095; CAD-II, $1790
Requires: Apple II, II Plus, or IIe; 64K RAM; two disk drives
CIRCLE 503 ON READER SERVICE CARD

INPUT DEVICES

Apple Graphics Tablet
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(800) 538-9696
List Price: $795
CIRCLE 504 ON READER SERVICE CARD

Hi-Pad Digitizer
Houston Instruments
8500 Cameron Road
Austin, TX 78753
(800) 531-5205
List Price: DT-11, $840; DT-114a, $920
CIRCLE 505 ON READER SERVICE CARD

KoalaPad
Koala Technologies Corporation
3100 Patrick Henry Drive
Santa Clara, CA 95050
(408) 986-8866
List Price: $125
CIRCLE 506 ON READER SERVICE CARD

DISPLAY DEVICES

Number Nine Graphics System Board
Number Nine Computer Corporation
691 Concord Avenue
Cambridge, MA 02138
(617) 492-0999
Option 1 (interlaced video) boards
16 colors 512 × 512 resolution: $895
4 colors, 720 × 720 resolution: $945
2 colors, 1024 × 1024 resolution: $1195
CIRCLE 507 ON READER SERVICE CARD

Some Option-1-Compatible Monitors
Sony PVM1270Q
(201) 930-2000
Aydin Controls 8810, 8830
(215) 542-7800
Electrohome ECM1301
(519) 744-7111
Gigateck 1331 LP
(416) 292-8329

Number Nine Graphics System Board
Option 2 (noninterlaced video) boards
16 colors, 512 × 512 resolution: $1095
4 colors, 720 × 720 resolution: $1195
Analog RGB Module (provides choice of 16 colors from palette of 4096): $295
CIRCLE 508 ON READER SERVICE CARD

Some Option-2-Compatible Monitors:
Princeton Graphics System SR12
(609) 683-1660
NEC JC1401 P1A
(312) 228-5900
Aydin Controls 8815, 8835
(215) 542-7800

OUTPUT DEVICES

Plotter Model 410
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(800) 538-9696
List Price: $779
CIRCLE 509 ON READER SERVICE CARD

Plotters
Hewlett-Packard Company
16399 West Bernardo Drive
San Diego, CA 92127
(800) 367-4772
List Price: HP 7470A, $1095; HP 7475A, $1895
CIRCLE 510 ON READER SERVICE CARD

Plotters
Houston Instruments
8500 Cameron Road
Austin, TX 78753
(512) 835-0900
CIRCLE 511 ON READER SERVICE CARD

Your money saving Christmas list from Nonagon

MACINTOSH

	Retail Price	Your Price
GAMES:		
Blue Chip:		
Millionaire	60.00	48.00
Penguin:		
Pensate	39.95	31.95
Transylvania	39.95	31.95
Mark Of Unicorn:		
Mouse Stampede	39.95	31.95
Scarborough:		
Run For The Money	49.95	39.95
Soft-Life Corp.:		
Mac-Slots	77.77	62.00
Infocom:		
Deadline	59.95	47.95
Zork I	39.95	31.95
Zork II or III	49.95	39.95 ea.
Hayden:		
Sargon III	49.94	39.95
BUSINESS/UTILITIES:		
ATI:		
MacCoach	75.00	60.00
Central Point Software:		
MacTools	39.95	31.95
Continental		
Home Accountant	150.00	120.00
Dow Jones:		
Straight-Talk	79.99	64.00
Haba Systems:		
Habadex	199.00	155.00
Hayden:		
DaVinci Series	49.95	39.95 ea.
Living VideoText:		
Think-Tank	145.00	116.00
Magnum:		
McPic	49.95	39.95
Main Street:		
Main Street	200.00	150.00
MicroSoft:		
Multiplan	195.00	155.00
Basic	150.00	120.00
Chart	125.00	100.00
Monogram:		
Dollars & Sense	150.00	120.00
Miles Computing:		
Mac the Knife	39.95	31.95
Odesta:		
Helix	395.00	315.00
Software Publishing:		
PFS File & Report	195.00	155.00
T Maker:		
Click Art Personal/ Publications	49.95	39.95 ea.
Telos Software:		
FileVision	195.00	155.00
HARDWARE/ACCESSORIES:		
Amray:		
Media Mate 3½"	14.95	12.95
Assimilation Process:		
Mac Daisy Wheel Connection	99.00	85.00
Kensington:		
Starter Pack	90.00	72.00
Memorex:		
3½" Diskettes	60.00	48.00
Prometheus:		
Promodem 1200 with MacPack	495.00	395.00

APPLE

	Retail Price	Your Price
GAMES:		
Avant-Garde Creations:		
Hi-Res Computer Golf	39.95	28.95
Blue Chip Software:		
Millionaire	59.95	47.95
Broderbund:		
Choplifter	34.95	24.95
Lode Runner	34.95	24.95
CBS Software:		
Murder by the Dozen	34.95	24.95
Epyx:		
Temple of Apshai	39.95	27.95
Summer Games	39.95	31.95
Worlds Greatest Baseball	39.95	31.95
Electronic Arts:		
Pinball Const. Set	39.95	31.95
One-On-One	39.95	31.95
Archon	39.95	31.95
Sky Fox	39.95	31.95
Music Const. Set	39.95	31.95
Hayden Software:		
Sargon III	49.95	39.95
Infocom:		
Zork I, II, or III	39.95	28.95
Deadline	49.95	37.95
Enchanter	49.95	37.95
Sorcerer	49.95	37.95
Microlab:		
Miner 2049er	40.00	28.00
Death in the Caribbean	35.00	25.00
Muse:		
Three Mile Island	39.95	27.95
Castle Wolfenstein	29.95	21.95
Odesta Corporation:		
Chess	69.95	49.95
Origin Systems:		
Ultima III	54.95	43.95
Penguin Software:		
Transylvania	34.95	24.95
The Coveted Mirror	34.95	24.95
Sierra On-Line:		
Time Zone	99.95	69.95
Ultima II	54.95	38.50
SirTech:		
Wizardry I:	49.95	34.95
Wizardry II:	34.95	24.95
Wizardry III:	39.95	27.95
Strategic Simulations:		
Computer Quarterback	39.95	28.95
Computer Baseball	39.95	28.95
Germany 1985	59.95	43.95
Ringside Seat	39.95	28.95
Broadsides	39.95	28.95
Geopolitique	39.95	28.95
North Atlantic '86	59.95	43.95
Carrier Force	59.95	43.95
Computer Ambush	59.95	43.95
War in Russia	79.95	59.95
Questron	49.95	39.95
Sublogic:		
Flight Simulator II	49.95	39.95
Night Mission: Pinball	39.95	31.95
Synergistic		
Microbe	44.95	35.95
BUSINESS/UTILITIES:		
Artsci:		
Magicalc	149.95	106.95
Magic Office System	295.00	220.00
BUSINESS/UTILITIES:		
Beagle Brothers:		
Apple Mechanic	29.95	21.95
GPLE	29.95	22.95
Beagle Graphics	59.95	47.95
Triple Dump	39.95	31.95
Borland:		
Turbo Pascal/Toolbox	54.95	49.95 ea.
Broderbund:		
Bank Street Writer	69.95	50.95
Printshop	49.95	39.95
Central Point Software:		
Home Accountant	74.95	54.95
Datatransform:		
Fontrix	75.00	69.95
Font Disk (#'s 1 thru 5)	24.95	18.95 ea.
Electronic Arts:		
Financial Cook Book	49.95	39.95
Funk Software:		
Side Ways	60.00	48.00
Microsoft:		
Multiplan (Apple Dos)	195.00	150.00
T.A.S.C.	195.95	146.95
Micro-Sparc, Inc.		
G.A.L.E.!	49.95	39.95
Macrosoft/Assembler	69.95	55.95
Monogram:		
Dollars and Sense	100.00	79.95
Penguin Software:		
Comp. Graphics Sys.	79.95	61.95
Graphics Magician	59.95	42.95
Paper Graphics	49.95	37.95
Sensible Software:		
Image Printer	49.95	37.95
Sensible Speller	124.95	90.95
Book Ends	124.95	94.95
Sierra On-Line:		
Screenwriter II	129.95	90.95
Silicon Valley Systems:		
Word/List Handlers	79.95	36.95 ea.
Software Masters:		
Visible Computer: 6502	49.95	39.95
Software Publishing:		
PFS: Report/Write	125.00	87.50
PFS: File/Graph/	125.00	87.50
PFS: Access	70.00	52.95
Roger Wagner Publishing:		
Merlin Pro	74.95	52.95
Printographer	39.95	31.95
United Software		
Ascii Express Professional	129.95	105.95
Visicorp:		
Flashcalc	99.95	79.95
HARDWARE:		
Hayes Products:		
Joystick Mach III	59.95	43.95
Koala Technologies:		
Koala Pad	124.95	84.95
Kraft:		
Joystick	59.95	43.95
Sweet Micro:		
Mockingboard Sound & Speech	195.00	155.00
TG Products:		
Joystick	59.95	43.95
Select-a-Port	59.95	41.95

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COMPANY	PROGRAM	DESCRIPTION
Afterthought Engineering San Diego, CA	Wiremaster	Creates a wire list for building wire-wrap prototypes
Applied I Palo Alto, CA	Tutsim	Creates graphic representations of a linear and nonlinear system model
Arrow Data Systems Los Angeles, CA	Arrowcode 15, Version 3.1	Provides a special method of solving trigonometry problems in numeric-control programming
Avant-Garde Publishing Corp. Eugene, OR	Hi-Res Secrets Graphics Application System	Creates block, vector, and H-plot shapes, and animation
	Build Your Dream House: Architectural Design	Contains 75 basic floor plans that can be moved and rotated
	Build Your Dream House: Interior Design	Contains moveable scale furniture and moveable household fixtures
	Build Your Dream House: Landscape Design	Provides basic ground plans for positioning of plant shapes and charting of their growth
	Hi-Res Electronic Design	Designs electronic schematics
Cascade Graphics Development Santa Ana, CA	Cascade I, Version 1.0	Develops graphics software
Chessel-Robocom Corp.* Newtown, PA	ROBO Systems CAD-1	Develops interactive graphics software
Comprep Corp.* Orange, CA	Simultaneous Three Axis Contouring (STA-Pattern)	Drives a three-axis milling machine to produce airfoil shapes and sculptured surfaces
	GeoStac II	Assists in semi-automatic numerical control (N/C) programming
Disco-Tech Microcomputer Products* Santa Rosa, CA	Retailing Wall Design (RETWALL)	Designs and analyzes concrete or block stem walls
	Simple Beam Design & Analysis (BEAM-1)	Calculates reactions, shears, and moments for loading conditions on simple beams
	STADIA	Performs stadia reduction, calculating the distance, elevation, and coordinate, at the rod station
	Horizontal Curve Stake (HCS)	Calculates and prints data needed to lay out a circular curve
	Tiltwall	Designs concrete tilt-up walls
	Verticurve	Calculates station and elevation for vertical curves, point of vertical intersection of tangents, and high/low points
	Cut & Fill	Calculates cut and fill, based on the matrix method
	Field Note Data Reduction (FINDER)	Reduces survey field data for closed or open traverses to northings and eastings (data can be used with other Survey 80 programs)
	Mapcheck	Creates and stores parcels calculated from data previously generated by FINDER, COGO, and EDM/TOPO
	Topographic Survey Using EDM & Theodolite (EDM/TOPO)	Calculates the horizontal distance, elevation, and coordinates at the reflector station
	Point-to-point Coordinate Plotting	Performs point-to-point plotting
	Survey 80/Coordinate Geometry (COGO)	Performs variety of calculations for geometric layouts
Ditechs Walnut Creek, CA	Ditechs Design Drafting Software	Does general-purpose architectural/mechanical drafting
Dynacomp, Inc. Webster, NY	Transfer Function Analyzer (TFA)	Performs frequency-spectrum analyses
	Beam Deflection (BEAM)	Calculates beam deflection, with plotting
	Active Circuit Analysis Program (ACAP)	Analyzes active and passive circuits
	Digital Filter	Analyzes active and passive circuits
	Logic Simulator	Analyzes circuit performance
	Softnet	Analyzes liquid pipeline network
	Microcomputer Circuit Analysis	Analyzes and plots active and passive circuits
	Microcomputer Logic Design	Does interactive drawing and simulation
	Fourier Analyzer	Performs Fourier integral analysis
	Harmonic Analyzer	Performs Fourier transforms
	Filter Analysis	Does filter design and plotting
Ecom Associates, Inc. Milwaukee, WI	Flat Slab Analysis and Design Program (CD-3)	Analyzes and designs flat-slab or waffle-slab floors
	Reinforced Concrete Column Design Program (CD-2)	Designs and checks capacity of a reinforced concrete column
	Steel Column Design Program (SD-2)	Designs and checks sections subjected to axial loads with or without bending moments applied above axis of the column
	Steel Beam Design Program (SD-1)	Designs by American Institute of Steel Construction code (AISC) for Wide-Flange Section and Channel shapes (WS&C)
	General Frame and Truss Analysis	Determines critical moments, shears, axial loads, and displacement and displacements at all joints
	Reinforced Concrete Beam Design Program (CD-1)	Designs reinforced concrete beams by either the ultimate strength or working stress method
Elite Software Development, Inc.* Bryan, TX	Fire Sprinkler Design	Performs hydraulic calculations following National Fire Protection Agency (NFPA) standards
	Short Circuit Calculation Program	Calculates maximum fault current using the "per inch" method
	Lighting Fixture Calculation Program	Calculates fixture requirements using the IES zonal cavity method
	Voltage Drop Calculation Program	Calculates voltage drops in electrical networks
	Service Supply Pipe Sizing	Sizes pipes for domestic hot-and cold-water systems
	Duct Sizing Program	Sizes ducts, using either the static-regain, equal-friction, or constant-velocity methods
	HVAC Loads Programs	Performs heating-and cooling-load calculations

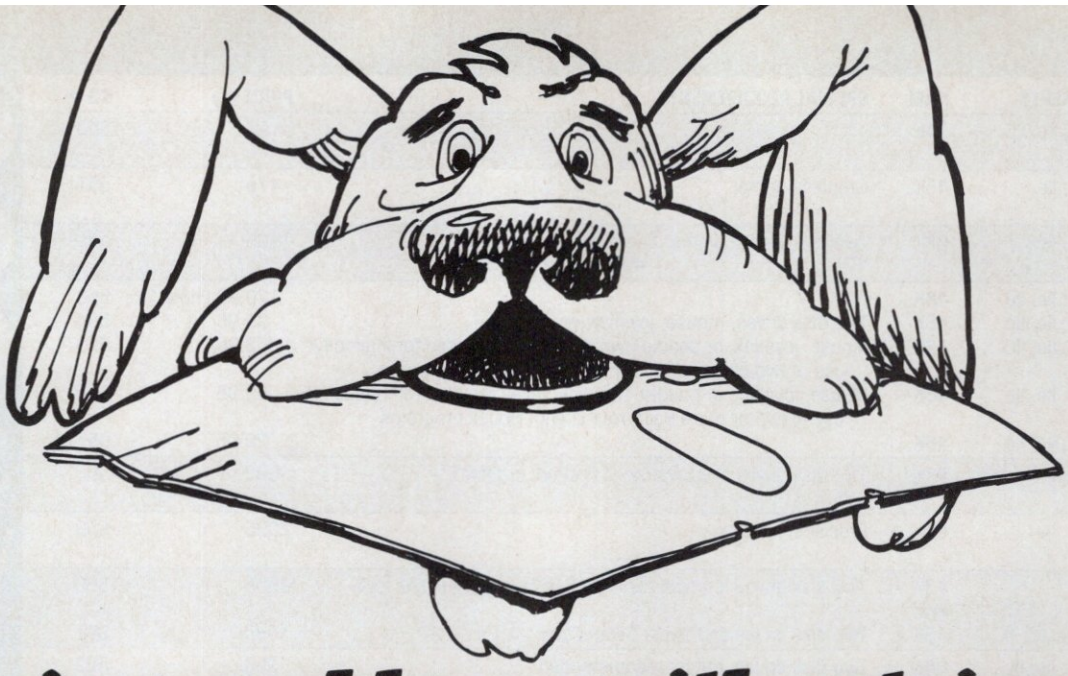
*Other CAD/CAM/CAE products not listed here are availale from this company. This chart contains a sampling of products, and the information herein is based on manufacturers' claims. For more information on the products listed above, circle the appropriate card number on the Reader Service Card in this issue.

CAD CAM CAE SOFTWARE

SYSTEM REQUIREMENTS		RAM	SPECIAL REQUIREMENTS	PRICE ($)	RS #
CP/M	II, II+, IIe, III	64K		195	550
DOS 3.3	II, II+, IIe	48K	Graphics printer	475	551
DOS 3.3	II, II+, IIe	64K	Two disk drives; plotter recommended	1995	552
DOS 3.3	II, II+, IIe, IIc	48K		129.95 (note 1)	553
DOS 3.3	II, II+, IIe, IIc	48K	Two disk drives; mouse, joystick, or paddle	99.95	554
DOS 3.3	II, II+, IIe, IIc	48K	Mouse, joystick, or paddle; two disk drives required for interactive use of two or more Build Your Dream House programs	69.95	555
DOS 3.3	II, II+, IIe, IIc	48K	Mouse, joystick, or paddle; two disk drives required for interactive use of two or more Build Your Dream House programs	69.95	556
DOS 3.3	II, II+, IIe, IIc	48K		29.95	557
DOS 3.3	II+, IIe	64K	Two disk drives and joystick, KoalaPad, or tablet	895	558
DOS 3.3	II, II+, IIe	64K	Precision joystick	1095	559
DOS 3.3	II+ IIe	43K 64K	Two disk drives; compatible numerical-control machine tool	9995	560
DOS 3.3	II+, IIe, IIc, III	48K	Two disk drives and Super Serial Card	1595	561
CP/M	II, II+, IIe, III	64K	Two disk drives; printer recommended	250	562
CP/M	II, II+, IIe, III	64K	80-column card; printer recommended	145	563
CP/M	II, II+, IIe, III	64K	80-column card; printer recommended	95	564
CP/M	II, II+, IIe, III	64K	80-column card; printer recommended	95	565
CP/M	II, II+, IIe, III	64K	80-column card; printer recommended	125	566
CP/M	II, II+, IIe, III	64K	80-column card; printer recommended	125	567
CP/M	II, II+, IIe, III	64K	80-column card; printer recommended	145	568
CP/M	II, II+, IIe, III	64K	80-column card, two disk drives; printer recommended	400 (note 2)	569
CP/M	II, II+, IIe, III	64K	80-column card, two disk drives; printer recommended	95 (note 2)	570
CP/M	II, II+, IIe, III	64K	80-column card, two disk drives; printer recommended	125 (note 2)	571
CP/M	II, II+, IIe, III	64K	80-column card, two disk drives; dot-matrix or letter-quality printer	95 (note 2)	572
CP/M	II, II+, IIe, III	64K	Two disk drives	500 (note 2)	573
Pascal	II, II+, IIe	64K	Two disk drives; RAM disk; plotter; digitizer, joystick, or KoalaPad	1995	574
DOS 3.3	II, II+, IIe, IIc, III	32K		29.95	575
DOS 3.3	II, II+, IIe, IIc, III	32K		39.95	576
DOS 3.3	II, II+, IIe, IIc, III	48K		43.95	577
DOS 3.3	II, II+, IIe, IIc, III	32K		53.95	578
DOS 3.3	II, II+, IIe, IIc, III	48K		43.95	579
DOS 3.3	II, II+, IIe, IIc, III	48K	Printer optional	129.95	580
DOS 3.3	II, II+, IIe, IIc, III	64K	Two disk drives; printer optional	399.95	581
DOS 3.3	II, II+, IIe, IIc, III	64K	Two disk drives; printer optional	399.95	582
DOS 3.3	II, II+, IIe, IIc, III	32K		23.95	583
DOS 3.3	II, II+, IIe, IIc, III	32K		33.95	584
DOS 3.3	II, II+, IIe, IIc, III	48K		33.95	585
CP/M	II, II+, IIe, III Mac w/ MS-BASIC	64K	Two disk drives, 80-column card and printer	700 (note 3, 4)	586
CP/M	II, II+, IIe, III Mac w/ MS-BASIC	64K	Two disk drives, 80-column card and printer	575 (note 3, 4)	587
CP/M	II, II+, IIe, III Mac w/ MS-BASIC	64K	Two disk drives, 80-column card and printer	425 (note 3, 5)	588
CP/M	II, II+, IIe, III Mac w/ MS-BASIC	64K	Two disk drives, 80-column card and printer	375 (note 3, 5)	589
CP/M	II, II+, IIe, III Mac w/ MS-BASIC	64K	Two disk drives, 80-column card and printer	600 (note 3)	590
CP/M	II, II+, IIe, III Mac w/ MS-BASIC	64K	Two disk drives, 80-column card and printer	600 (note 3, 4)	591
CP/M	II, II+, IIe, III	64K		495	592
CP/M	II, II+, IIe, III	64K		495	593
CP/M	II, II+, IIe, III	64K	Two disk drives	495	594
CP/M	II, II+, IIe, III	64K		195	595
CP/M	II, II+, IIe, III	64K		395	596
CP/M	II, II+, IIe, III	64K		395	597
CP/M	II, II+, IIe, III	64K	Two disk drives	295	598

Notes: **1.** Demo disk $10 **2.** Survey-80 package price, $995 (includes FINDER, COGO, EDM/TOPO MPACHECK, and PLOTTER) **3.** All six programs, $235 **4.** CD1, CD2, and CD3 package price, $1350 **5.** SD-1 and SD-2 package price, $650

Chart continues on page 46



Having problems with retrieval?

You need software insurance.

Diskettes are fragile, and when a protected program is damaged, the results are expensive and inconvenient. If you have a backup diskette, though, you can have your Apple, IBM or compatible computer back on line within seconds... affordably. That's software insurance.

Copy II Plus (Apple][,][Plus, //e)

This is the most widely used backup program for the Apple. Rated as "one of the best software buys of the year" by **InCider** magazine, its simple menu puts nearly every disk command at your fingertips. The manual, with more than 70 pages, describes protection schemes, and our **Backup Book™** lists simple instructions for backing up over 300 popular programs. A new version is now available that is easier to use and more powerful than before. Best of all, Copy II Plus is still only **$39.95.**

WildCard 2 (Apple][,][Plus, //e)

Designed by us and produced by Eastside Software, WildCard 2 is the easiest-to-use, most reliable card available. Making backups of your total load software can be as easy as pressing the button, inserting a blank disk and hitting the return key twice. WildCard 2 copies 48K, 64K and 128K software, and, unlike other cards, is always ready to go. No preloading software into the card or special, preformatted diskettes are required. Your backups can be run with or without the card in place and can be transferred to hard disks. **$139.95** complete.

Important Notice: These products are provided for the purpose of enabling you to make archival copies only. Under the Copyright Law, you, as the owner of a computer program, are entitled to make a new copy for archival purposes only, and these products will enable you to do so.

These products are supplied for no other purpose and you are not permitted to utilize them for any use, other than that specified.

Copy II PC (IBM)

This is **THE** disk backup program for the IBM PC and PC/XT that backs up almost anything. Others may make similar claims, but in reality, nothing out performs Copy II PC... at any price. Copy II PC even includes a disk speed check and is another "best buy" at only **$39.95.**

We are the backup professionals. Instead of diluting our efforts in creating a wide variety of programs, we specialize in offering the very best in backup products. So, protect your software investment, **before** your software meets its master.

CENTRAL POINT Software, Inc.

The Backup Professionals

To order, call 503/244-5782, 8:00-5:30 Mon.-Fri., or send your order to: Central Point Software, 9700 SW Capitol Hwy, Suite 100, Portland, OR 97219. **Prepayment is required. Please include $3 for shipping and handling ($8** outside U.S. or Canada). MasterCard VISA **Welcome**

CIRCLE 184 ON READER SERVICE CARD

"Listen to the way he responds to the Uptown Trivia questions. His deliberate pauses, deep voice and those intentional mispronunciations . . . I'm sure it's his way of saying there's more on his mind than trivia."

Uptown Trivia,™ from Uptown Software,™ Inc. is more than just another trivia game. It's the mature, sophisticated way to socialize.

It's flexible. One to ten people or teams can play. The number of correct answers needed to win each of the six categories is up to you.

It's timely. Set the graphically displayed timer for as much or as little time per question as you like.

It's challenging. The computer randomly selects a category and question. Then a series of four answers appears one at a time. As each answer appears, you answer yes or no. A wrong answer at any point and you've missed the question.

Other sociable features include 3,600 original questions, exciting color graphics, sound effects and cumulative scoring. Plus, additional question disks are available.

Uptown Software's other games include Compuzzler,™ a strategy game based upon crossword puzzles.

And Uptown Double Crostics,™ a true enhancement of this traditional word game.

Uptown Software. This holiday season, make it the life of the party.

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For a dealer near you, call 1-800-824-7888, Operator 584. (In Hawaii and Alaska, 1-800-824-7919, Operator 584) Compuzzler, Uptown Double-Crostics and Uptown Trivia © 1984 by Uptown Software, Inc., Cambridge, MA. Versions available for Apple® Commodore 64™ and IBM® PC and PC*jr* computers. Apple is a registered trademark of Apple Computer, Inc. Compuzzler, Uptown Double-Crostics and Uptown Trivia developed by Wordware, Inc.

CIRCLE 169 ON READER SERVICE CARD

COMPANY	PROGRAM	DESCRIPTION
Elite Software Development Inc.* Bryan, TX	Building Energy Analysis Program	Calculates building operating costs using hour-by-hour methods
	Energy Accounting Program	Performs systematic tracking of energy consumption and costs in commercial buildings
	Life Cycle Economics Program	Performs multiple phased net-present-worth calculations
Eventide Clockworks, Inc. New York, NY	Specsystem 2.0	Application provides additional features for real-time spectrum analyzer
Gulf Publishing Co. Houston, TX	Finite Element-Static/CM (FE-Static/CM)	Analyzes 2-D bodies under plane stress or strain conditions to obtain static deformation and stress fields
	C-Beam	Does structural analysis of continuous supported beams; up to eight spans
	Stress/Computational Mechanics (Stress/CM)	Analyzes 2- and 3-D framed structures with varying types of joints and members to obtain shear-forces displacements and bending moments
Interlaken Technology Corp. Minneapolis, MN	CALFEX Electrical Engineering Application (EE PACK #1)	Provides a collection of electrical-engineering programs
	CALFEX + CALFEX G/T	Processes equations for engineering analysis and graphic capabilities
	CALFEX Mechanical Engineering Application (ME PACK #1)	Provides a collection of mechanical-engineering programs
John Wiley & Sons, Inc.* New York, NY	Column Design	Assists in column design according to AISC standards
	Heat Transfer Analysis	Calculates heat flow in up to ten wall layers
	Shock Absorber Analysis	Assists material-handling engineers in shock-absorber analysis
	Beam Analysis	Does 24 classical stress analyses on single-span horizontal beams with varying load and end conditions
	Steel Assembly Weight Determination	Calculates total weight in pounds of any steel structure, weldment, or assembly
	Column Buckling	Analyzes steel columns for design acceptability
	Cylinder Analysis and Selection	Assists material-handling engineers in the selection of air or hydraulic cylinders
Kelix Software Systems Baton Rouge, LA	Chemical Engineering PACK-1	Provides eight commonly encountered problems in chemical engineering
Lucasfilm Ltd. San Rafael, CA	CADroid	Designs electronics schematics for electronics designers
National Semiconductor Corp. Santa Clara, CA	PLAN (Programmable Logic Analysis by National)	Provides three programs: PLUS, Programmable Logic Utility for Selection; SERV, file SERVicing & documentation utility; PROG, equation-file reformatting and PROGramming utility
Rabalais Computing Mesa, AZ	2-D Drafting Board	Assists in production of blueprint drawings
	Electrical/Electronic Schematic Capture	Assists in production of intelligent electrical schematics
	Architect Package	Assists in production of architectural drawings
	3-D Modeling	Assists in modeling 3-D objects
	Facility Planning, Plant Layout	Assists in production of facility and plant drawings for furniture, pipes, etc.
Rune Enterprises Pacifica, CA	The Electronic PAD (People-Assisting Design)	Draws your electronic circuits and simulates circuit testing and analysis
Software Arts, Inc. Wellesley, MA	TK! Solver Pack for Mechanical Engineering	Provides templates of frequently used models in mechanical engineering
	TK! Solver	Processes general-use equations
	TK! Solver Pack for Building Design and Construction	Provides template of frequently used models in building design and construction
Solarsoft, Inc. Burlingame, CA	Daylite	Analyzes natural illumination in a building
	TSWING/SOLGAIN	Does thermal simulations, predicting temperature swings in a building
	Sunpas/Sunop	Analyzes auxiliary heating and/or cooling requirements in residential or light-commercial buildings
	F-Chart	Analyzes performance of active solar-collection systems
Spectrum Software Sunnyvale, CA	Mathematics Series	Provides four programs; Matrix, 3-D Surface Plotter, Statistical Analysis, and Numerical Analysis
	Microcomputer Circuit Analysis Program (Micro-Cap)	Combines electronic-drawing and -analysis programs in an integrated package
	Microcomputer Logic System (Micro-Logic)	Does interactive logic design and simulation
T & W Systems, Inc. Huntington Beach, CA	CADAPPLE, Version 3.0	Does general-purpose 2-D drafting
	CADAPPLE Entry Level	Scaled-down version of CADAPPLE, Version 3.0
Triple D Software Layton, UT	Fairisle Designer, Version 1.0	Designs knitting patterns
	Knitting Computer Program	Utilizes computer as a hand- or machine-knitting calculator
United Systems Software New York, NY	Apple World Enhanced	Does 3-D graphics design, enabling image rotation and projection in true perspective
West Coast Consultants Tracy, CA	Curve Three-D	Plots 3-D equations, user data, and space curves in oblique projection
	Curve Perspective Program	Plots images of arbitrary 3-D objects in perspective or orthographic projection

*Other CAD/CAM/CAE products not listed here are availale from this company.

CAD CAM CAE SOFTWARE

SYSTEM REQUIREMENTS		RAM	SPECIAL REQUIREMENTS	PRICE ($)	RS #
CP/M	II, II+, IIe, III	64K	Two disk drives	695	599
CP/M	II, II+, IIe, III	64K	Two disk drives	895	600
CP/M	II, II+, IIe, III	64K	Two disk drives	295	601
DOS 3.3	II, II+, IIe	48K	Eventide APX-252 spectrum analyzer ($595)	199	602
CP/M	II, II+, IIe, III	64K		450, 517 (export)	603
CP/M	II, II+, IIe, III	64K		495, 570 (export)	604
CP/M	II, II+, IIe, III	64K	Printer recommended	1450, 1668 (export)	605
DOS 3.3	II, II+, IIe, III	48K	CALFEX + CALFEX G/T	200	606
DOS 3.3	II, II+, IIe, III	48K		295	607
DOS 3.3	II, II+, IIe, III	48K	CALFEX + CALFEX G/T	200	608
DOS 3.3	II, II+, IIe	48K		125	609
DOS 3.3	II, II+, IIe	48K		295	610
DOS 3.3	II, II+, IIe	48K		65	611
DOS 3.3	II, II+, IIe	48K	Two disk drives	125	612
DOS 3.3	II, II+, IIe	48K		125	613
DOS 3.3	II, II+, IIe	48K		125	614
DOS 3.3	II, II+, IIe	48K		125	615
DOS 3.3	II, II+, IIe, III	48K		99	616
	Lisa			6000	617
DOS 3.3	II, II+, IIe	64K		195	618
	Mac or Lisa			150	619
	Mac or Lisa			150	620
	Mac or Lisa			150	621
	Mac or Lisa			150	622
	Mac or Lisa			150	623
	Mac or Lisa			395	624
DOS 3.3	IIe or Mac	128K	TK! Solver; 128K Extended 80-column card for IIe	100 (IIe), 59 (Mac)	625
DOS 3.3	IIe or Mac	128K	Extended 80-column card for IIe	299 (IIe), 249 (Mac)	626
DOS 3.3	IIe or Mac	128K	TK! Solver; 128K Extended 80-column card for IIe	100 (IIe), 59 (Mac)	627
	III or Lisa 7/7	128K	Two disk drives	750	628
DOS 3.3	II, II+, IIe, III	48K		400	629
DOS 3.3	II, II+, IIe, III Lisa 7/7 or Mac	64K	Two disk drives	400	630
DOS 3.3	II, II+, IIe, III	64K	Two disk drives	400	631
DOS 3.3	II, II+, IIe, IIc	48K		50	632
DOS 3.3	II, II+, IIe, IIc	64K	Two disk drives; Grappler card recommended	475	633
DOS 3.3	II, II+, IIe, IIc	64K	Two disk drives; Grappler card recommended	450	634
Pascal	II, II+, IIe	64K	Two disk drives; joystick or digitizer; and plotter or graphics printer	1795	635
Pascal	II, II+, IIe, IIc		Two disk drives; joystick, mouse, or KoalaPad; and Apple plotter	495	636
DOS 3.3	II, II+, IIe	16K		199.95	637
DOS 3.3	II, II+, IIe	16K		29.95	638
DOS 3.3	II, II+, IIe	48K		59.95	639
DOS 3.3	II, II+, IIe, IIc, III	48K	Two disk drives and graphics printer recommended	250	640
DOS 3.3	II, II+, IIe, IIc, III	48K	Two disk drives and graphics printer recommended	450	641

This chart contains a sampling of products, and the information herein is based on manufacturers' claims. For more information on the products listed above, circle the appropriate card number on the Reader Service Card in this issue.

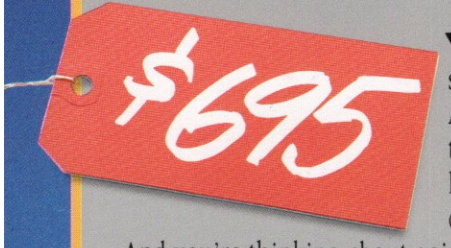
Get the **complete** modem/software package for your **Apple II, II+,** or **IIe** that includes 300 Baud **Modem card**, easy menu-driven **communications software** and a subscription to **The SOURCE.** Ask your computer dealer about the **NETWORKER™** or call us at 1-800-631-3116 and we'll tell you where to pick one up. The **NETWORKER™** modem is made in the U.S.A. by ZOOM Telephonics, Inc.

ZOOM Telephonics/207 South St./Boston, MA/02111
CIRCLE 195 ON READER SERVICE CARD

Apple® *II*+ and *II*e owners: Don't go to the computer store when you need more computer storage.

Go to the

BUY THE SIDER:™ 10 MEGABYTES OF FIRST CLASS MASS STORAGE AT A BULK RATE PRICE.



You need more storage for your Apple *II+* or *IIe* than your trusty little floppy disk drive can deliver. And you're thinking about going down to your local computer store to check out your next logical storage step: A hard disk file. Sure, you'll have to face several hard facts. One, you know it's going to cost you an arm and a leg, particularly from your computer dealer. And two, you heard that the state-of-the-Winchester-art is less than it's cracked up to be. But you and your Apple are caught between a rock and the hard facts. If you're going to compute, you've got to store, and what alternative is there to ye old computer store?

First Class Peripherals. And what an alternative we offer! Our message is a simple one: *We have the finest, easiest-to-install 10-megabyte Winchester hard disk subsystem in the industry today, bar none. And we have it, direct through the mail to you, for the best price. Period.*

The Sider: Absolutely First Class, Inside And Out.

True to our name, we simply wouldn't offer a product that wasn't first class, inside and out. And The Sider is evidence. Outside, that fact is obvious. Just take a long, lean look at it. While Apple may have written the book on micro-computing, First Class Peripherals has clearly written the bookend. The Sider's compact, smart-looking cabinetry is a true complement to the computer alongside which it works, and an unobtrusive, space-saving partner as well.

Inside, that quality look is matched by the highest quality components, from the half-height 10-megabyte Winchester, to the best-selling intelligent controller in the business, right down to the power supply. The most comprehensive component-to-component testing ensures first class reliability, day-in and day-out. And advanced internal design has allowed us to build these components into this modestly-sized casing in such a way that we've even eliminated the need for a cooling fan.

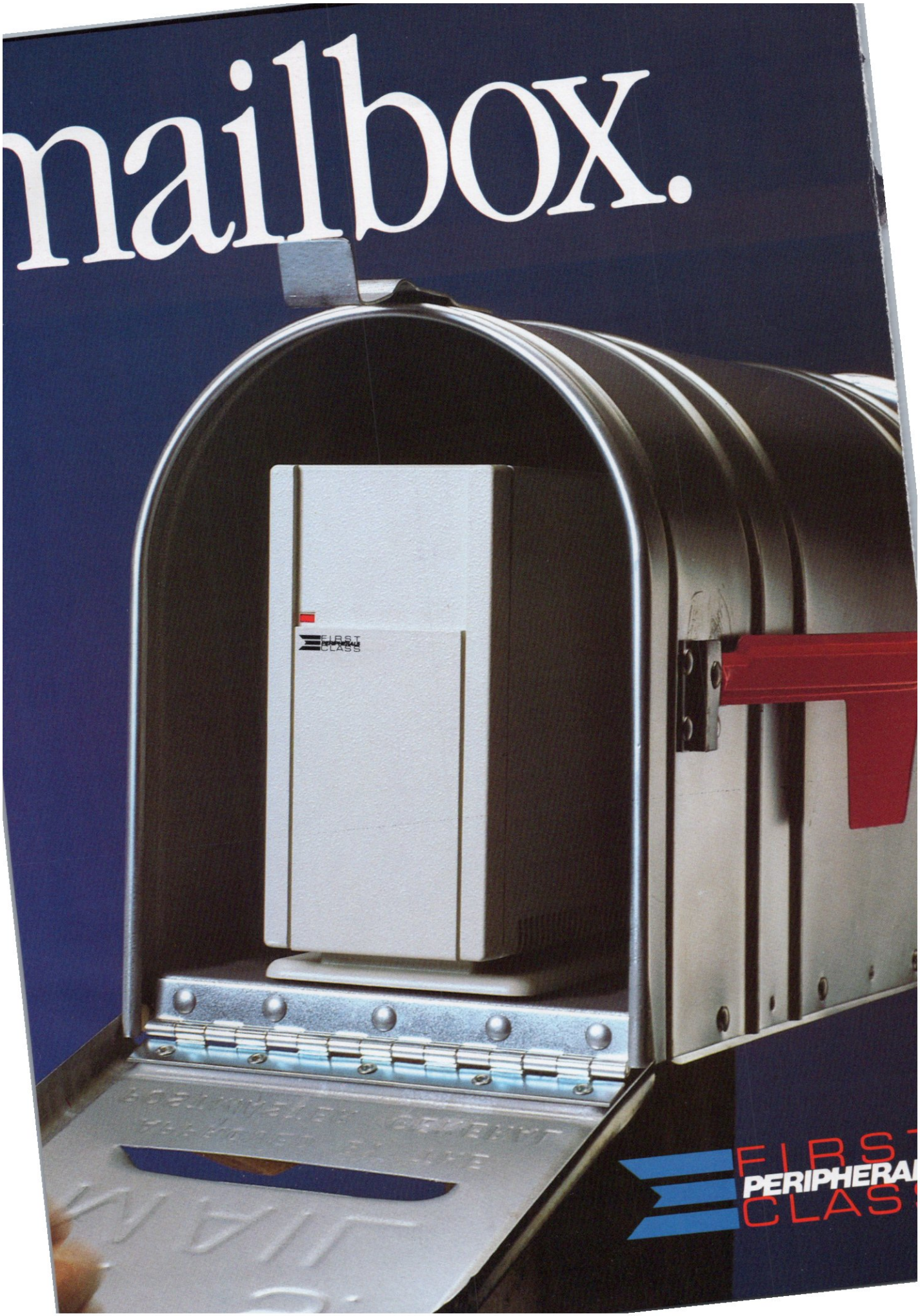
From Hotline To Swapline, A First Class Commitment To Support.

Our name is our commitment. First Class. That's why we offer a full one-year warranty on The Sider. No hassle. No nonsense. Full documentation, of course, accompanies the subsystem. A toll-free hotline is in place to answer any technical or service question you may have concerning The Sider's operation. But if there's any problem whatsoever that relates to the manufactured quality of the product, just return it for immediate replacement.

Here's A First Class Idea: Order Now. 1-800-538-1307

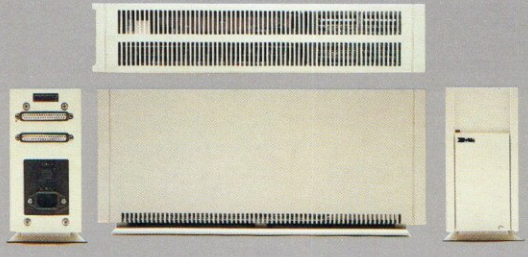
We expect The Sider to sell like crazy. Because the product is right for today's Apple *II+* and *IIe* owners. And the price is, well, the price speaks for itself. You won't find an offer like this one anywhere in the industry for a long time to come.

So, act now. Complete the order form attached to this advertisement or call our toll free number. Harness the power of your Apple to the price/performance of The Sider. What a team!


mailbox.
FIRST CLASS
FIRST
PERIPHERAL
CLASS

The Sider:
A First Class Engineering Achievement.

PUT ON YOUR SPECS AND READ OURS.



The quality of a product is often made or lost in the fine print, the nitty-gritty engineering details. That's why we're proud to say that the technical-at-heart can indeed take heart at how we put together The Sider.

Take a look at these specifications.

Operating Systems Supported
- Apple DOS 3.3; ProDOS™ 1.0; Microsoft CP/M® 2.23; PCPI™ CP/M 1.0, 1.5, 2.0; Apple Pascal 1.1, 1.2

Specifications
- Formatted Capacity: 10 MB
- Sectors/Track: 32
- Bytes/Sector: 256

AC Power Requirements
- Source: 100–126 VAC, 220–240 VAC
- Line Frequency: 50/60 Hz (±2%)
- Power Consumption: 40 W

Environmental Range
- Temperature—Operating: 10°C to 40°C; Non-Operating: −40°C to 60°C
- Relative Humidity: 20% to 80% (without condensation)
- Altitude—Operating: −300 ft. to 10,000 ft. (−91 m to 3,048 m); Non-Operating: −300 ft. to 30,000 ft. (−91 m to 9144 m)
- Shock—Operating: 5 g; Non-Operating: 40 g
- Vibration—Operating: 2 g; Non-Operating: 3 g

Physical Dimensions
- Height: 7.5 in.
- Width: 3.375 in.
- Depth: 16.0 in.
- Net Weight: 11 lbs.

Feature/Benefit Brief
- Automatic data error detection and correction for high data integrity and faster system throughput.
- Internal diagnostics for increased subsystem reliability.
- Field-proven Winchester disk technology for better data integrity.
- Small footprint for increased workspace dynamics.
- Regulatory agency approval, meeting FCC Class B requirements.
- Menu-driven installation for increased user friendliness.
- Backup and restore utility for most operating systems, by volume, by operating system, by file, and by use of wild card backup.
- Flexible partitioning for optimizing operating system file sizes.
- Built-in modular drive expansion capability.
- Direct boot from hard disk, eliminating floppy drive booting.

FIRST CLASS PERIPHERALS

First Class Peripherals
P.O. Box 6187
Lehigh Valley, PA 18001
1-800-538-1307

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PCPI is a trademark of Personal Computer Products, Inc.
The Sider is a trademark of First Class Peripherals.

▶ BOOK EXCERPT/BY PAUL FREIBERGER AND MICHAEL SWAINE

This month we are beginning a two-part series on the history of Apple Computer, Inc., excerpted and condensed from the new book *Fire in the Valley*, by Paul Freiberger and Michael Swaine, which chronicles the development of the personal-computer industry.

This installment presents the modern-day Horatio Alger story about two guys named Steve who sold a Volkswagen and two calculators to start a company that was destined to become the first corporation to make the Fortune 500 list in only five years. We follow the development of the Apple I and learn how it evolved into the Apple II, and how Apple became a major player in the personal-computer industry.

FIRE IN THE valley

The Apple I had only the essentials. It lacked a case, a keyboard, and a power supply. The hobbyist owner had to connect a transformer to it in order to get it to work. It also required laborious hand-assembly. Woz spent a lot of time helping friends implement his design.

Steve Jobs saw an opportunity in this skeletal machine. He suggested that they start a company.

MICHAEL SANCHEZ

Woz reluctantly agreed. The idea of turning his hobby into a business bothered him a little. But Jobs persisted. "Look, there's a lot of interest in what you've done at the Homebrew Computer Club," he argued. Since he wouldn't have to leave his job at Hewlett-Packard, Wozniak conceded.

The two soon sold their most valuable possessions—Jobs, his Volkswagen microbus, and Wozniak, his two HP calculators—to pay for someone to create a printed circuit board. The PC board would save them the trouble of assembling and wiring each computer—a task that was driving them to 60-hour weeks. Jobs figured they would be able to sell the boards at Homebrew.

But Jobs set out to do more than sell them to hobbyists. He also began trying to interest retailers in the Apple. At a Homebrew meeting in July 1976, Woz

The two soon sold their most valuable possessions to pay for someone to create a printed circuit board.

gave a demonstration of the Apple I. Paul Terrell, one of the industry's earliest retailers, was in attendance. Jobs gave Terrell a personal demonstration of the machine. "Take a look at this," Jobs told Terrell. "You're going to like what you see."

Jobs was right. Terrell did like the machine. He told Jobs that it showed promise and that he should keep in touch. Terrell meant what he said. The machine was interesting, but there were a lot of sharp engineers at Homebrew. This computer might be a winner, or some other machine might. If Jobs and Wozniak really had something, he figured, they'd keep in touch.

The next day Jobs appeared, barefoot, at the Byte Shop. "I'm keeping in touch," he said. Terrell was impressed by this confident perseverance. He ordered 50 Apples. Visions of wealth flashed before Jobs's eyes. But Terrell added a condition. He wanted the computers fully assembled. Woz and Jobs were back to 60-hour workweeks.

They had no parts and no money to get them with, but with a purchase order from Terrell for 50 Apple I's, Jobs and Woz were able to obtain net 30 days credit. Jobs didn't even know what net 30 days credit was at first. Terrell later received several calls from suppliers who wondered whether the long-haired kids really had the guarantee from Terrell that they claimed.

They were in business. But though they knew they could work together under time pressure, they also knew they couldn't do this task alone. The parts had to be paid for in 30 days. Thus they had to build 50 computers and deliver them to Paul Terrell in 30 days. Jobs paid his sister to plug chips into the Apple I board. He also hired Dan Kottke, who was in town for the summer from college, telling him, "You've got to come out here this summer. I'll give you a job. We've got this amazing thing called 30 days net."

Terrell got his 50 Apple I's on the 29th day. The 200 or so Apple I's that were eventually built were sold through a handful of computer stores in the Bay Area and through United Parcel from Jobs's garage for $666. Jobs ran the business.

By the end of the summer Wozniak had begun work on another computer. The Apple II would have several advantages over the Apple I. It would be a complete computer with a keyboard and power supply, BASIC, and color graphics all built into an attractive case. Jobs and Woz made provisions to sell just the circuit board to hobbyists who wanted to customize the machine. For output, the user would hook it up to a television set. They agreed it was going to be the hit of Homebrew. Jobs hoped it would have a much broader appeal.

When the features of the Apple II became clear, Woz and Jobs argued over its price. Jobs wanted to sell the board alone for $1200. Woz said that if the price were that high, he wanted nothing to do with it. They finally decided to charge $1200 for the board and the case.

Now they had at least the outline of a real commercial product, and Jobs's ambition flowered. "Steve was the hustler, entrepreneur type," said Woz. Jobs wanted to create a large company. He sought advice from Atari founder Nolan Bushnell, who introduced him to Don Valentine, a successful venture capitalist in Silicon Valley. Valentine suggested that he speak to a friend of his. Although Mike Markkula was now retired, Valentine had a hunch that this former Intel executive would be interested in Jobs and Wozniak's machine.

In 1976 A. C. "Mike" Markkula had been out of work for over a year. His unemployment was deliberate, self-imposed, and rather pleasant. Markkula had done well for himself during his tenure with two of the most successful chip manufacturers in the country: Fairchild and Intel. He was uniquely suited to the work. Though a trained

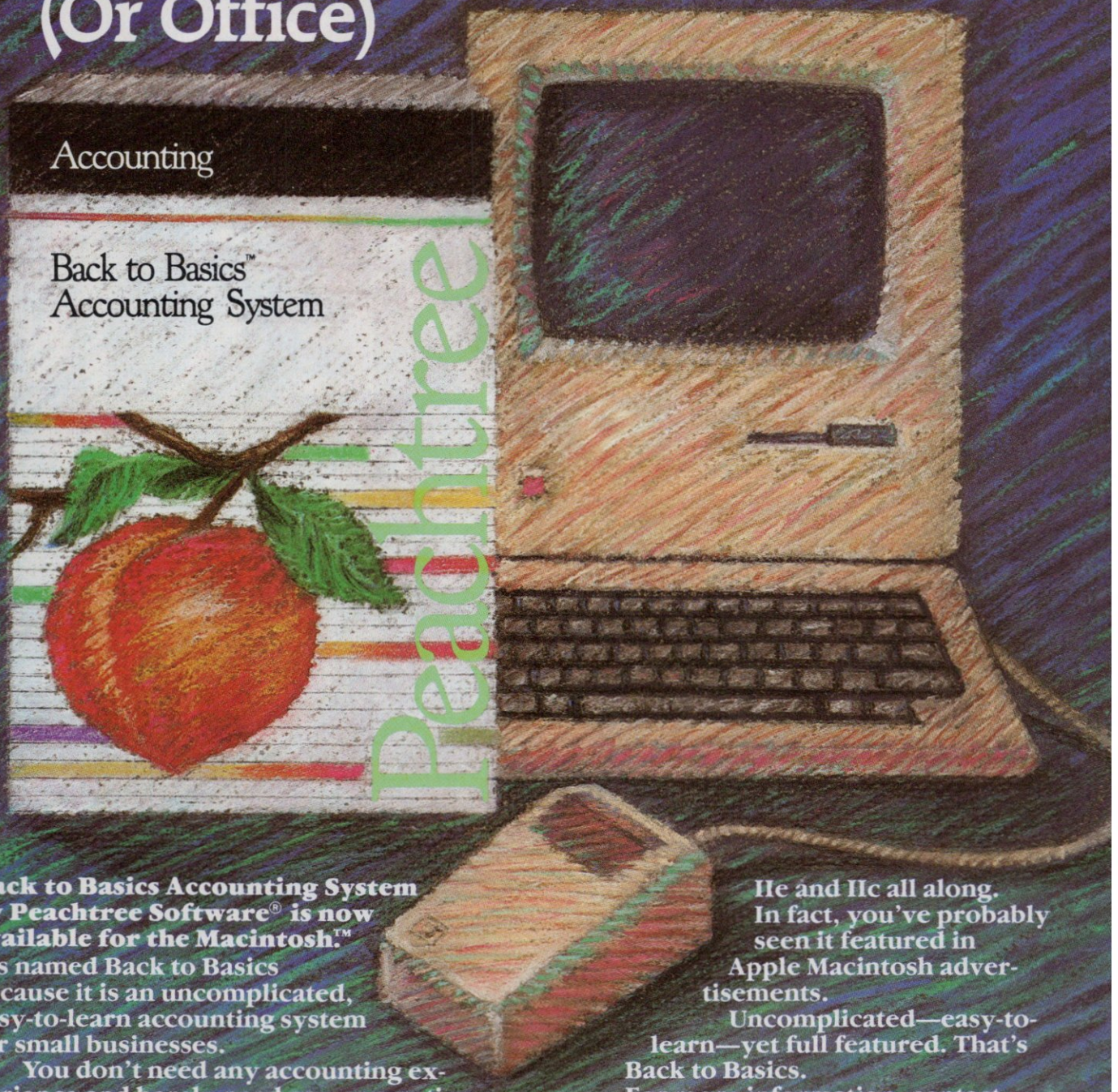
Now they had at least the outline of a real commercial product, and Jobs's ambition flowered.

electrical engineer who understood the possibilities of the microprocessor, at Intel he worked in marketing, and friends said he was a marketing wizard. He certainly loved the job. Beyond the excitement of the technology, Markkula enjoyed forging a large company in a competitive environment. Outside the hobbyist community few people understood the potential of microprocessor-based technology as well as Mike Markkula. No microcomputer company had anyone like Markkula. No microcomputer company could afford him.

In 1976 Mike Markkula had retired. Intel stock options had made him a millionaire, and he had no financial prod to work any longer. He was a dedicated family man and wanted to spend more time at home. He planned a leisurely existence, and he convinced himself that after the breakneck pace of life in the semiconductor industry, he could be happy learning to play the guitar and taking skiing vacations at his cabin near Lake Tahoe. Friends might have observed that his investments in wildcat oil wells did not bespeak a full commitment to the idle life, but Markkula was adamant. He was out of the rat race for good.

In October 1976 Markkula visited Jobs's garage. Like Terrell, he liked what he saw. He wasn't violating his resolve to stay retired, he thought. He was just giving advice to two sharp kids. One couldn't even call it business, since they couldn't afford to pay him what a consultant with his experience would normally get. But Markkula was interested in their project. It made sense to provide computing power to individuals in the home and workplace. He offered

Introducing Accounting For Those With A Mouse In The House. (Or Office)



Back to Basics Accounting System by Peachtree Software® is now available for the Macintosh.™ It's named Back to Basics because it is an uncomplicated, easy-to-learn accounting system for small businesses.

You don't need any accounting experience and barely need any computing experience. The straightforward manual teaches both accounting and computing at the same time.

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The first business accounting system for the Macintosh, Back to Basics has been enjoyed by owners of Apple® II+, IIe and IIc all along. In fact, you've probably seen it featured in Apple Macintosh advertisements.

Uncomplicated—easy-to-learn—yet full featured. That's Back to Basics.

For more information, contact your local dealer or Peachtree Software, 1-800-554-8900.

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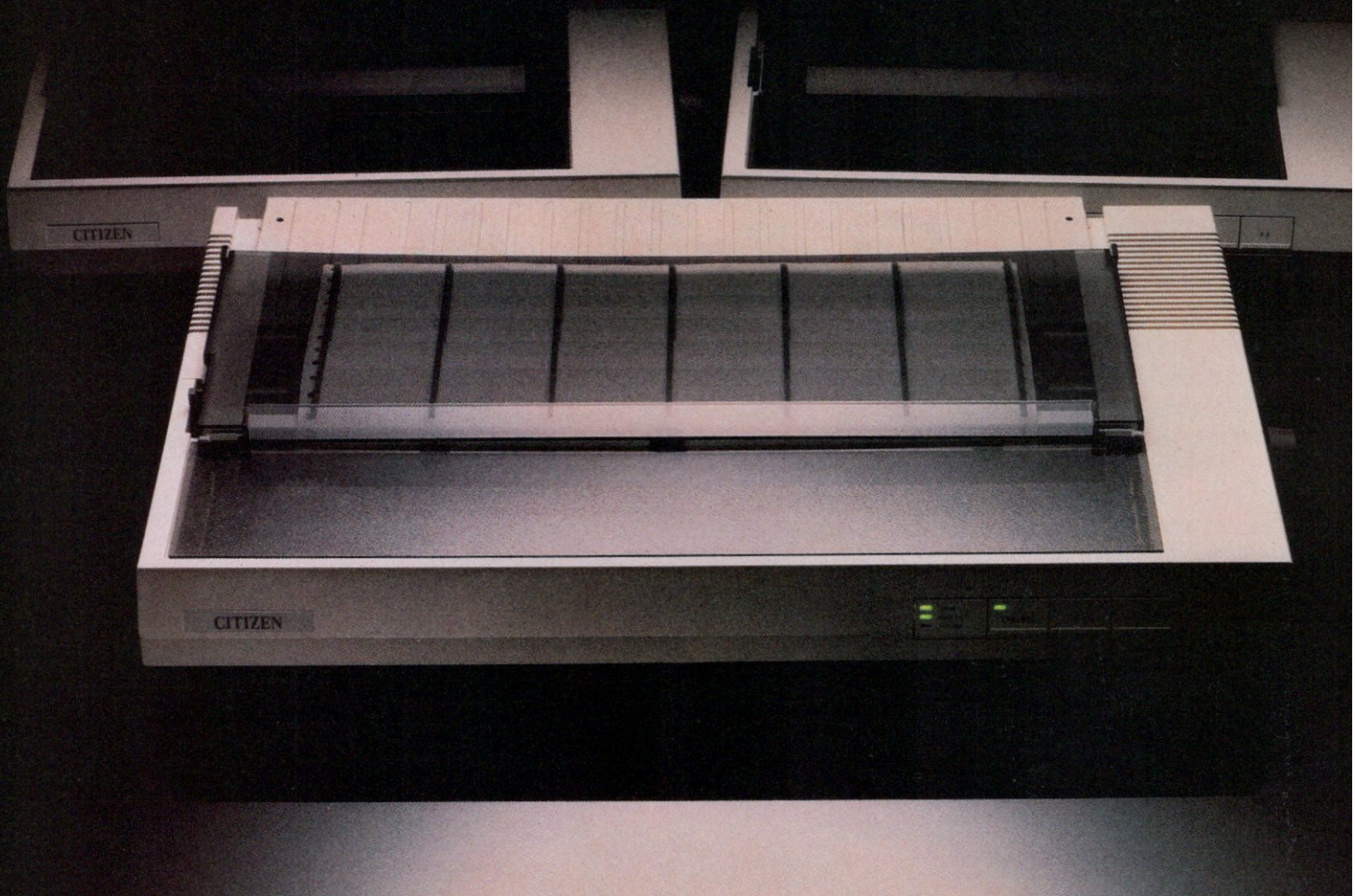

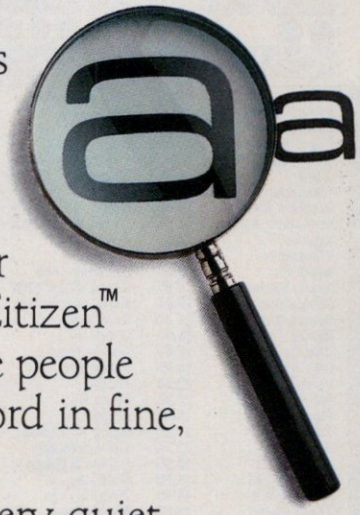

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to help the pair draw up a business plan.

Within a few months, Markkula decided to join the corporation. He assessed Jobs and Woz's equity in it at about $5000 and added $91,000 of his own money, telling the pair a one-third interest in their company was now worth that amount. Why did this 34-year-old retired executive throw in his lot with two long-haired kids in jeans? Even Markkula couldn't answer the question precisely, but by this time he had become convinced that Apple could make the Fortune 500 list in less than five years, a feat never before accomplished. The idea hooked him. He couldn't stay out.

Why did this 34-year-old retired executive throw in his lot with two long-haired kids in jeans?

Thereafter, Markkula set the tone for the company. He helped Jobs with the business plan. He obtained a line of credit for Apple at the Bank of America. He told Woz and Jobs that neither of them had the experience to run a company and hired Mike Scott as its president. Scott, known as Scotty, was a seasoned executive who had worked for Markkula in product marketing at Fairchild. He was accustomed to a traditional business environment, and for this reason would later have problems with Woz's work habits.

The first decision Markkula made was to retain the name Apple. He recognized the simple marketing advantage of being first in the phone book. He also believed that the word *Apple*, unlike the word *computer*, had a positive connotation. "Very few people don't like apples," he said. Furthermore, he liked the incongruous pairing of the words *apple* and *computer*. It would be good for name recognition, he realized.

The Evangelist

By the fall of 1976 Woz had already made progress on the design of his new computer. The Apple II would embody all the engineering savvy he could bring to it. He had made it considerably faster than the Apple I. There was a clever trick he wanted to try involving color too. The Apple II would be the computer Steve Wozniak would like to own.

As Wozniak had worried about forming his own company, he worried about working full-time for it. He always enjoyed his job at Hewlett-Packard. In particular, he admired the company's emphasis on quality design. He was having a good time. Woz had shown his Apple I design to the managers at Hewlett-Packard with the hope that he could convince the company to build it. But they told him that the Apple was not a viable product for HP. It made more sense for a start-up company to sell it. HP eventually gave Woz a release that permitted him to build the machine on his own. But Wozniak made two more attempts to join computer development projects at HP and was turned down for the project that eventually developed into the HP 75 computer and for work on a hand-held BASIC machine.

As good an engineer as he was, Woz could only work on projects that interested him, and then only for as long as they interested him. Jobs understood his friend's genius better than anyone. He constantly urged Woz on, and this pressure sometimes led to arguments.

One thing that Woz did not want to design, and perhaps could not design, was the device to connect the computer to a television set. Another was the power supply. Both devices required skill in analog electronics and differed from the digital electronics that Woz and Jobs had been working with. The internal circuitry of the computer was basically on/off: one thought of voltages as high or low, present or absent, 1 or 0. To design a power supply or send a signal to a television set, one had to consider actual voltages and interference effects. Woz didn't know or care about these things.

Again Jobs turned to one of his former superiors at Atari, Al Alcorn, for advice. Alcorn suggested that Jobs consult with Rod Holt, a sharp analog engineer at Atari.

Holt told Jobs that as an Atari engineer, he felt helping Apple represented an obvious conflict of interest. Besides, he added, he was expensive, at least $200 a day. But that didn't worry Jobs. "We can afford you," Jobs said. "Absolutely."

Holt liked the brash kid at once. Regarding the conflict of interest, Jobs told him to check with his boss and that it would be all right. "Steve is a nice guy. Help the kids out," Holt recalled Al Alcorn telling him. He started working in the evening at Atari on the televi-

sion interface and the power supply, concentrating on the latter. He also persuaded Jobs not to challenge FCC regulations by trying to build an interface for a television set. Holt knew that the FCC could cause them distress over the interface issue and told Jobs so. Jobs was frustrated at first, but then hit upon a clever way out of the problem. He made it a simple task for *others* to design the modulators to link the computer to a television set. If laws were broken or regulations bent, the malefactor wouldn't be Apple—at least technically.

Rod Holt was not the first employee Woz and Jobs hired. That honor went to the friend who had introduced them to each other several years earlier, Bill Fernandez. As a formality, Jobs gave Fernandez a test before officially hiring him. Fernandez answered a series of questions about digital electronics before going to work in Jobs's garage manufacturing the Apple I's. Fernandez practiced the Bahai faith, and he spent many hours discussing religion with Jobs in the garage.

If laws were broken or regulations bent, the malefactor wouldn't be Apple—at least technically.

Other early employees were high-school students Chris Espinosa and Randy Wigginton, Woz's friends from the Homebrew meetings. After the meetings the trio would often return to Woz's house and continue discussing means of improving the capabilities of the Apple I to turn it into something more.

Espinosa and Wigginton were hobbyists, but of a different sort than either Jobs or Woz. They had no special expertise in designing a machine. Rather, they enjoyed writing programs. When Woz brought the Apple I to Homebrew, they would quickly write some programs to demonstrate the machine to club members. Woz had built a working prototype of the Apple II by August of 1976, and he loaned one to Espinosa, who began developing games and demonstration software. By actually using the new computer, the self-confident teenager was able to suggest

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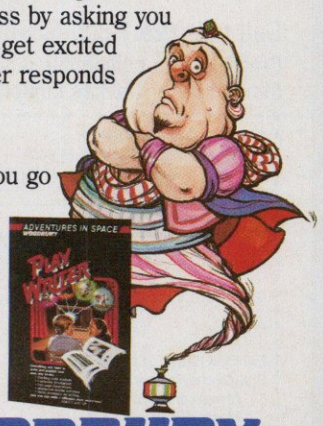

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ways to better its design.

Jobs was just then facing his biggest challenge in persuasion. By that time the company had coalesced. Markkula had agreed to join Jobs and Woz. The final obstacle was convincing Woz to leave his job at Hewlett-Packard to work full-time for Apple. Markkula would have it no other way.

In October of 1976 Woz wasn't sure he wanted to make this move. Steve

Woz had been afraid that designing computers full-time might not be as much fun as it had been in Homebrew.

Jobs was panicking. All of his carefully wrought plans depended on Woz. Then, one day in October, Woz said that he would not do it. "Steve went into fits and started crying," said Woz. But Jobs's self-control wasn't lost for long. He began lobbying with Woz's friends, having them call Woz to get him to change his mind. The effort was successful. Woz had been afraid that designing computers full-time might not be as much fun as it had been in Homebrew. Somehow his friends helped him overcome this fear. At the time Woz believed, at his most optimistic, that they would sell no more than 1000 Apple IIs.

But Jobs was more ambitious and he aggressively set out to get people who could help him—people like Regis McKenna, owner of one of the most successful public relations and advertising firms in Silicon Valley.

Jobs had already placed an ad in the computer magazine *Interface Age*. But he had also seen the Intel ads and was impressed enough to call the semiconductor company and ask who had done them. Regis McKenna, he had been told. Jobs wanted the best for Apple, and he decided that McKenna was the best. He was going to get McKenna.

McKenna's ads had indeed been very good for Intel. McKenna wore suits and had a large desk and photographs of his favorite Intel ads on his walls. He spoke softly and reflectively and appeared the antithesis of the unkempt and pushy kid who had walked into his office that afternoon in cutoffs,

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sandals, and what McKenna called a "Ho Chi Minh beard." But since McKenna normally took start-up companies as clients, Jobs's garb did not frighten him off, although he took note of it. "Inventions come from individuals," he reminded himself, "not from companies." Jobs was certainly an individual, McKenna thought.

At first McKenna turned Apple down. But Jobs had never taken rejection passively and he persisted in his efforts. "I don't deny that Woz designed a good machine," said McKenna. "But that machine would be sitting in hobby shops today were it not for Steve Jobs. Woz was fortunate to hook up with an evangelist."

McKenna eventually agreed to take Apple on, and right away his firm made two important contributions. The first was a colorful design that has served as the company logo ever since. Initially, Jobs feared that the multicolored picture of an apple wouldn't work, that the colors would run together. But when the first metallic labels arrived for the Apple II, he loved them.

McKenna also decided to run a color ad in *Playboy* magazine. It was a bold, expensive grab for publicity when a cheaper ad in *Byte* would have reached virtually all the microcomputer buyers of that time. "It was done to get national attention," said McKenna, "to popularize this idea of low-cost computers."

Other companies had been selling microcomputers for two years, but no one had yet tried to excite the general public's imagination in this way.

Other companies had been selling microcomputers for two years, but no one had yet tried to excite the general public's imagination in this way. Apple's publicity campaign resulted in articles in national publications, articles not just about Apple but about small computers generally.

By February 1977 Apple Computer had established its first office in two large rooms a few miles from Homestead High School in Cupertino. Desks were brought in, and lab benches were trundled over from Jobs's garage. The night before they were to begin working in the new suite, Woz, Jobs, Wigginton, and Espinosa sat in different parts of the 2000-square-foot office playing a game with the telephones, each trying to buzz one of the others' phones first. "We never thought that we'd grow up to be battling one-on-one with IBM," said Espinosa.

In early 1977 the young company faced more modest tasks: to finish the Apple II design by the time of Jim Warren's First West Coast Computer Faire in April and then ready it for production shortly thereafter. Markkula was already signing up distributors nationwide, many of whom were eager to work with a company that would give them greater freedom than MITS had and also functional products.

Steve Wozniak is justly credited with the technical design of the Apple I and Apple II. However, an essential contribution in making the Apple II a commercial success came from Jobs.

Most early microcomputers were far from attractive as consumer fare. Typically they were ugly, drab, blue metal boxes. Steve Jobs decided to pick up the look of the product. He covered it with a lightweight beige plastic case that brought the keyboard and computer together in a modular design. Woz could design an efficient computer, but he cheerfully admitted that he didn't care whether wires dangled from the side or not. Jobs realized that the Apple had to look presentable.

It took much travail to ready the Apple II for the West Coast Computer Faire. Woz worked, typically, day and night until it was done. Jobs made sure that it would be seen. He arranged to have the biggest and most elegant booth at the Faire. He brought in a large projection screen to demonstrate programs and placed Apple IIs on either side of the booth.

The First West Coast Computer Faire was a big success for Apple. Everyone seemed to like its computer, although *Computer Lib* author Ted Nelson complained that it displayed only uppercase letters. Jobs, Mike Scott, Chris Espinosa, and Randy Wigginton manned the booth while Mike Markkula toured the auditorium signing up dealers for the company. Woz walked around checking out other machines. He also played one of his favorite practical jokes. He decided to advertise a product that did not exist. To avoid immediate disavowals, he had

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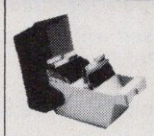

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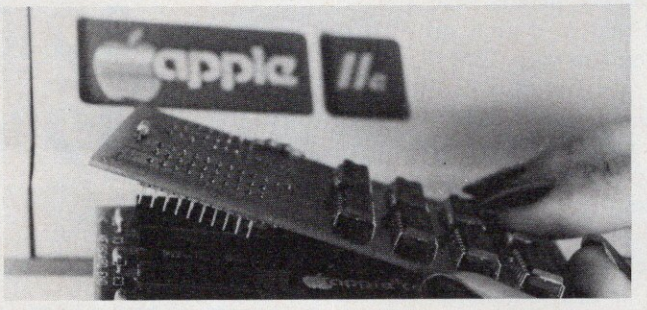

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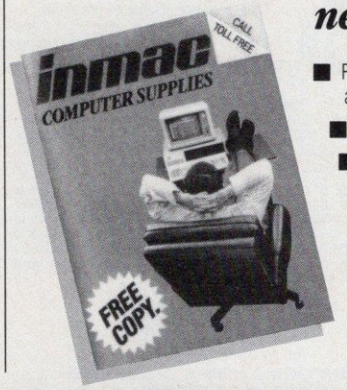

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CIRCLE 406 ON READER SERVICE CARD

to play the prank on a company not at the show. MITS was not at the show. With the help of Randy Wigginton, Woz whipped up a brochure on the "Zaltair," supposedly an enhanced Altair computer. "Imagine a dream machine. Imagine the computer surprise of the century, here today. Imagine BAZIC in ROM, the most complete and powerful language ever developed," the fake advertisements purred. Woz was satirizing marketing hype as he had learned it from Jobs. "A computer engineer's dream, all electronics are on a single PC card, even the 18-slot motherboard. And what a motherboard . . . " On the back of the brochure was a mock performance chart comparing the Zaltair to other microcomputers including the Apple. Jobs, who knew nothing of the joke, obtained one of the brochures at the show and read it in dismay. But after a quick, nervous scan of the performance chart, he looked relieved. "Hey," he said, "We came out OK on this."

Magic Times

In 1977, Apple could do no wrong. It was a magic time for the tiny company, which radiated an innocent confidence. Hobbyists praised Woz's design, dealers requested the new computer, and investors sought to sink money into the company.

Right away Woz and Jobs had offered work to their friends in the Valley. Chris Espinosa and Randy Wigginton frequently came by the Apple offices after school to help develop software for the new machine. They were paid a modest hourly wage, but mostly it was fun. They enjoyed working with Woz because he was their technical mentor, the "extremely brilliant" computer genius, according to Wigginton.

In 1977, Apple could do no wrong. It was a magic time for the tiny company.

In May Woz reviewed Wigginton's performance to see if he deserved a raise. His work was fine, but Woz—ever the stern taskmaster—demanded something more. He was irritated that he had to walk around the block to get to a nearby 7-Eleven Store. A large fence prevented his direct access. But if

Wigginton would remove a big board from below a section of the fence, Woz could pass under it and Wigginton would get his raise. The next day Woz found the board on his desk, and Wigginton started earning $3.50 an hour.

Each Tuesday and Thursday the company opened its doors to the public for a demonstration of the product. Chris Espinosa was completing his final semester at Homestead High. Each Tuesday and Thursday he drove his moped, the "first sign of [his] entering the business world," to the Apple offices and supervised the demos. Once when representatives of the Bank of America came by, Espinosa acted quickly to remove "OH SHIT" from Woz's *Breakout* game and replace it with "THAT'S TERRIBLE." Though boyish in appearance, Espinosa had a serious, responsible, scholarly air that impressed everyone. Jobs and Markkula were thankful that he kept the visitors engaged so they could attend to the more important task of signing up new dealers. "For about six months I was the sole means by which people off the street in the Bay Area would learn about Apple Computer," Espinosa said.

But there were also indications that Apple meant business. Markkula and Scott were growing tired of the youthful crowd that frequently dropped in to check out Woz's progress. Alan Baum, a close friend of Wozniak's from Hewlett-Packard, had even contributed ideas to the design. But Mike Scott finally decreed that some confidentiality was essential. Scott felt obliged to instill a professional atmosphere at Apple. Baum visited less and less frequently as the year wore on.

On the other hand, Scott appreciated the contributions of some of the youthful employees. He convinced Randy Wigginton to stay by offering to have Apple pay for his college education.

Mike Scott was a complex individual who was vital to Apple's success. Scott was not a smooth-talking, dapper individual like Mike Markkula. His management style was less formal, more abrupt. He liked to stroll through the company and chat with employees. He often alluded to his role in maritime metaphors. He was a ship captain, standing at the helm. "Welcome aboard," he would say to a new employee. Scott didn't hide his moods. When he was happy, he would make other employees happy too. Around Christmas time in Apple's first year, he dressed up in a Santa Claus suit and walked through the company handing out presents. But if he was displeased with someone's performance, he could let that person know it.

Scotty's bedrock goal was a desire to build a big company. But he could be flamboyant too. According to Rod Holt he had a "slush fund" for special expenses, such as an enormous hot air balloon and a large sail for Holt's yacht, each beautifully decorated with Apple's logo.

Scott quickly grew impatient when projects were delayed. At least once Woz's generosity to his friends caused friction with Scotty, who was less tolerant than Markkula of corporate eccentricity. He couldn't understand Wozniak's irregular work habits, which swung from total dedication to headstrong avoidance, depending on his interest in the task at hand. Scotty also failed to understand some of Woz's friends.

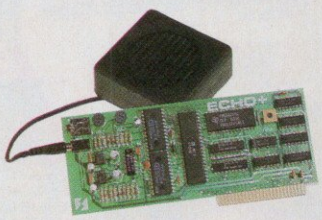
'Scotty could fire anybody. All he needed was one excuse.'

Woz had kept in touch with John Draper. In the fall of 1977 Draper was visiting Woz at Apple and expressed interest in helping design a digital telephone card for the Apple. No one understood telephone lines better than Captain Crunch. Scott had granted Woz a separate office in which to work, hoping that it might encourage his creativity. John Draper went to work there too. But many of the other employees disliked Draper. He was an awkward young man with strange interests, and he made them feel uncomfortable.

Draper and Woz constructed a device that could, among other things, dial numbers automatically and function much like a telephone answering machine. But Draper also built a blue box capability into the card. The cards were powerful. According to Espinosa, a network of a dozen Apples equipped with Draper's cards could bring down the nation's entire phone system. When Scott learned that the device could be used illegally, he stalked the deck in rage. The phone card didn't last long after that, although, without Draper's knowledge, modifications were being designed into the card by other engineers to nullify most of its phone

This

Plus This



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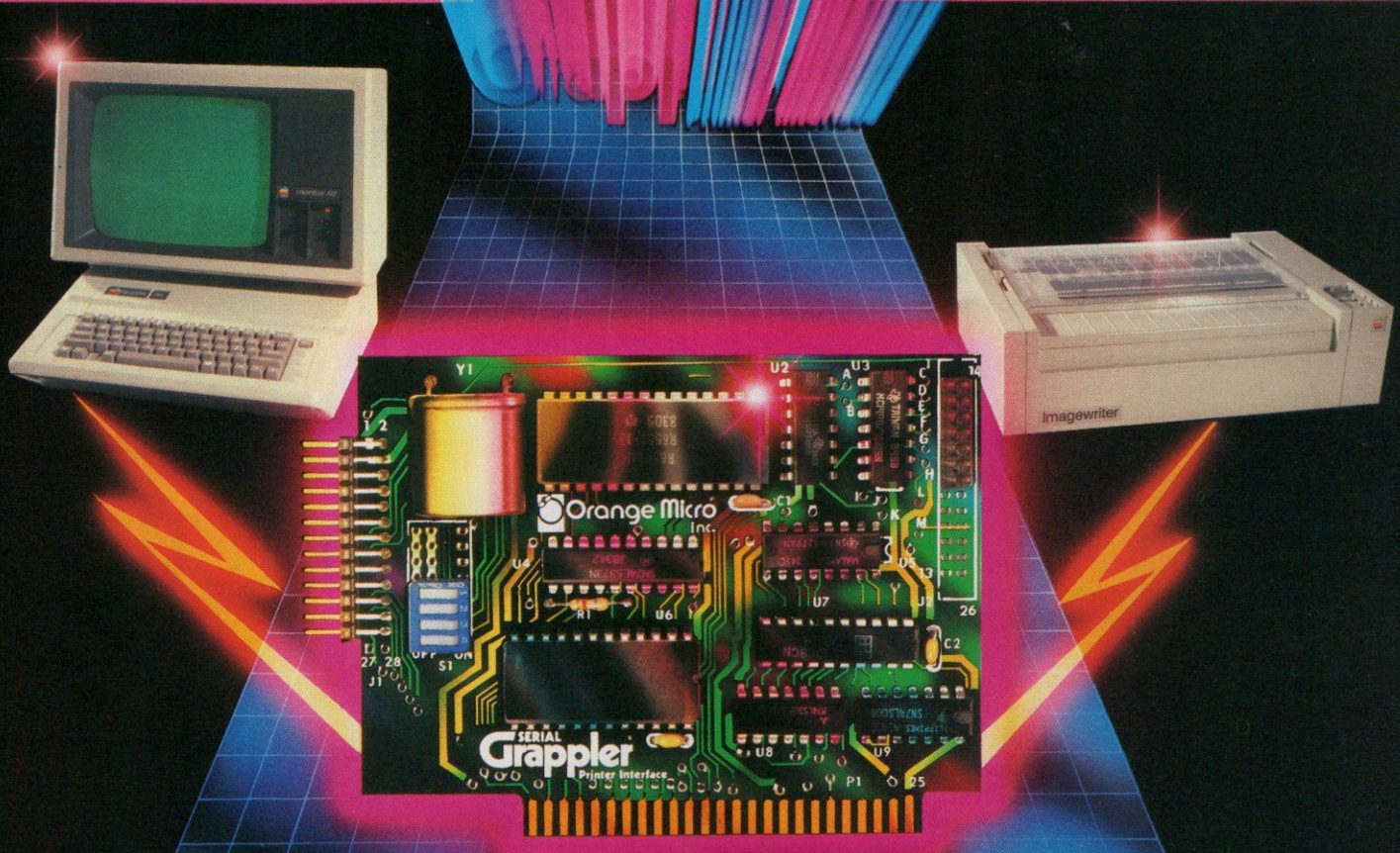

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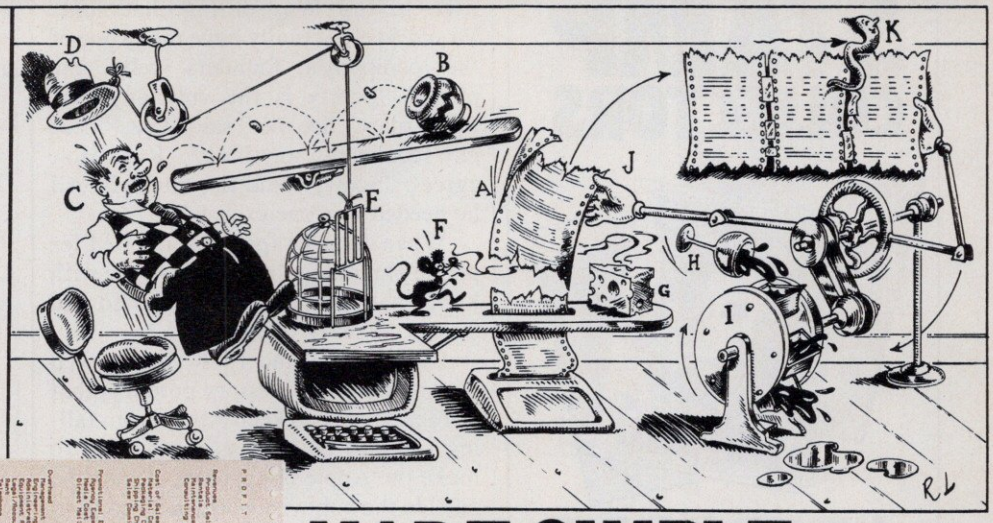
SIMPLIFIED SPREADSHEET ASSEMBLY

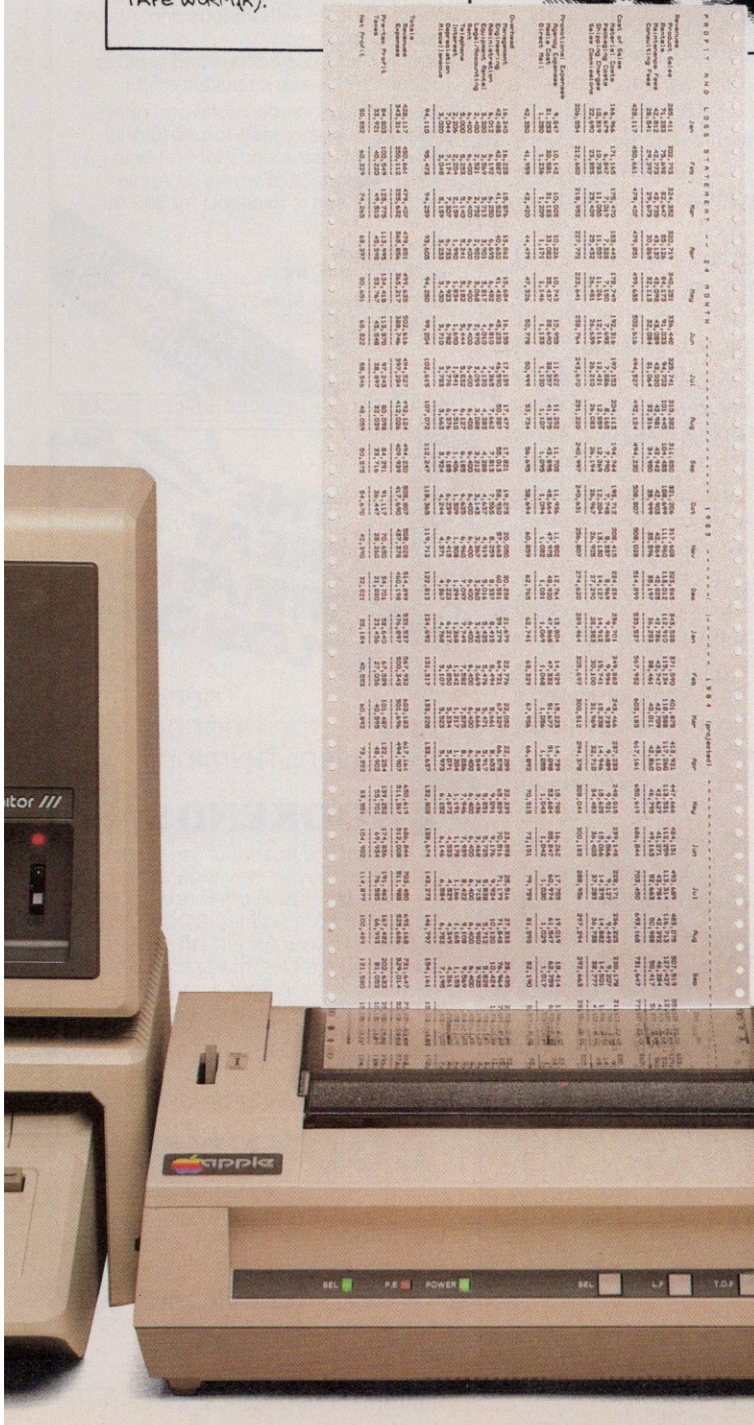
RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOBULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).





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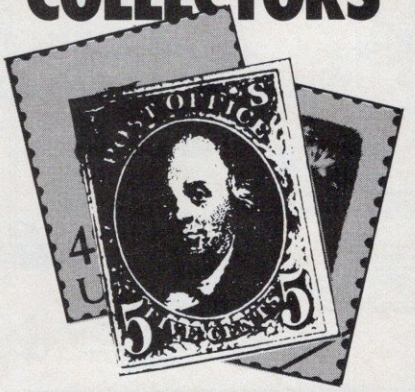

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phreak capabilities. According to one Apple board member, Scott almost tried to fire Woz during that time. Would Scott actually have made one of the company's founders walk the plank? "Scotty is the only guy that could [dare] fire me," said Woz. "That guy could do anything." Rod Holt agrees: "Scotty could fire anybody. All he needed was one excuse."

When John Draper was arrested for phone phreaking, he had an Apple with him. The machine was confiscated and Scotty cursed Woz again.

During 1977 and 1978 Woz worked on a number of accessory products that were necessary to keep Apple from falling to earth as soon as it ripened. To make the Apple II appeal to customers outside the hobbyist world, add-on peripherals were needed so the machine could work with different kinds of printers and connect with the modems that allowed users to transfer information from one machine to another over a telephone line.

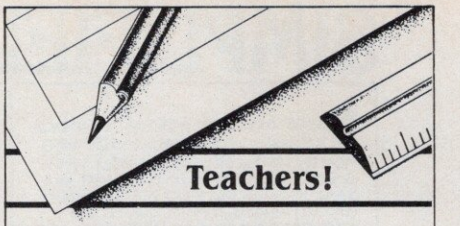
Business was promising. More and more dealers signed on, and Apple began manufacturing the Apple II. By the end of 1977 the company was making a profit and doubling production every three to four months. An article in *Byte* popularized the Apple II further. Mike Markkula had also attracted investment capital from the successful New York-based firm of Venrock Associates, a firm formed by the Rockefeller family to invest in high-tech enterprises.

By year's end the company moved into a larger office on nearby Bandley Drive in Cupertino. The structure was huge, and it gave the Apple employees a feeling that the firm was going to get big. They were right. Apple soon outgrew the building and added another on the same street.

Perhaps the most significant accomplishment of this time came out of Woz's 1977 Christmas vacation. ✚

Freiberger and Swaine are both veteran technology writers who formerly covered the microcomputer beat for InfoWorld. *Freiberger is now an editor of* Popular Computing, *and Swaine is editor-in-chief of* Dr. Dobb's Journal.

Next month we will pick up their story with Wozniak's amazing Christmas-vacation effort that resulted in the Apple Disk II, a burst of genius that gave Apple a real boost in the industry. Part II will take us from the heights of Woz's Disk II to the lows of the Apple III fiasco and finish with Apple's great hope, the Macintosh.



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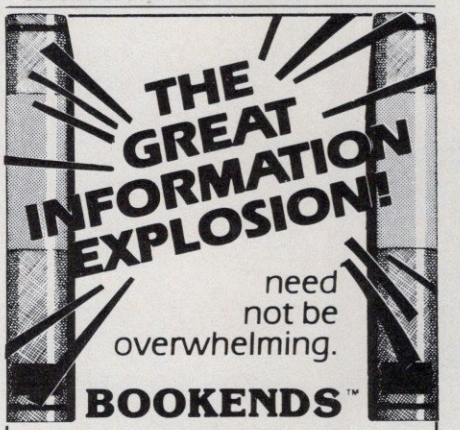

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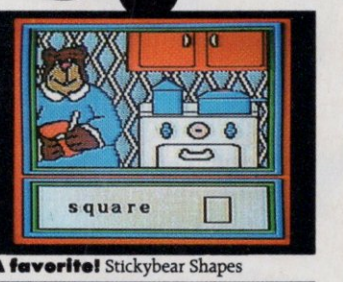

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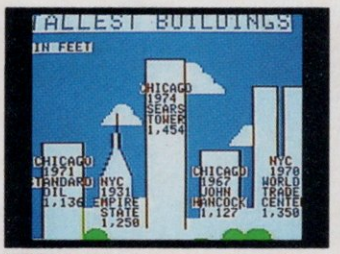

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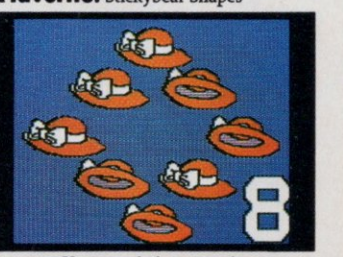

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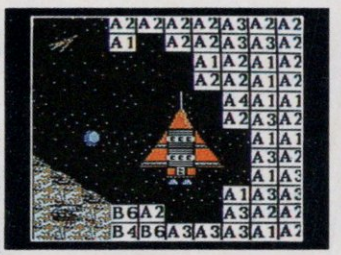

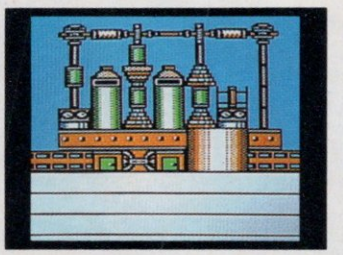

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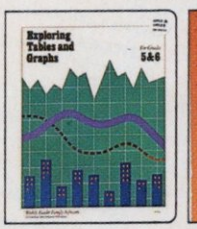

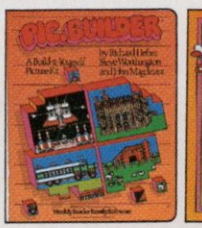

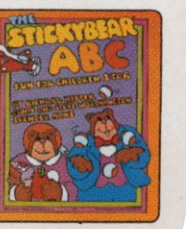

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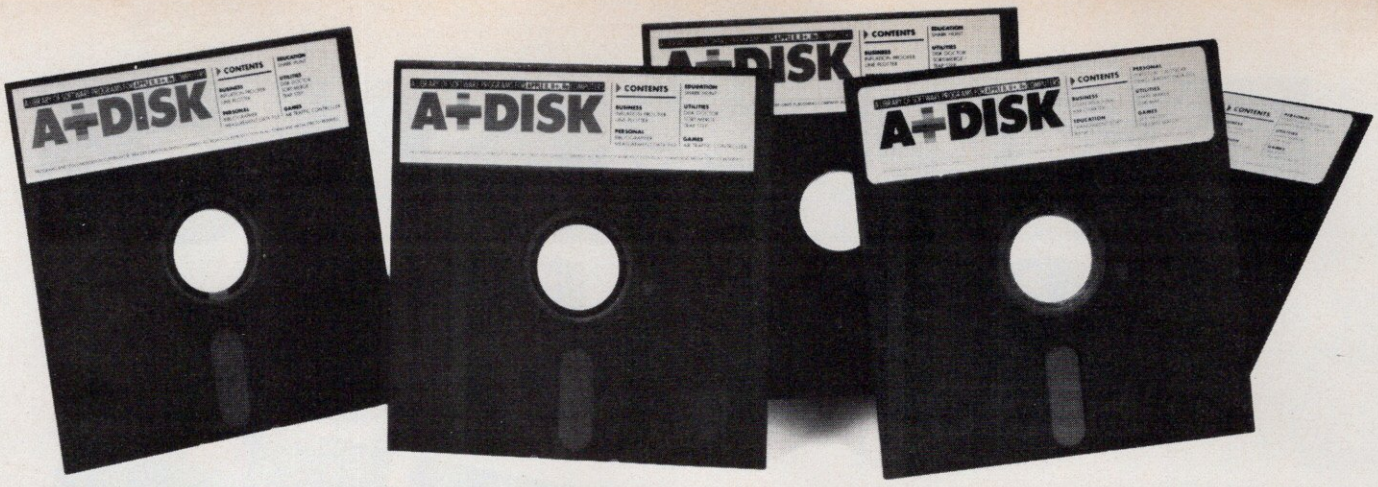

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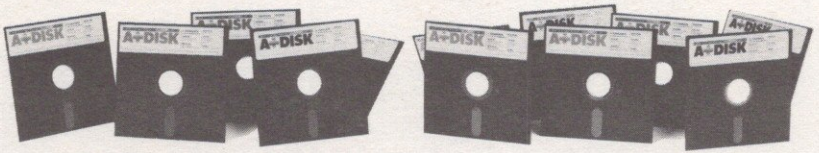

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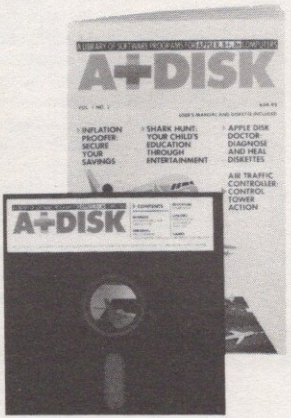

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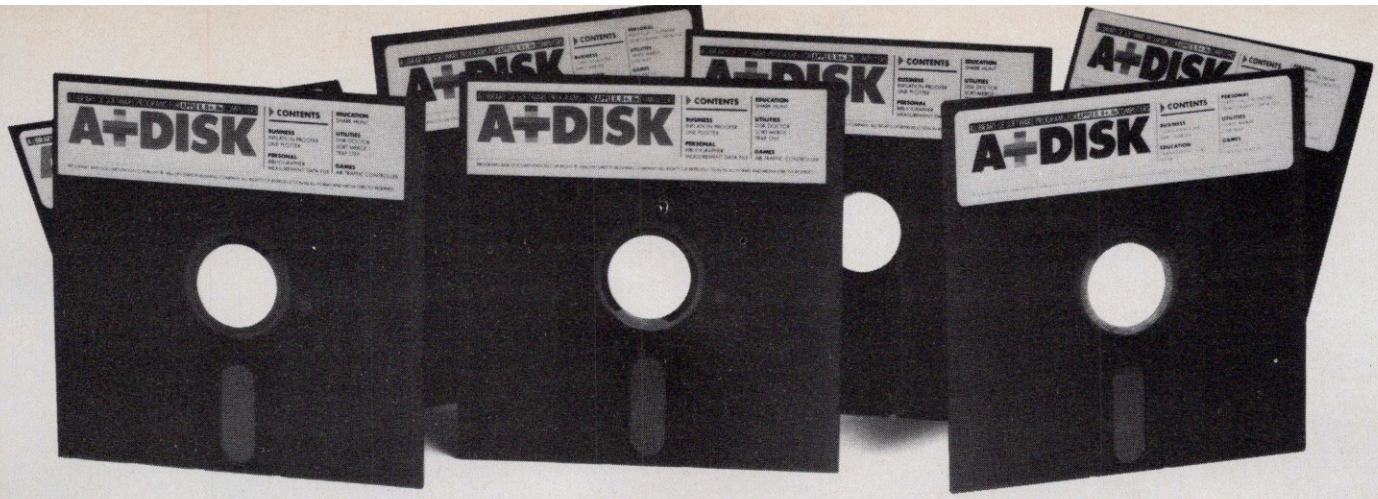

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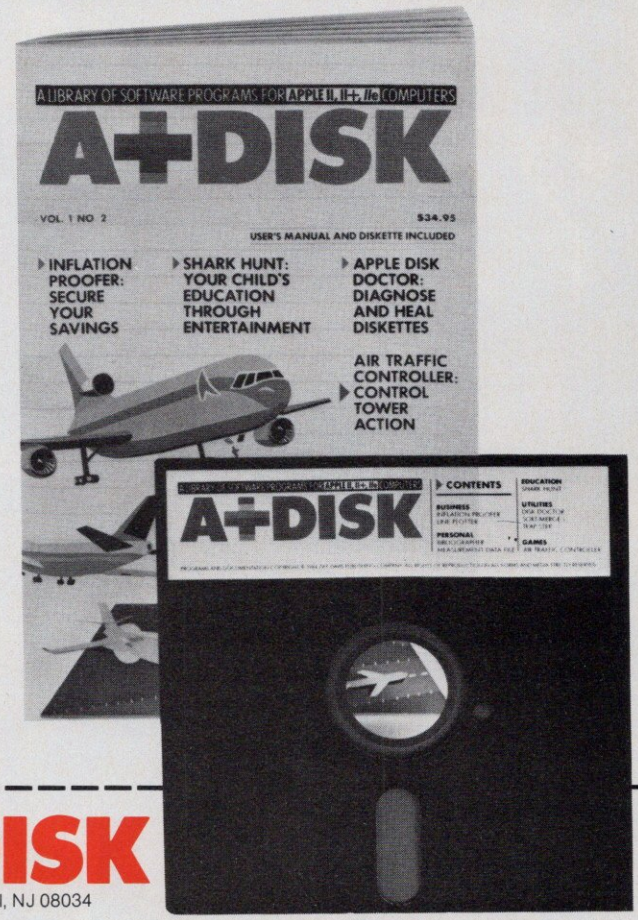

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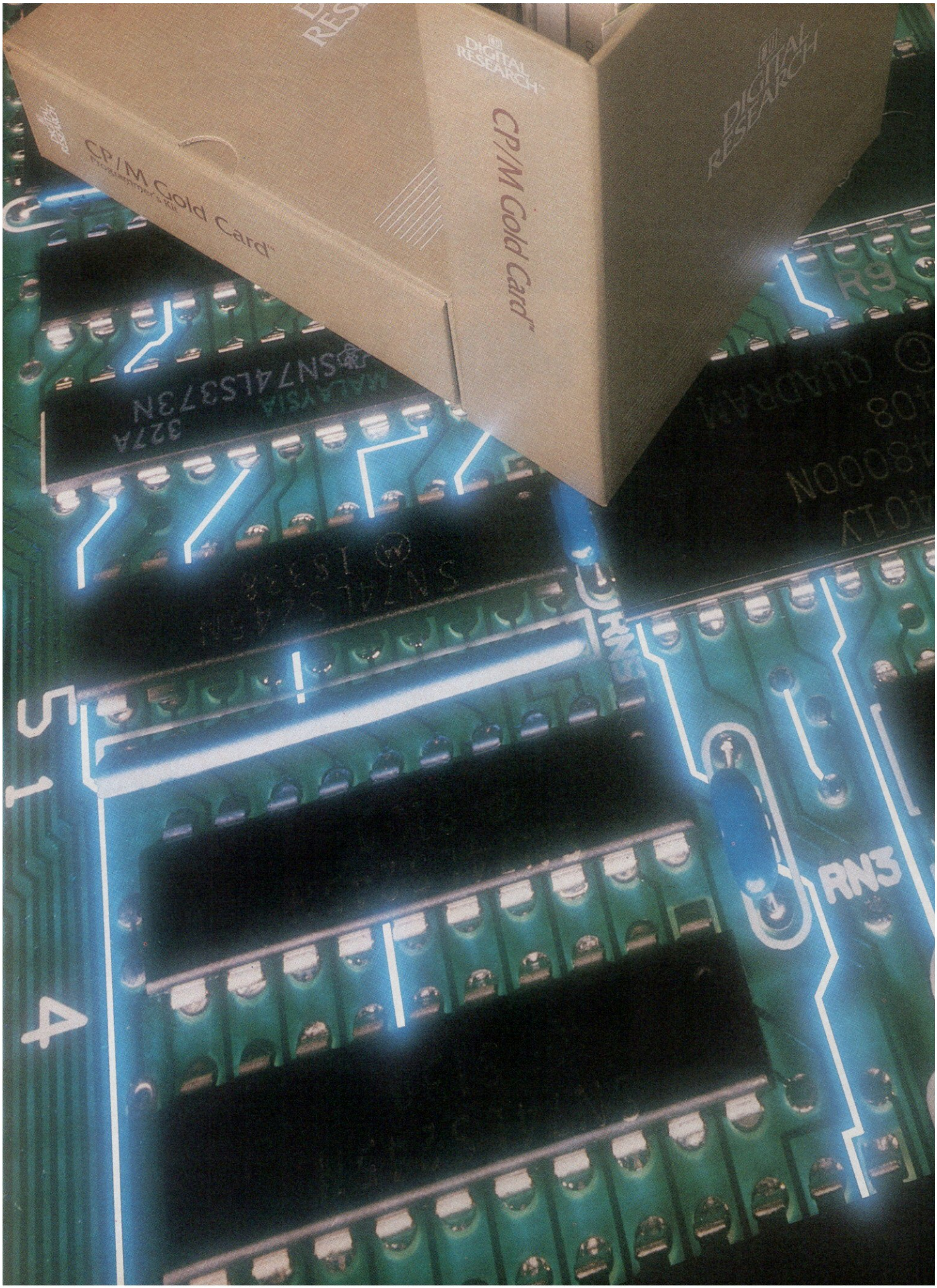
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DIGITAL RESEARCH GOES FOR THE GOLD

CP/M GOLD CARD WITH CP/M PLUS

Seven years is a long time in the life of any small computer, but the Apple IIs are a hardy bunch, and they have proven to be the most durable and flexible of all microcomputers. One proof is that designers continue to come up with new peripherals to dress up the IIs' output and increase their processing power.

Among the more recent enhancements is the Gold Card from Digital Research, a hardware/software package that includes a high-speed Z80 processor, a built-in 80-column card, high-speed RAM, extensive documentation, CP/M versions 2.2 and 3.0, and the CBASIC programming language. The Gold Card comes in two configurations (64K RAM nonbanked and 192K RAM banked) and lends to the Apple II, II Plus, and IIe a degree of flexibility most people associate only with computers of more recent vintage.

The existence of more than 5000 CP/M programs, including such popular packages as WordStar, SuperCalc, and dBASE II, has resulted in a market rife with hundreds of dedicated CP/M machines and models equipped with a Z80 microprocessor. More people are now running CP/M on Apple IIs (and compatibles) than on any other computer, however.

CP/M did not become popular among Apple users overnight. One reason why many early Apple users were slow in adopting the Microsoft CP/M card was the cost. In addition to the $300 CP/M card, the system also required an 80-column card, 48K of RAM (preferably 64K), a monitor capable of displaying 80 columns (many people were using their television sets with an RF modulator), and two disk drives (most systems had only one disk drive or a cassette). Remember, Apple drives cost $500 in the early days. Finally, transforming an Apple into a business-oriented system made little sense unless you also had a printer—you didn't get much of a printer for under $800 back then. Thus, at 1980 prices, the cost of adding CP/M could run as high as $2000.

A Range of Choices

Microsoft's Z80 Softcard no longer has the market cornered; now a plethora of CP/M and 80-column cards is available at prices as low as $50 each (not including software). Such inexpensive CP/M boards may perform as well as the old Microsoft card, but they are a far cry from the newer, more expensive models, which are both faster and more powerful. The software has changed, too. As microcomputers have proliferated and designers have taken them down mutually incompatible paths, Digital Research, the creator of CP/M, has developed several varieties of the operating system to suit new generations of processors; the most widespread is CP/M-80, the version tailored to Apples and other 8-bit machines. Version 2.2 of CP/M-80 continues to predominate, but with hardware advances and increased memory limits, using CP/M 2.2 becomes tantamount to occupying a mere two rooms in an otherwise empty mansion. To keep up with the changing technology, Digital Research introduced CP/M 3.0, also known as CP/M Plus.

OVER 5000 CP/M PROGRAMS ARE ON THE MARKET, AND MORE PEOPLE RUN THEM ON APPLE IIs AND COMPATIBLES THAN ON ANY OTHER COMPUTER.

The Digital Research Gold Card package reflects both the hardware and software advances. After all, CP/M belongs to Digital Research, so it stands to reason that the company designed its first CP/M card to take full advantage of one of the latest editions of its software.

All That Glitters. . .

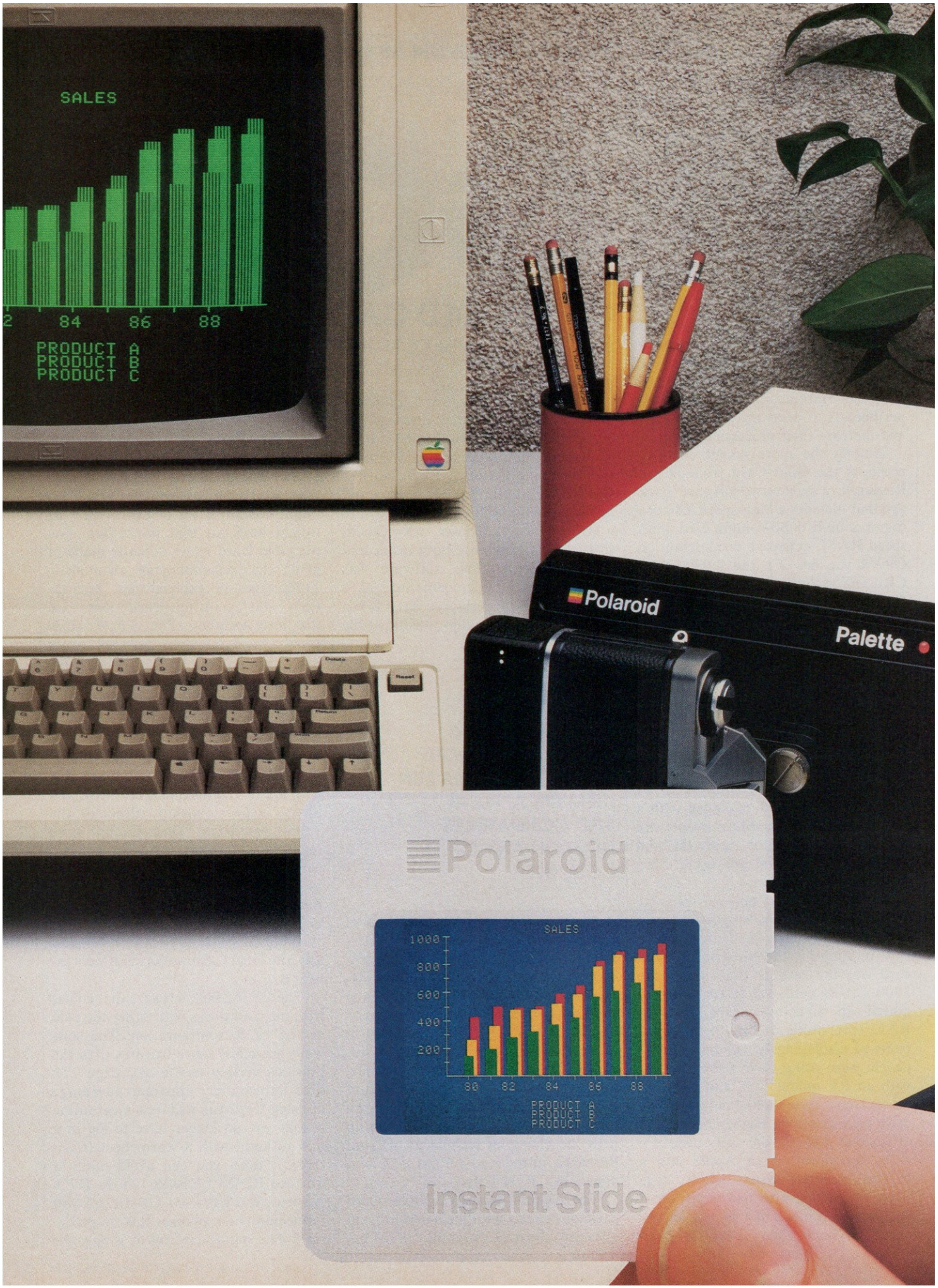
When the card was delivered to me, I first thought there had been a mistake. The huge box looked more like it might contain a set of dishes, and its weight bore out that impression. No, the Gold Card is not actually made of gold; the accompanying manuals—1100 pages of explanations, descriptions, and operating instructions—are the heavyweights. The *CP/M Gold Card User's Guide* is only 44 pages long, the *CP/M Plus User's Guide* takes up 263, and the *CBASIC Reference Manual* comprises 176 pages. The rest, a separate three-ring binder, is strictly for programmers.

The Software

The card I received for review came with the full complement of RAM, and it was easy to install, although the 128K piggyback "Disk Cache" card makes it a tight squeeze when another card resides in the higher adjoining slot. Slot 8 is, therefore, the best bet. Digital Research advertises that the card works in any slot of the Apple II, but the manual specifies slots 4 or 7. Actually, the Gold Card works in all slots except 0.

The CP/M Plus software that comes with the card works with either the 64K or the 192K configuration. The software has many more features than the previous version (see chart, page 77). One immediately apparent advantage of using CP/M in its latest incarnation is that you no longer have to log in a new diskette with a warm boot (Control-C); thus, you can avoid many a dreaded BDOS ERROR ON X: R/O. Anyone who has used CP/M 2.2 will immediately recognize this improvement as a major one, and it is only the

DAVID BISHOP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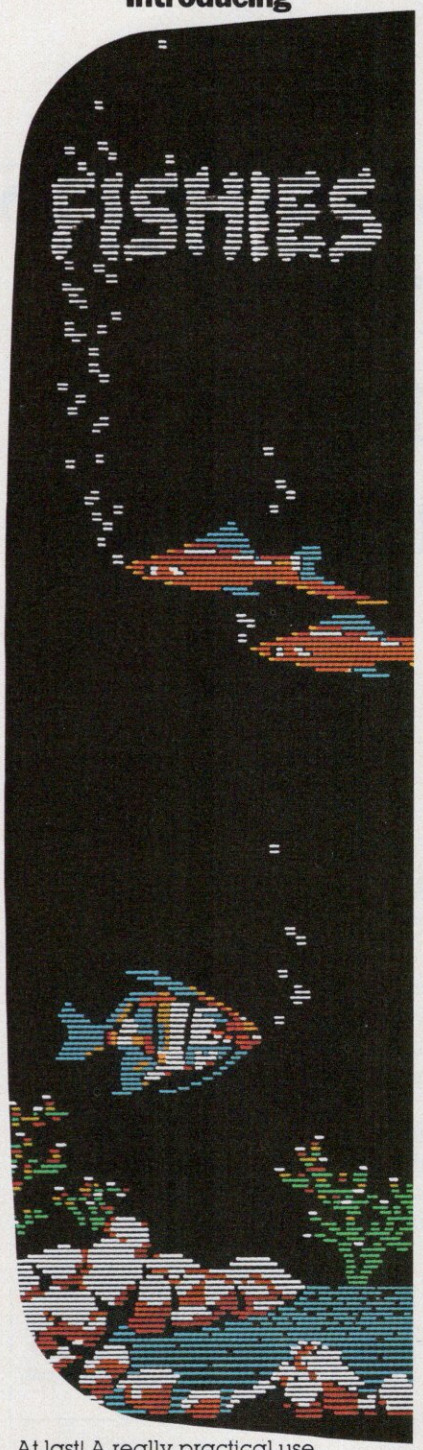

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beginning. CP/M Plus also takes advantage of the Gold Card's on-board real-time clock interrupt. Unlike battery-powered clocks, it has to be set each time you turn on the computer, but it keeps time well. Entering DATE produces the date and time in the format Fri 06/22/84 23:04:25, and DATE C keeps the clock display running until you press any key.

I ran it for close to five hours without losing more than five seconds. Being able to produce the date and time on the screen is fine, but the practical application of this feature uses CP/M Plus' ability to label files in a directory with the date and time. This function is useful for determining when a file was last updated.

Owners of Apple II and II Plus machines will welcome Newkey, a command that lets you temporarily redefine the keyboard. The Apple IIe is equipped with an adequate keyboard, but it is no secret that the Apple II and II Plus keyboards leave much to be desired. The Newkey command remedies some of the shortcomings by letting you redefine any key with a simple data file.

The supplied utilities disk contains the Newkey command file and two sample data files—one with a definition called WORDSTAR.KEY and one with a definition called NORMAL.KEY. The former redefines keys specifically for use with WordStar, and invoking the latter returns the default setting. You can write your own definitions, too (using the CP/M line editor—ED.COM—or your word-processing program), and save them on a disk containing the program to which they apply. The manual is too general to deal with this Apple II-specific solution, but the disk contains a help file that lives up to its name. One use of Newkey is to move it and the two sample files, WORDSTAR.KEY and NORMAL.KEY, to a disk containing WordStar and then save the following batch file as WST.SUB:

```
NEWKEY WORDSTAR.KEY
WS
NEWKEY NORMAL.KEY
```

Entering the command WST invokes the built-in batch processor, with the following results:

1. Keys are redefined for WordStar.
2. WordStar is activated.
3. Keys return to default (normal) values on termination of WordStar.

If you get a 64K version of the Gold Card, you can later upgrade it to a capacity of 192K RAM with a Disk Cache piggyback card. It sells for $325 and uses a 192K systems disk that accompanies the 64K version of the card. The main board is the same for the 64K and 192K configurations, so even if you start with the 64K version, you get the advantages of a system-clock speed of 6 MHz, as opposed to the Softcard's 2 MHz. As the comparison chart on page 77 shows, however, the added RAM gives the 192K version some significant additional advantages.

Speeding Up

If you have ever used a pseudodisk, you know that zipping from one place to another is a breeze when your text or data is in RAM; the fully equipped Gold Card works the same way. For instance, scrolling one screen at a time (using Control-C), I moved from the top of a ten-page WordStar file to the bottom. In the process, WordStar accessed the default disk about a dozen times, but the text was simultaneously being loaded into the Gold Card's RAM, so when I scrolled back to the top of my file, the process took no measurable time, and the disk did not have to be accessed at all. From then on, find-and-replace functions were almost instantaneous.

Considering its speed, the built-in 80-column-display generator, and the advantages of being able to run CP/M Plus, the 64K Gold Card is a vast improvement over the old Z80 Softcard, but it also has the edge when you compare it to the newer generation of CP/M cards. Other new cards have similar features (see "Comparing CP/M Cards," *A+*, March 1984, page 51), but only the Gold Card has up to 192K of TPA (transient-program area), the region of memory where transient programs execute; a full 80-column video-display generator; compatibility with Apple II, II Plus, and IIe; and CP/M Plus.

Now, not all that is gold glitters. For example, you will not be able to use the Gold Card's 80-column-display generator or the extra RAM in DOS. This limitation may not matter to you now, but as more and more advanced programs are written for ProDOS, having all that memory available on the board and not being able to access it will be wasteful, and having two 80-column generators will seem unnecessarily redundant.

Then, too, I was alarmed by the heat this card generates; it is worse than the first Videx card, and that was almost bad enough to make the chips flee from their sockets. If your Apple is already

COMPARE THE WARE

HARDWARE SUPPORTED	CP/M 2.2 non-banked system	CP/M Plus non-banked system	CP/M Plus banked system
8080, Z-80®, or equivalent	■	■	■
Banked RAM			■
Minimum RAM	20K	64K	96K
TPA size (assuming 2K BIOS)	58K	54K	62K
Maximum number of drives	16	16	16
Maximum capacity per drive (in Mb)	8	512	512
Maximum file size (in Mb)	8	32	32
PERFORMANCE			
Hashed directory access		■	■
LRU record buffering			■
Multi-sector disk reads and writes		■	■
OS reloaded on warm boot	■		
USER INTERFACE			
Time and date stamps on files		■	■
Automatic diskette login		■	■
HELP facility		■	■
System utilities prompt for missing arguments		■	■
Console I/O redirection		■	■
User profile initiated at system boot		■	■
Multiple system commands on one line		■	■
Line editing of console buffer input			■
Multiple drive file searches		■	■
System files on USER 0 available to all USER #'s		■	■
APPLICATION PROGRAM INTERFACE			
Application program may trap system errors		■	■
Drive free space system function		■	■
Truncate file system function		■	■
Program chain system function		■	■
Time and date accessible through system function		■	■
Direct BIOS calls through system function		■	■
Program and overlay loading as system function		■	■
System Control Block		■	■
I/O Byte	■		
Multiple device input and output		■	■
Resident System Extensions		■	■
FILE SYSTEM COMPATIBILITY			
CP/M 2.2 files	■	■	■
MP/M II file password protection			■
SYSTEM IMPLEMENTATION			
Blocking and deblocking code in BIOS	■		
Linkable BIOS		■	■
System generation utility		■	■

Comparison Chart courtesy of Digital Research, Inc.

crowded inside, don't add the Gold Card without having a good fan. Since I had no intention of moving my Apple II Plus around, I overcame the heat problem by adding a fan and placing the power supply on the outside.

Is It for You?

So who should buy the Gold Card? I found the Gold Card's performance impressive, and everything I tried worked as advertised, but, with Z80 cards selling for as little as $50 (without software) and older cards already installed in so many Apple II, II Plus, and IIe machines, owners may find it difficult to justify spending $775 or $495 for the Gold Card.

Granted, these are the list prices set by Digital Research, and many of us have developed an aversion to paying the manufacturer's suggested list price for peripherals when there are attractive alternatives. Discounted or not, the Gold Card will probably remain relatively high-priced, but the price is right if the card is not duplicating something you already have and if you really want to turn your Apple II, II Plus, or IIe into a serious tool. Also, if you are using your computer for a task that makes heavy use of the processor, the Gold Card will provide a dramatic increase in the speed of the computer's operation.

I have barely touched the surface in describing the advantages of CP/M Plus over version 2.2, but although I still am not sure that the Gold Card is the best hardware to get, I can vouch for the software. +

PRODUCT INFORMATION

CP/M Gold Card
Digital Research, Inc.
160 Central Avenue
Pacific Grove, CA 93950
(408) 649-3896

List Price: 64K version, $495; assembled 192K version, $775; Disk Cache 128K add-on board for 64K version, $325

Requires: Apple II, II Plus, or IIe with at least 48K RAM and two disk drives; monitor capable of 80-column display

Features: 6-MHz Z80B microprocessor; 64K or 192K RAM; on-board 80-column-video-display generator

Software: CP/M 3.0 (64K and 192K system disks); CP/M System Utilities; CP/M Assembler Plus Tools; Digital Research CBASIC Compiler and Interpreter

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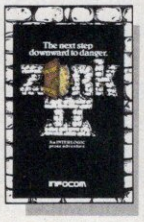
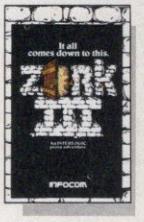
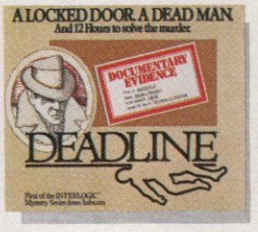
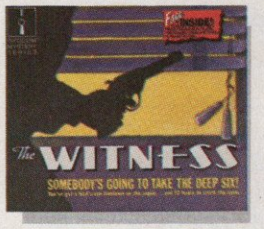
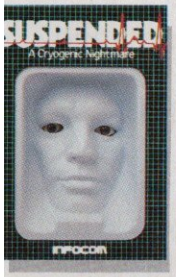

The next step downward is danger.
ZORK II
INFOCOM

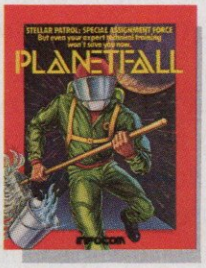

It all comes down to this.
ZORK III
INFOCOM

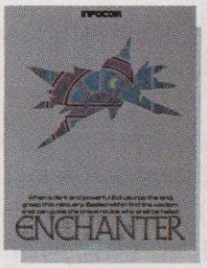

A LOCKED DOOR. A DEAD MAN.
And 12 Hours to solve the murder.
DOCUMENTARY EVIDENCE
DEADLINE

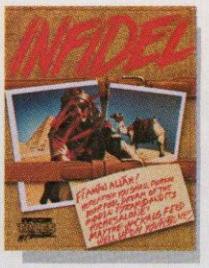

The WITNESS
SOMEBODY'S GOING TO TAKE THE DEEP SIX!

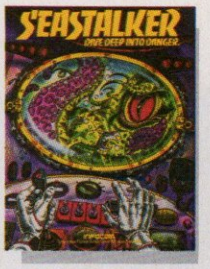
STARCROSS
INFOCOM











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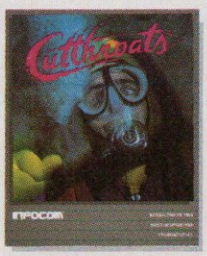

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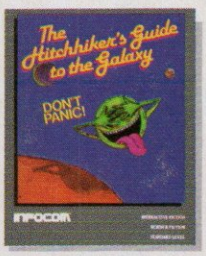

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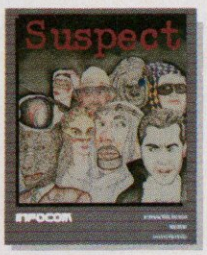

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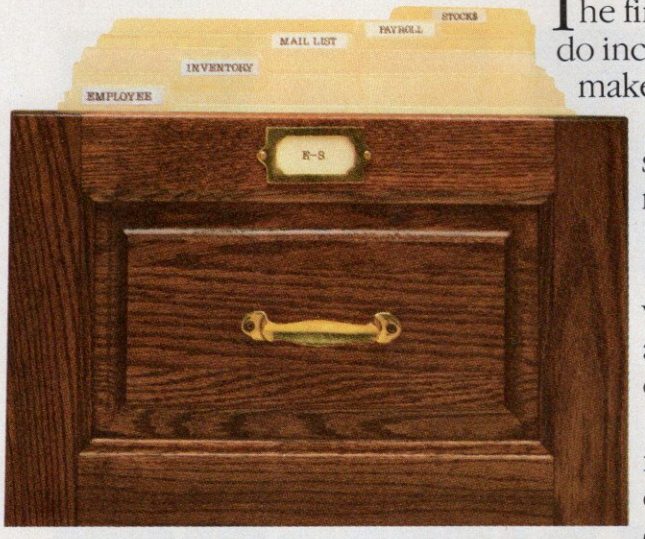

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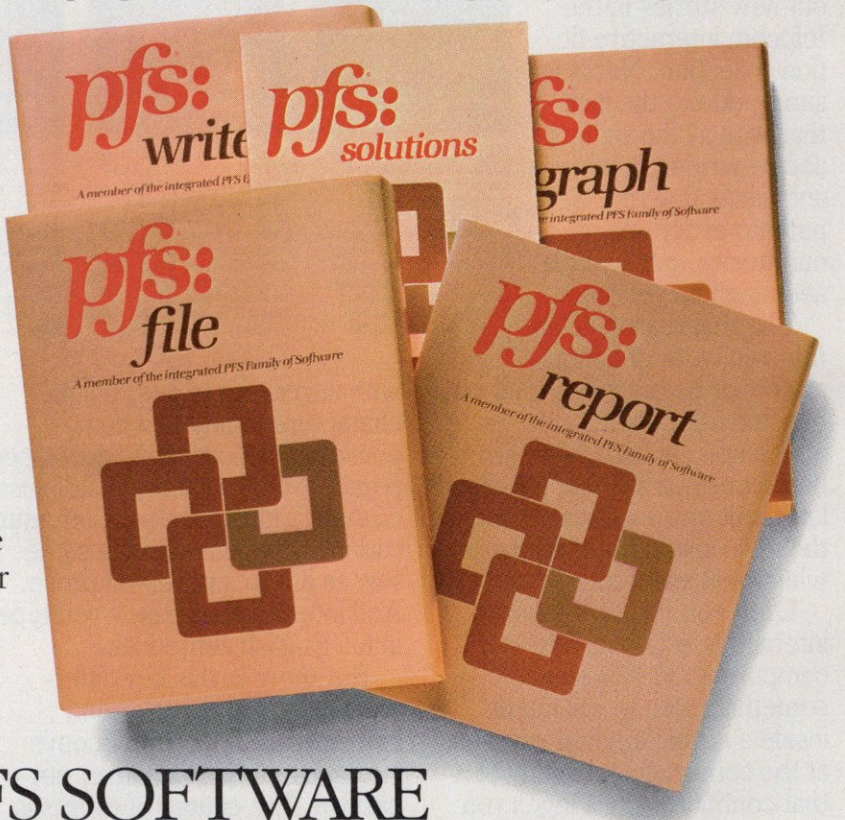

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TIME-SAVING SOFTWARE

STREAMLINING YOUR dBASE CODE

CREATING INSTANT dBASE PROGRAMS

GRAPHING YOUR dBASE DATA

Isaac Newton noted that if he deserved credit for any significant achievements, it was because he had stood on the shoulders of giants. Similarly, many personal-computer companies today owe their accomplishments to products that have come before.

One of today's giants is dBASE II, and outside software developers have eagerly created add-on utilities, enhancements, and application programs for dBASE in an attempt to catch a free ride to the top. Of these firms, Fox and Geller, of Elmwood Park, New Jersey, has gained attention by strongly marketing three programs: Quickcode, dUtil, and dGraph.

I have spent some time experimenting with these packages, and here are my findings.

QUICKCODE

Imagine. It's 3:00 P.M. on Friday, and your boss is wondering where those programs for dBASE II are that you were supposed to come up with this week. There you are, struggling away, writing modules for editing, appending, reindexing. Another ***SYNTAX ERROR***! Sound familiar?

Suddenly, from between the raster lines on your CRT appears your Electronic Fairy Godmother with a copy of Quickcode. Within two hours you have read the manual and created several programs, complete with formatted screens, report generation, MailMerge interfaces, and label printing.

Can it be true? Well, partially. QuickCode is a program generator, a program that creates other programs. Without *too* much hassle, Quickcode "writes" dBASE II programs that can meet elementary database needs, using your specifications. These programs can be stand-alone fully functional systems or separate modules that experienced programmers can subsequently alter or rearrange to suit more complex tasks.

Creating Databases and I/O Screens

First you design a data input/output screen that suits your fancy, complete with field names, types, and whatever prompts you want on your screens. Designing the screen is simple with a full-screen editing mode called Quickscreen (similar to ZIP, dBASE II's screen editor). By placing special reserved codes and names on the screen, you declare the size, number, and location of field and memory variables you need. User-definable control codes move the cursor, set margins, center text, and draw lines. Quickcode uses your single screen layout to create supplementary screens and code for appending, editing, and displaying data.

Once you've designed your I/O screen, you have two choices. You can elect to fine-tune your system, or you can have Quickcode generate programs using the newly created layout. Choosing the latter option requires a slight delay while Quickcode and the computer process your design. After the pause, you get ready-to-run programs that work with dBASE II, complete with fully structured database templates. Some fine-tuning is usually preferable first, during which you declare the nature of your variables, lengths of fields, and so on. If you don't, Quickcode can give you undesirable results because of the default values—as many as 79 spaces for a character field, for example, which can waste considerable space on your disks.

Using the Fine Tuning option brings up a mode similar to Modify Structure in dBASE, only with more columns. In this mode, you can specify the parameters of your data fields. You can set a field's data type to any of the following formats, which control the appearance of your data when you enter it or display it on the screen:

Type	Example
Numeric	000.0
Character	asd" $j
Dollars	999.99
Date	00/00/00
Telephone	(000)000-0000
Social Security	000-00-0000
Logical	Y/N

Two more impressive capabilities that can save you a great deal of coding are data validation and default value of fields. You can direct your system to check for the correctness of new data with minimum/maximum range checking, list checking, or validation involving "lookup" data in an indexed file. Finally, you can tell Quickcode to fill a given field with a default value each time you add a record to the database, which spares you from repetitive

data entry if all or most of a field is often the same.

What You Get

The programs you end up with are straightforward and fairly simple to use. You even get a main menu that ties them all together. On-screen prompts tell you what to do in most cases. Appending and editing are easy. To search for data, you use the top field on the screen, unless you chose otherwise when creating the system. Once you've found a record, you can edit, delete, or print it easily.

You can also "dSCAN," which means that you can type in a line of dBASE code that, if the syntax is right, (and it'd better be—otherwise the program bombs) uses dBASE's Locate command to find a particular record using fields other than the index key.

Issuing the Report command results in dBASE's usual confusing prompts if the report-form file doesn't already exist.

Finally, a labels/forms printing option prints out hard copy of exactly what appears on your screen or mailing labels in 1-up or 4-up format. You can also use dSCAN for selective label/form printing.

The Pros and Cons

One of Quickcode's limitations is that it allows only 9 characters (instead of the usual 10) in database field names. Thus, you may have to rename fields in existing databases if you plan to use them with Quickcode-generated programs.

Quickcode also has some notable file and index restrictions. You can use only one database per set of generated programs, and you can employ only one key file (index file) with this database. Creation of multiple indexes is possible, but you have to design a separate set of programs, complete with screen I/O and other associated files. Since each system keeps only one index up to date, you must regularly rebuild the other indexes if they are to be accurate.

In the good-news department, installation is easy, and Quickcode includes numerous on-screen help and error messages, most of which are helpful. Also, the documentation is well written, and voluminous at 165 pages. Explanations are clear and concise, with numerous examples.

Quick and Easy Programs

The manual emphasizes from the start that Quickcode cannot generate intricate programs, but it can handle simple data entry, retrieval, and reporting, as well as form generation. Once I became familiar with the few bugs running around in this program, it seemed to work acceptably. My success in raising action via Fox and Geller's phone number (which is even printed on the manual!) bodes well for the uninitiated.

Personally, I like writing dBASE II code by hand, but if you don't mind doing some experimentation, giving up about half of dBASE II's power, and reading another manual, you and Quickcode can churn out lots of quick-and-easy programs in a snap. If you have to turn out lots of relatively straightforward dBASE code, Quickcode may be the answer—assuming you have the time to learn the program.

Watering down dBASE with Quickcode is analogous to putting bicycle tires on a Maserati.

Quickcode may also be a useful tool for dBASE II novices, though watering down dBASE with Quickcode is analogous to putting bicycle tires on a Maserati. The extensive capabilities of dBASE are so muted by Quickcode that you'd be better off purchasing a database program that is simpler than dBASE II at a significantly lower cost. As an intermediate step to mastering the full capabilities of dBASE, though, Quickcode may make good sense, especially if you already have dBASE sitting on the shelf.

dUTIL

dUtil is supposed to make your dBASE programs run faster, look better, and require less development time. It can also help you create and maintain up-to-date documentation of programs. Sound too good to be true? Perhaps.

The general idea of dUtil is that it takes dBASE II programs you have already created—either manually or with a program generator such as Quickcode—and modifies them in several ways. First, it checks for errors in logic flow (such as DO WHILEs with missing ENDDOs) and generally cleans up the appearance of the database using tabs and capitalizing and expanding key words of your choice. It gives ENDIFs and ENDDOs identifying suffixes to simplify debugging. Another option is to have the program remove comments from your code, which can speed up execution time. Finally, dUtil's Do command can replace any calls to other programs with the code found in the called program (up to nine levels deep), creating one larger program that may run faster, since some file opening and closing is eliminated.

Other Features

dUtil can perform other duties as well. The most notable is the creation of a "tree" file that contains a structural chart of your programs for reference. Another option is the creation of a Submit file that contains instructions for automatically printing out all your program listings for reference. Each line of the listing can be numbered if you wish, and you can choose to have your new files printed out or sent to a disk file, automating the chore of program backup. Unfortunately, you can get the tree file only when you merge command files into one larger file.

dUtil sounded good on paper, but making it work was another matter. I tried about ten times to create one functional file containing all the programs I use most often. The programs encountered several logic errors, each of which dumped me out to the CP/M prompt. It's frustrating when, after ten minutes of waiting, a utility program bombs out because of an error in your programming. Interestingly, these errors had not caused trouble before. Once I got the interesting message in figure 1 (below).

Who would have guessed this jumble meant I was out of directory space on my disk?

Next, I decided to see whether keeping my programs separate but running them through housecleaning might help. Doing my best to follow incomplete instructions resulted in the automatic erasure of all 15 of my command files! Perhaps Fox and Geller knew more than they revealed when they cautioned extra care in making backups.

Finally, after about six hours of experimentation (and frustration), I end-

```
End of file (2), File:FBEAUTY =B:M.NEW
Traceback 3DB1 3BCE 1246 0E05 * 0DD7 080D 04DA 01F0
END OF EXECUTION.
B>
```

Figure 1: dUtil error message

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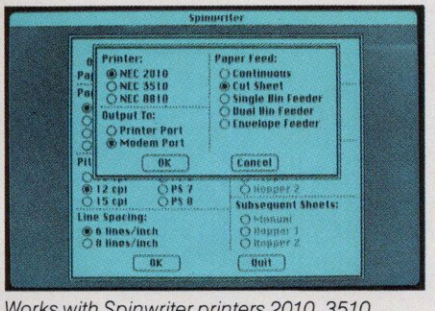

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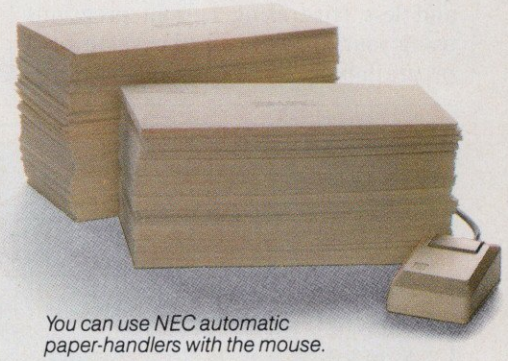

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ed up with 15 erased files, 5 debugged and rewritten files, and 1 large command file that failed to execute.

Documentation

Claims by Fox and Geller that its "documentation is second to none in the industry" stretches the truth more than a bit. The manual has some obvious omissions, topics are introduced a bit out of order, several command definitions are based on terms that have not yet been explained, and some abuses of standard English grammar are glaringly obvious.

On the positive side, the customization notes are helpful, and you should have no trouble installing the program for your computer. Even troubleshooting notes are included.

Limited Applications

In addition to having some serious flaws, dUtil seems to be very picky about how you write your code. If you have used Quickcode to create dBASE II programs for you, however, then dUtil may be useful, since Quickcode has the habit of writing lots of little files whose code dUtil can merge into a single file. Otherwise, it's easier, cheaper, and less frustrating to join programs using your text editor and develop good programming practices such as flowcharting and indentation.

dGRAPH

dGraph is a graphics generator that, using dBASE II data files or other sources of data (spreadsheets, text files, BASIC data files), can produce a variety of charts and graphs on many dot-matrix and letter-quality printers. With dGraph you can

- Print line, pie, bar, or "piebar" charts
- Edit your chart data with the supplied editor
- Add titles and text to your charts

dUtil seems to be very picky about how you write your code.

- Specify data to be included in or excluded from your chart. Selection can be based on exact matching of values or falling within a specific range of values
- Save an "image" of your chart that you can send to other computers via modem
- Elect to have the Autograph program utility determine all the details of your charts, or determine them manually

You cannot do the following:

- Freehand drawings, type fonts, or special symbols
- Change the size of the charts (3¾ inches high by 8 inches is the only size you get)

Charting Your Course

As supplied, dGraph works on the Apple II, II Plus, and IIe, with an 80-column card and an Epson 70, 80, or 100 printer, though other printer options are available. Because of the limitations of standard Apple II drives, you will have to be content with swapping disks at appropriate times. Some transferring of files is necessary before you start, but after that, the program is fairly easy to use, even though it's a bit complex.

Since dGraph has a built-in data editor, you can build chartable data files in dGraph or use existing files created by dBASE or other software. Either way, selection of the data you want to use is relatively simple.

First you choose which fields you want charted (the "subject") and the mathematical basis for the charting (sum, count, average, percentage of the sum, or percentage of the count). The

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subject matter can also be a mathematical relationship between two different fields—Sales minus Costs, for instance.

Next you choose how you want to organize the data (using other information such as Month or Company Division from your database), which translates into row and column information when you print out the chart. Finally, selecting Draw sends dGraph off for some time, reading and writing files, computing the graph in memory, and then printing it either in normal or reverse shading.

As a test, I pulled out my utility bills for the last year, created a data file, and charted it in various ways (see figures 2-5). If you have one of the dot-matrix printers dGraph works with (see Product Information), you're in luck. Average print time was about five minutes on my Epson. The same graph on a NEC 5510 looked great but took 20 minutes.

Documentation

The 152-page manual is well written and includes a step-by-step tutorial, but like the other Fox and Geller manuals, it is not typeset.

The first few pages discuss how the manual is organized, as well as how to get started without reading the manual—a nice touch. Also included is an introduction to graphics in general, a discussion on interfacing to other programs, a section for programmers on dGraph file structures, five appendices, and an index.

This program is versatile and includes lots of nice features including exception reports (to locate bad data) and charting of dates by month, day, and year. Even a sample MBASIC program for data-file generation comes on disk. The on-screen help is well thought out, too, complete with page references to the manual. If you need to chart data from dBASE or other sources, I recommend dGraph. ✚

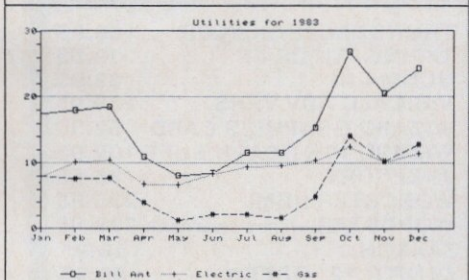
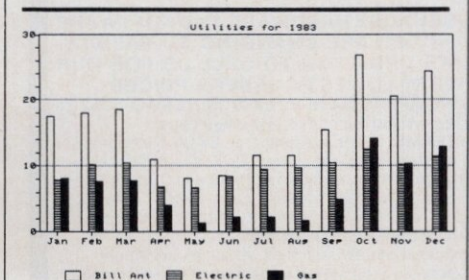


Figure 2: Line graph of Utilities database



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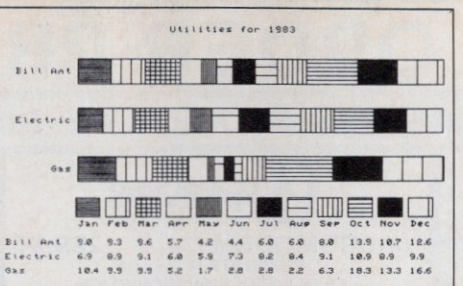

Figure 4: "Pie-Bar" chart of Utilities database

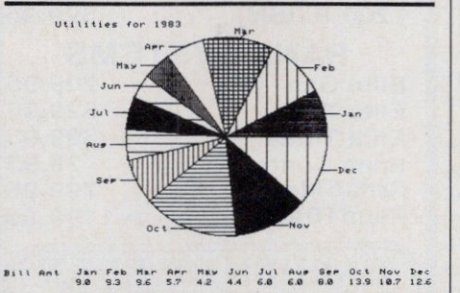

Figure 5: Pie chart of Utilities database. Note that only one series of values can be plotted on a pie chart. This chart shows the total bill amount.

▶ PRODUCT INFORMATION

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Requires: Quickcode—Apple II, II Plus, or IIe; 64K RAM; Z80 card with CP/M 2.2 or later. dUtil—Apple II, II Plus, or IIe; 48K RAM; Z80 card with CP/M 2.2 or later. dGraph—Apple II, II Plus, or IIe; 64K RAM; Z80 Card with CP/M 2.2 or later; 80-column card (with clear-screen and addressable-cursor capabilities); disk capacity of 240K on one or more drives (each drive must store at least 90K); one of the following printers: Epson with Graftrax; Okidata Microline; Xerox 1750; Diablo 630, 1640, or 1650; Prism 80 or 132 series; Anadex 9000A, 9001A, 9500A, or 9501A series; Nex Spinwriter 5000 or 7000 series; C. Itoh Model 8510A; DataSouth Model 180, among others.
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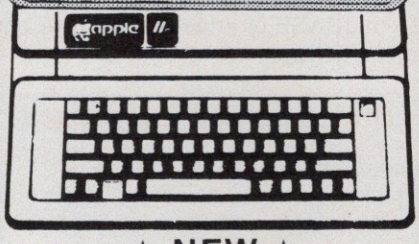

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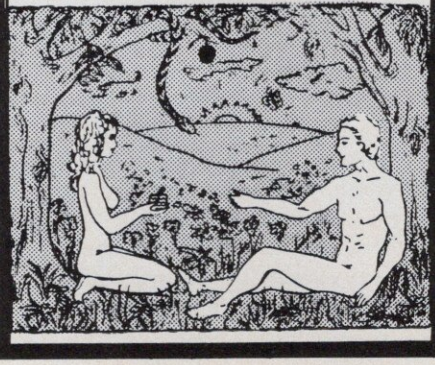

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THE FAST-EVOLVING WORLD OF INTERACTIVE FICTION

NEW GAMES, NEW WORLDS

"Floyd . . . I felt terrible when he was killed. Every move I made I expected Floyd to bump into me or go exploring. I began to miss his constant chatter . . . the way he said ' . . . are we gonna try something dangerous now?' . . . and his lopsided grin . . . the electric shock when I kissed him. I fell into massive depression . . ."

ADRIAN DAY

Ah, the wonders of fiction! It can grab you, transport you to another world, and make you believe in—and what's more care about—something as uncaring as a robot (in this case named Floyd), and a fictional robot at that. Delightful, you say, but not unusual; any good book can do the same. The opening quotation isn't a reaction to a book, though. It's one of many letters to Infocom about one of its more recent games, Planetfall; and, as such, it's a measure of a rapidly evolving category of computer software called interactive fiction.

Born in the vast Underground Empire of Zork, and owing a significant debt to Wizardry (Sir-Tech Software, Inc.), the most popular piece of software ever produced for the Apple, interactive fiction is rapidly developing into a new communication (should we say literary?) form. Users must decide whether or not it has yet arrived, but in the next 12 months, several pieces of software will no doubt appear that leave the ax-wielding trolls and magic spells far behind. By and large, this software will try to involve you in something more than puzzles; and, like the robot Floyd, it may even touch your heart.

Puzzles, Prose, and Graphics

The key to this change is a rapid evolution from games created solely by programmers to new efforts based on the work of some of the best science-fiction authors of our time—Arthur C. Clarke, Michael Crichton, Ray Bradbury, Douglas Adams, Robert Heinlein—as well as some of the best-loved children's classics, such as *Swiss Family Robinson*, *Wind in the Willows*, and *The Wizard of Oz*.

At the same time, a switch in marketing strategy will include a new emphasis on packaging, using bookstores as outlets, and capturing a new audience with familiar titles. Furthermore, this may just be the beginning. We may be looking at the nickelodeon of computer-delivered fiction. Future efforts could involve multiple users in a world that is largely of their own creation, and the tools of that involvement could include biofeedback, which aids the development of a story by monitoring reactions that users may not even be aware of (or only vaguely so), such as increased pulse rate.

I'm jumping ahead just a bit, though. Interactive fiction begins with programmers' inherent love of puzzles, as expressed in Adventure, the first adventure game, which was developed on mainframe computers in the 1960s at Massachusetts Institute of Technology and Stanford. Apple enthusiasts got their first real taste of adventuring when Zork arrived in 1980. Zork resembles the mainframe adventure in many ways. It has no plot. The environment is part logic, part fantasy. The goal is simple—you explore the world, map it piece by piece, collect treasures, and thus accumulate points. What sets Zork aside, however, is the richness of its prose and the wonderful sense of humor of its writers, who seem to have anticipated an incredible number of possibilities.

Since Zork's introduction, companies that produce interactive-fiction roughly divide into two camps—those who write text-only programs (Infocom), and those who support their adventures with graphics (nearly all others).

"There's a place for graphics," says Jonathan Palace, one of the editors at Infocom, "but they take up so much room on the disk that the text can't be as long or as colorful as it can be without graphics."

The Infocom party line has always been that "your brain is the best graphics generator" and that computer graphics, at this point, are simply not good enough to significantly enhance its products.

In contrast, Mark Pelezarski, president of Penguin Software, which has produced some of the best graphics adventure games, feels graphics definitely enhance the game. "We have a lot of things in a picture that test your powers of imagination," says Pelezarski. In fact, to get through a Penguin game such as Transylvania, you have to study the pictures for clues that exist nowhere else.

Most of the new games will continue

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**Catalyst works on the Apple IIc, IIe and Apple III. It is not compatible with Macintosh.

Photography by Barbara Kasten

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to use a mixture of text and graphics, as do Penguin's. But whether the games are text or a mixture of text and graphics, two major trends are worth noting:

- A move away from strict puzzle solving and into plot and character development.
- Use of successful fiction writers and proven stories.

These trends are evident in the development of Infocom's line, but the last few months should mark a turning point of sorts, with several new offerings in the field from other companies.

As Palace describes it, Zork is made up of puzzles, with no plot or character development. With Infidel and later games, the puzzles were part of a story, or a series of puzzles made up a story. Witness shows real scene development. Written in the tone of a 1930s detective novel, the goal is "to simulate the experience of being in Southern California in 1938," says Palace. That's a routine goal for fiction, but a giant step for adventure games. Now Infocom has just released Cutthroats, a tale that places you in a treasure hunt with some pretty seedy companions, and it is working with Douglas Adams to bring out a game based on his novel *The Hitchhiker's Guide to the Galaxy*.

The *Washington Post* described the book version of *The Hitchhiker's Guide to the Galaxy* as "inspired lunacy," which is also a good way to describe Zork. Thus, Adams and Infocom should be a natural team. (Adams approached Infocom with the idea.) The result will be more a story than a puzzle, says Palace, and "more enjoyable than the book."

Tempting a Broader Public

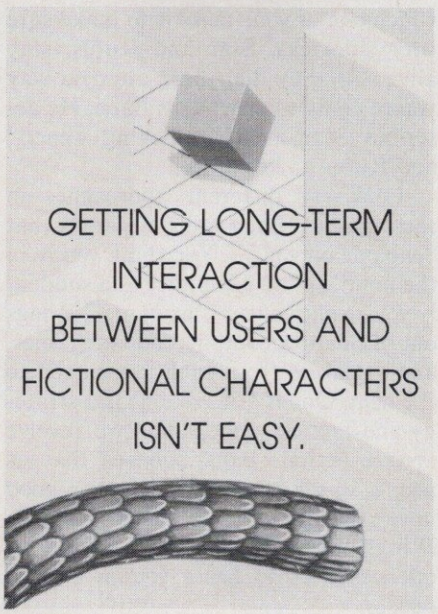
What lies ahead, says Palace, is a new product, as yet untitled, that involves no scoring and gives players no choice but to follow through on their actions. (It won't have a "save game" feature, which adventurers often use to ward off disaster. Such a feature holds a copy of a game at a specific point so adventurers can take a dangerous action without fear of losing all they've done so far.) The new product will offer many possible actions, "some of which are good, many of which are bad, many of which are ambiguous." There won't be a single path to success, but many.

The editors at Infocom are trying to find where the enjoyment lies—in solving difficult puzzles or just in wandering through the story. "And that's a hard question to answer," says Palace. "Some people like the hardest puzzles we can come up with, but others find the puzzle aspect frustrating."

Infocom isn't the only company looking for an answer. Penguin and others plan to stick with the puzzles while developing other aspects of the medium, but at least three new lines of software are just beginning to test the taste of a broader public—those from Baen Enterprises and two subsidiaries of Spinnaker Software, Trillium and Windham Classics.

New-World Authors

Trillium has an impressive stable of writers and titles, some just recently introduced and others on the way.



"We attempted to go to the people who are best at creating new worlds," says Trillium brand manager Seth Godin. If you're a science-fiction fan, the list has got to set your mouth watering.

Familiar works blossoming into interactive fiction include Clarke's *Rendezvous with Rama*, Heinlein's *Starman Jones*, and Ray Bradbury's *Fahrenheit 451*. Michael Crichton, author of *The Andromeda Strain* and other novels, has developed a story just for interactive fiction called Amazon. (One of Trillium's first releases, Amazon presents a helpful companion, a parrot called Paco, for whom you quickly develop a strong attachment.)

Rama is a space ark that arrives for a short spin around the sun. It is apparently a dead world, and in Clarke's book you follow the actions of a small team that explores it. In the book, though, the team doesn't always look at the things you might want to examine. They don't always ask the questions you might ask. In the computer version, you'll do the exploring—up to a point. Obviously, limited disk space inhibits the inclusion of every alternative.

"Some things the book doesn't do as well, some things it does better, " says Godin. As with all the Trillium releases, this one will include graphics. Trillium isn't afraid to inject a page or two of pure text, however. As for puzzles, "they're great if they fit into the plot," says Godin, "but a lot of times they don't. In Rama there are puzzles, but they add to the plot or the characters."

Trillium has also tried to increase user involvement by rewarding users for acting in character. In Dragon World you play a shy adventurer who wouldn't hurt a fly. When a crying woman blocks your way in a cave, you must keep your character in mind if you hope to get by.

Getting long-term interaction between users and fictional characters isn't easy, though, says Godin. "Paco (in Amazon) is a parrot. He can say stupid things; he can repeat himself all the time." You can't have a fictional person behaving that way.

Characters You Care About

Still, you can expect to see some interaction. In the Windham Classic version of *The Wizard of Oz*, for example, you are Dorothy, and you can ask questions of the Scarecrow, the Tin Man, and the Cowardly Lion.

Other titles being brought out under this name offer some interesting situations that should help break new ground and cultivate more markets for interactive fiction. In Wind in the Willows, you start the game as Mole, then later become Toad. Swiss Family Robinson contains a built-in mapping feature, and your goal is basically the same as that of the marooned family—learn how to survive on an island by yourself.

These games aren't aimed at "hardcore adventure players," points out Thomas C. Pavela, brand manager. "One of the things we're trying to do is make these friendly and accessible." Of course, one of the keys is to start with friendly and accessible titles, which Trillium has done. Besides the titles already mentioned, the line includes Treasure Island and Below the Root. The latter, based on the Green Sky Trilogy, is joystick-driven with a text menu that includes some of the interactive commands found in more traditional adventure games.

Another company that has tapped well-known authors and works is Baen Enterprises. When asked how you build user involvement, Jim Baen replied, "The text isn't done by programmers, but by writers, and their whole purpose

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in life is to make you care about characters." He acknowledges that "you can't paint as textured and rich a canvas as you can in a book, but the medium offers much more in variability. Your feelings and approach have much more of an effect on the outcome."

Science-fiction author Fred Saberhagen helped design and program the firm's first offering, Wings out of Shadow, a game that draws on Saberhagen's Berserker series. In this one it's possible to "die" and yet have won the game. Heinlein's Glory Road is a game in which one of your tasks is to make sure your sidekicks, Star and Rufus, stay alive. "If they die, there ain't no way you're going to win," says Baen. He describes Star as a "rollicking wench" and Rufus as her uncle.

Look for different approaches in these games. Baen talks of games that "explode on you . . . You think you're in the middle of an adventure and suddenly you're playing a reflex game." Wings out of Shadow contains four subgames, and variables from each are passed to the next. One is a maze, one is a strategy-and-tactics game, and two involve arcade action. Baen believes that as people watch television or read a good novel, they go into a trancelike state. In Wings out of Shadow, each of the sequences tries to bring you in a little deeper.

How Deep Can It All Get?

Everyone wants to improve the language the games understand. Using tested writers may improve some of the prose the game throws onto the screen, but it takes memory and good programming to create a game that understands more than simple, two-word commands, such as climb ladder, or go north. Here Infocom has always had the edge with a parser that understands nouns, verbs, adjectives, and direct and indirect objects. Infocom has its own language, based on LISP, that is still evolving.

There are other ways to respond, however. Penguin, for example, is developing a game composed entirely of graphics for the Macintosh, says Pelezarski. "You'll be put in locations, and you'll point to things that you want to take, or look at, or manipulate."

As to graphics, Godin looks to the day when we'll be interacting with images of actors on video disks and you'll be "able to move your feet and arms. It will be one step short of Westworld," he says, referring to the movie that portrayed a fantastic entertainment park containing humanoids that helped guests live out their fantasies.

As to biofeedback, why not wear a little ring that connects to the computer and gives it information on your pulse rate? The game could change accordingly. "Ok, we got him really excited now, so zap him," says Baen with glee.

Baen is thinking in terms of optical disks and a "novel that would evolve in terms of what you discover . . . it would require the wordage of four or five novels and a tremendous amount of coding time—more now than the user environment can support."

An Ideal Fictional Form

If the marketplace would support it, if the technology were all in place, and if the artistic skills had evolved to match the medium, what then?

Baen answers, "an ideal fictional form that would include prose that would change in terms of what you wanted it to do, or even in terms of what you thought you wanted it to do, and the picture that went along with it would be a motion picture and would involve the same sort of thing." It would be, in short, "like an illustrated book that died and went to heaven."

Amen. +

FURTHER INFORMATION

Baen Enterprises
Simon & Schuster, Inc. (distributor)
Simon & Schuster Building
1230 Avenue of the Americas
New York, NY 10020
(212) 245-6400
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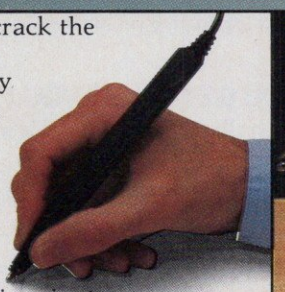

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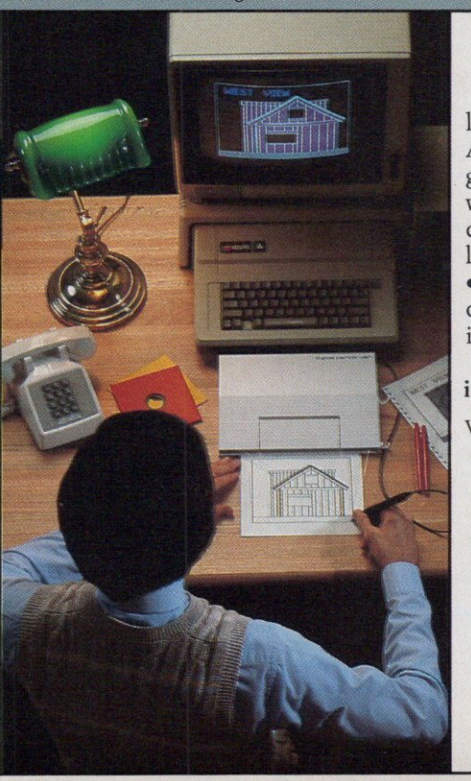

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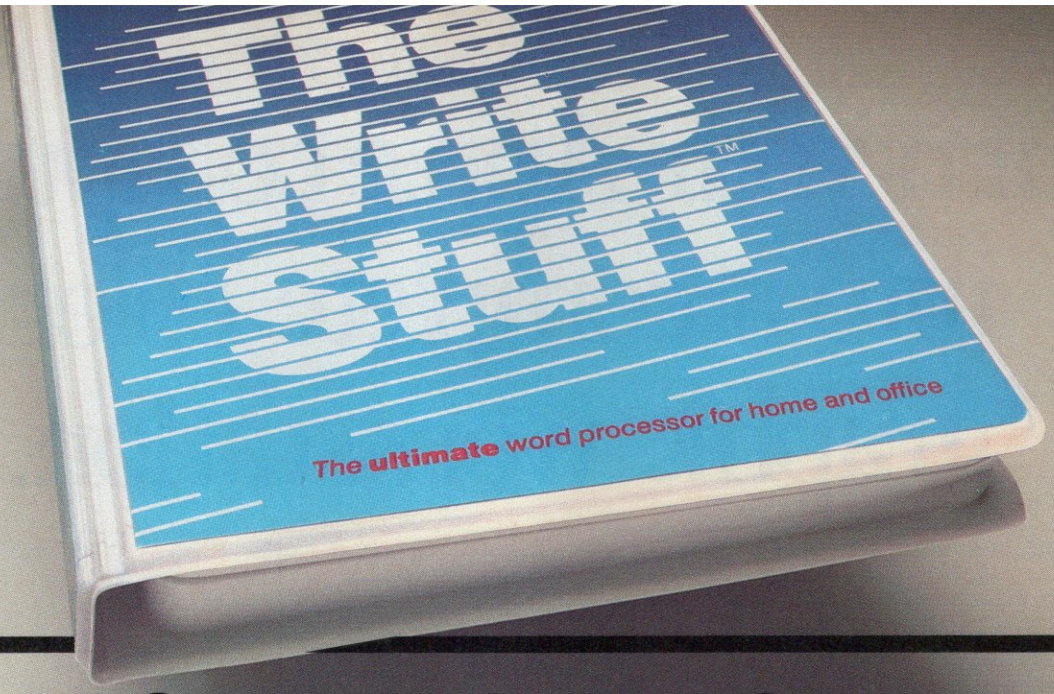

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THE PRINTSHOP

SOFTWARE REVIEW/BY ROBERT COWART

CUSTOM GRAPHICS WITHOUT A MOUSE

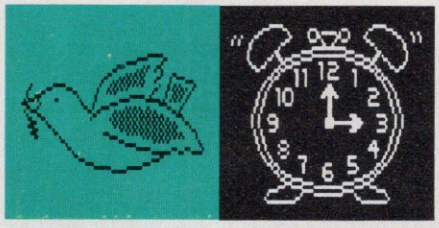
Are you envious of your Macintosh-owning friends because they can use MacPaint and MacDraw? Look again. The Print Shop, an ingenious Apple II program recently introduced by Brøderbund Software, gives the Macintosh's drawing programs a run for their money.

This easy-to-use package lets you quickly and easily design and print out commonly needed custom graphics—greeting cards, signs, banners, letterheads, and free-form screen images—without even touching a mouse or being a Leonardo da Vinci. You can easily include attractive graphic designs, pictures, borders, and text in a variety of type styles within your designs.

Skeptical? If you are, you probably have a good reason. Up to now, similar programs for the Apple II have required struggles with graphics tablets, font editors, light-pen systems, and programming, and they have relied heavily on users' initiative, time, and imagination. Getting what you wanted out of your printer hasn't been very easy. Because of the approachable and graphic presentation of The Print Shop's menus, though, even a nebbish in a hurry can crank out something creative and even impressive.

Being a sensible person, I rarely force myself to wade through the manual when trying out a new program, and since the general populace seems to apply the same logic, I figure it's part of my research to give a package a "dry run" first. Of course, I usually get stuck somewhere and have to dredge through the manual's index to extricate myself. Not so with The Print Shop.

Five minutes after I inserted my disk into the drive, the program had automatically made the one permissible copy of itself and prompted me to answer questions about my printer and interface card. A few minutes and keystrokes later, my first creation, a customized birthday card, came spurting out of my printer. I was impressed.



What's on the Menu

The Print Shop is menu-driven, with one attractive screen after another asking you to choose the details of your masterpiece. For example, the first screen has you move the highlighting cursor to the name of your desired creation (greeting card, letterhead, banner, sign, and so on)—using the keyboard, joystick, or KoalaPad—and press Return.

Now the fun begins. Say you want to make a greeting card. You can either design your own or let The Print Shop design it for you, using the recipient's name, if you desire. "Canned" greeting-card choices include birthday, Christmas, season's greetings, Valentine's Day, anniversary, invitations, notepaper, and thank-you notes.

If you opt to create your own design, you get a series of subsequent pictorial menus that ask you for more decisions.

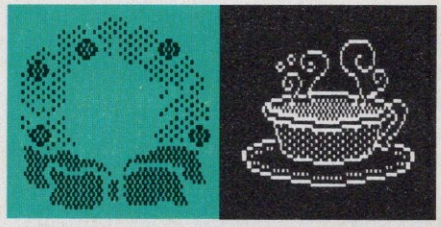
What You See

For example, to make a greeting card, you first decide which one of nine border patterns you like. An example of each border appears on the screen, one at a time. Again, you make your selection by highlighting your choice and pressing a button or key. Then, for a background, the choices include 10 interlocking abstract designs and 50 supplied pictures (some of which are reproduced in this article). The manufacturer promises that an auxiliary disk containing 100 more graphics is on the way. Should you choose a picture, you can have it printed in one of three sizes and in various arrangements. A "custom" layout offers more latitude, allowing placement in specific spots on the page, such as the upper right corner.

What You Say

Assuming you want your creation to communicate a message, a menu now appears, asking which of eight font styles you fancy. Again, you get to see an example of each, in their relative sizes, before deciding on one. Choosing a font advances you to the next screen, a text-editing module, where you enter your message.

Text can be right-, left-, or center-justified; solid black, hollow, or 3-D. The size can be large or small. Another attractive feature is that all type styles appear on the screen and print out proportionally spaced, meaning that narrower letters such as *i* fit right up



against adjacent larger letters, giving your text a professionally typeset appearance. Even more unexpected in a program of this price is the use of a lettering technique in which the strokes of some letters intermingle with those of their neighbors.

Moving along, the same process of border, graphics, and text selection repeats for the inside of your greeting card, after which you continue to the

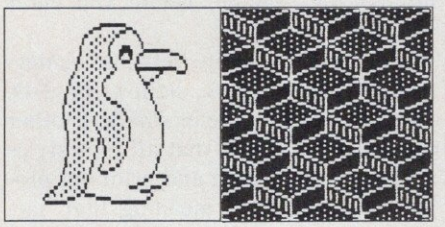
Print menu. Here you have the option of "giving yourself credit," which means typing a line of text that will appear on the back of your card where the copyright notice and price usually appear. A nice touch.

Then you conduct a little printer test to help align your paper, and printing begins. Printing a greeting card takes several minutes, but design time is so minimal that waiting at this stage doesn't matter much. Besides, The Print Shop puts a little entertaining show of pulsating patterns on your monitor, which offers diversion during the printing process.

An interesting feature of the printing process for a greeting card is that half of the printout is upside down in relation to the other half. After removing the paper from my printer and folding it over in quarters in the traditional greeting-card fashion, I realized why.

Another element of the program that affects printouts handles the task of clearing a border around letters that would otherwise blend into the pictures or background they overwrite. This feature is nice and probably required some intricate programming on the author's part.

Incidentally, unlike some other graphics programs that use screen-dump utilities for printing, thereby limiting the resolution of the printout to that of the screen, Print Shop is limited

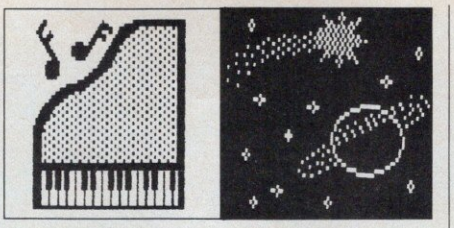


only by the capability of your printer. My Epson actually printed very-high-resolution (120 × 72-pixel) graphics. Okidata printers do not print quite as nicely, with only a 72 × 72-pixel matrix.

Reverse Psychology

An almost addicting feature of the entire creative process is the effortless way The Print Shop lets you change your mind (one of my favorite vices). At virtually any point, you can move forward or backward through the menus, modifying your previous choices. You can make anything you don't change revert to your earlier selection by pressing the Return key. You can temporarily suspend or even abort the printing process altogether.

The other types of printouts (letterheads, banners, and signs) basically require walking through the same or similar menus, but result in a different layout for the final product.



Worth noting is the ability to create letterheads with designs and text at either the top or the bottom of the page, or both, using two different type styles if you wish. Banners can be as long as you want, using any of the type styles, complete with oversize pictures.

Doing It Your Way

Just in case none of the 60 graphics that come with The Print Shop fill your needs, a well-designed pixel editor is included. Using a KoalaPad, joystick, or keyboard to edit an existing graphic or to create your own is relatively easy on the 5 × 5-inch matrix, measured on a 12-inch monitor. In about ten minutes I modified an existing graphic to my liking.

Saving it on disk was a snap, too, and The Print Shop even asked me if I needed to initialize a blank disk first—useful if you've just spent two hours editing and find yourself diskless.

More Magic

Finally, the most entertaining part of The Print Shop is called Screen Magic. It is essentially a screen-dump utility that lets you print out any high-resolution screens you've created either with The Print Shop or with another program. (Foreign files must be in standard 8K, hi-res, uncompacted format).

Screen Magic has a few unexpected features, too. For instance, unlike other screen-dump programs, this one is designed to reproduce color, rather than monochrome, screens in black and white. The four standard colors and black and white are all represented on printouts in varying shades of gray.

Another special feature is a menu option called Kaleidoscopes that turns your monitor into "living color" with constantly swirling and changing multihued patterns. It's even more hypnotic than network TV. Better yet, you can "freeze" the patterns at any time by pressing a key, superimpose them with text, and print them out. Some tricky menu-hopping can even get you a mixture of type styles on the same screen.

Next, the Print menu lets you choose on which half (top or bottom) of the page you want to print your composition. It just so happens that the aspect ratio between screen and printer works out right for making a long, horizontal greeting card. You can print one screen on the top half of one side and another screen on the lower half of the opposite side, fold it over, and end up with a real computer-art masterpiece.

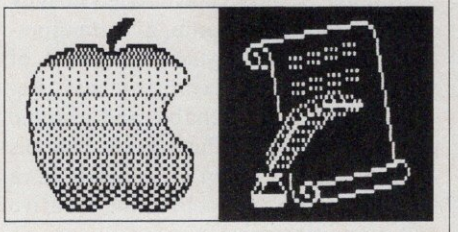
The Manual

Oh yes, the manual. Well, I've only needed to refer to it twice—too bad that one of the few well-written manuals I've seen should be wasted on a program that doesn't need it. Anyway, the Print Shop manual is 27 pages long, with copious examples and instructions for carrying out creative ideas such as making name tags and emblems, multicolored signs and banners, and new graphic patterns.

To complete the package, The Print Shop includes bright-colored tractor-feed paper (something I've never seen before), matching envelopes, and colored ribbons. The flip side of the disk contains a series of complex images that can serve as a background for signs.

Program of the Month

The Print Shop has won my private Program of the Month award because it's easy and fun to use, apparently bug-free, practical, and novel. It's the first Apple graphics program I have seen that combines ease of use, practicality,



and room for creativity, all in one package. Even my computerphobic friends like it, and it passed the ultimate test: I actually use it regularly. At $49.95, it's a bargain. +

PRODUCT INFORMATION

The Print Shop
By David Balsam and Martin Kahn
Brøderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
List Price: $49.95
Requires: Apple II Plus, IIe, or IIc, or III in Emulation mode; 48K RAM; one disk drive; printer and interface card that support graphics

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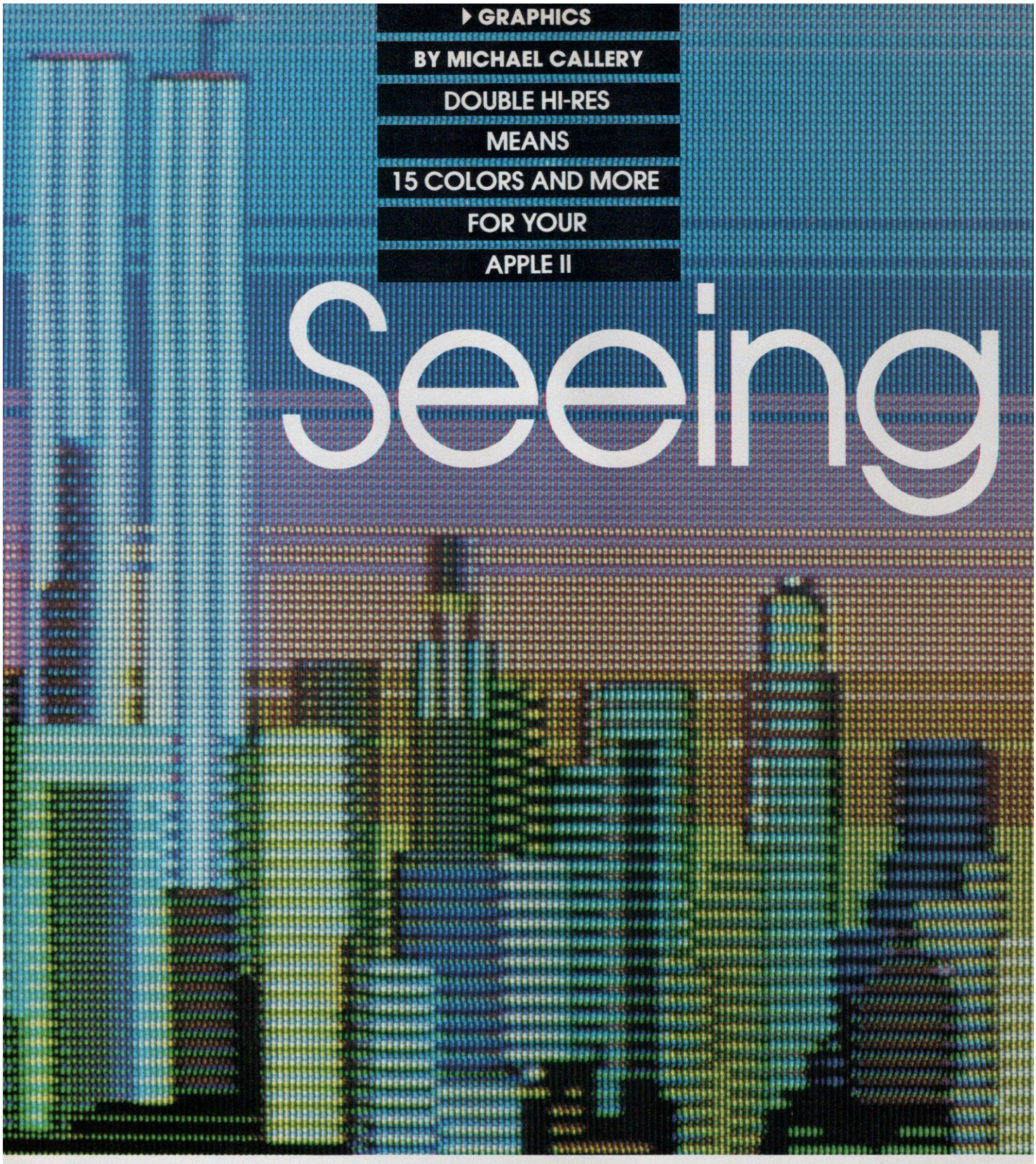


▶ GRAPHICS

BY MICHAEL CALLERY

DOUBLE HI-RES MEANS 15 COLORS AND MORE FOR YOUR APPLE II

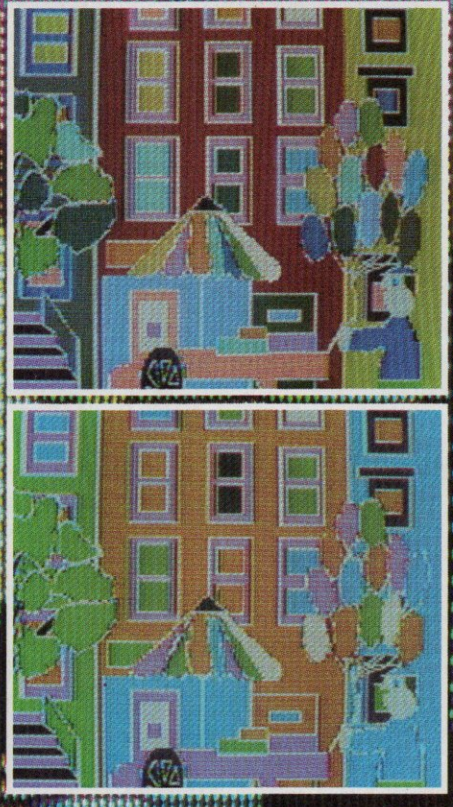
Seeing

Graphics have always been an important aspect of Apples, the first popular personal computers to offer reasonably high-resolution graphics as well as color. At first these features were buried inside the machines, so only whiz programmers could access them. The Apples had the raw capabilities, however, and application software soon provided us with personal graphics machines.

Artists could avail themselves of dozens of painting programs, businesses suddenly discovered business graphics, and colorful, hi-res graphics practically became a requirement of educational programs. Hi-res graphics brought 70-column screens and lowercase displays to word processing and opened a floodgate of exciting, animated fun in computer games.

These developments are history. Owners of Apple IIc's and 128K IIe's are in store for another revolution in graphics that has been available only to Apple III owners up to now, because these computers now have significantly more powerful graphics capabilities than those of their predecessors. Fo. artists and educators, one word says it all: red! Apple IIe and IIc computers

Double



The two insets (left) of same illustration show difference between double-hi-res (top) and regular hi-res (bottom).

can finally display Red Delicious apples in addition to Granny Smiths. For that matter, they can also display Golden Delicious apples, because along with the red comes yellow and several other colors, 16 in all, except that two of the colors are the same gray, so there are actually only 15 visibly different colors.

For businessmen or scientists, these new abilities are equally exciting. The graphs and charts they need can now be more precise than ever, because the newest Apples can display twice as many dots on the screen as Apples could before. Double hi-res on the Apple provides three different video-display modes: 560 × 192 pixels in monochrome, 560 × 192 pixels in a special "sliding scale" that can use some colors, and 140 × 192 pixels us-

THE NEWEST APPLES CAN DISPLAY TWICE AS MANY DOTS ON THE SCREEN.

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WHAT YOU NEED TO GET DOUBLE-HI-RES GRAPHICS

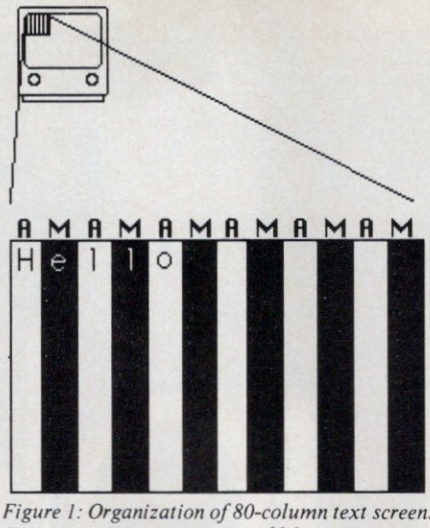

Figure 1: Organization of 80-column text screen. A represents aux memory, and M represents main memory.

To get extended graphics capabilities, you must have a 128K Apple IIe with Apple's Extended 80-column card or an equivalent compatible card—or an Apple IIc computer, which has this circuitry built in and ready to go. Apple IIe owners must purchase it as an option and must also have a "rev.B" main circuit board.

You can identify the circuit board by turning the power off, removing the cover of your IIe, and looking at the lettering etched at the rear of the board, behind the slot connectors. There you'll find a three-part serial number, something like 820-0064-A. The letter indicates the version of the circuit board. If it is an *A* and you have purchased an Apple Computer Extended 80-column card, your Apple dealer will replace the main circuit board with rev. B, free of charge.

To enable the switching circuitry for the hi-res memory, you must install a jumper on the 80-column card. A jumper is a small square (about 2 mm) of plastic, open at two ends, that sometimes comes with the card. Gently push the jumper onto the two small wires (labeled J1) that extend from the lower left corner of the 80-column card. Simply bending the two wires so they touch will also do the trick. Remember to turn the computer off when you remove or install an interface card.

Unfortunately, add-on 80-column cards for the older Apple II and Apple II Plus computers cannot provide double-hi-res graphics. These displays have a small amount of extra memory but handle their own video separately from the Apple. The entire display is contained on the add-on card and works like an external terminal (see Rescue Squad, November 1984, page 197).

ing all 16 colors. The term *double hi-res* applies to the extra colors, as well as the various increased resolution modes.

How It's Done

The evolution of the Apple II computer has been blessed by a high degree of compatibility between generations of computers, but one dramatic difference between the Apple II Plus and the Apple IIe and IIc is the graphics capability of the 128K memory and the 80-column display of the latter two machines. Although optional hardware from many sources can provide older Apples with increased memory, better keyboards, and most of the other advantages of the newest Apples, no one provides the additional graphics modes possible with the Apple Extended 80-column card, as yet.

Apple's display is termed a "memory mapped" display because each character on the screen is located in the memory the computer uses for programs or data. To produce 80 columns on an Apple II, an extra area of memory must be dedicated to the display.

The regular 80-column text card for the IIe requires only 1024 bytes (1K) of memory to store the extra screen characters, but the Extended 80-column card has a whole extra 64K. The Apple's 6502 microprocessor cannot use more than 64K of memory at a time, but you can use the extra memory to store data or to simulate a disk drive at lightning fast speeds, and advanced programmers capitalize on the extra capacity for longer programs. The extra RAM provides parallel addresses for both the text and the hi-res display.

This added display memory is mapped into the same addresses as the normal text and graphics displays. In other words, when the microprocessor is writing to display memory, it does so twice to the same place. The video circuitry takes care of switching between main and aux memory. From our point of view, the character columns alternate between main memory and aux memory (see figure 1).

For example, if the computer is displaying the word *Hello* in the 80-column mode, the *H* is in aux memory, the *e* is in main memory, the first *l* is in main memory, the second *l* is in main memory, and the *o* is in aux memory. This scheme provides easy conversion between the 40-column and the 80-column screen. Apple made the 80-column display an option on the Apple IIe and provided a new peripheral slot, the aux slot, for it. The Apple IIc's extended 80-column display, on the other hand, is built in.

If you type Control-Reset on an Apple IIe in the 80-column mode, the Apple will revert to the standard 40-column display and put only half the information on the screen. SYNTAX ERROR, for example, turns into SNA RO. The rest of the statement is stored in the duplicate text area of auxiliary memory. If we could view only this memory, we would see YTXERR (see figure 2).

A new main circuit board (designated Revision B) allows the hi-res screen to provide a new graphics mode with double the number of horizontal dots, 560, or double the number of colors, 16.

The Apple's hi-res screen is similar to the regular text screen. The screen is 40 bytes across, and each byte can contain a single character, which is five pixels across by eight pixels down. On the hi-res screen, the pixels displayed represent some of the bits in each byte of screen memory. Of the possible eight bits in each byte, only seven are displayed. The horizontal pixels on the screen total 280 (7×40). Vertically, each text character is made up of eight dots and the screen has 24 rows of char-

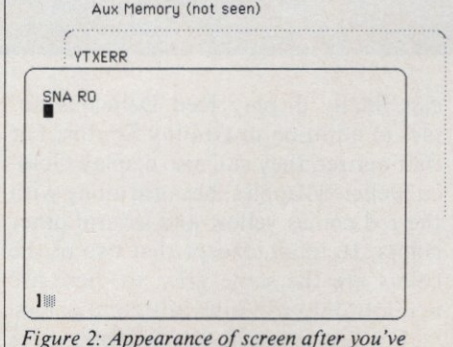

Figure 2: Appearance of screen after you've entered the 40-column mode with Control-Reset

acters (8 × 24=192 vertical pixels). On the hi-res screen, we control all of these dots—which form a grid of 53,760 (280 × 192)—rather than dealing with them in 5 × 8=pixel, character-sized chunks. In terms of memory, it takes 40 × 192 (or 7680) bytes to store this screen. There are some unused bytes, and a full 8192 (8K) bytes are assigned to the hi-res screen.

The double-hi-res screen is similar to the regular hi-res screen, but the number of horizontal bytes is doubled, yielding 560 × 192 resolution. Because double hi-res has twice as many dots, 16K of memory is required to store the screen: 8K of main memory and 8K on the Extended 80-column card.

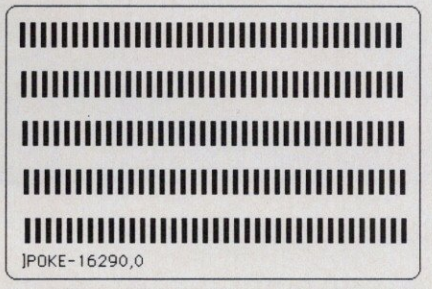

Figure 3: Appearance of the screen with double hi-res turned on after you've typed HGR

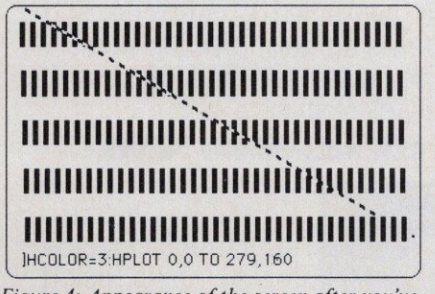

Figure 4: Appearance of the screen after you've plotted a diagonal line using Applesoft BASIC with double hi-res turned on

If you have an Apple IIe and an Extended 80-column card, or an Apple IIc, you can easily see this new graphics mode. First, enter the 80-column mode by keying PR#3, then enter the Graphics mode by keying HGR, and finally key POKE-16290,0. This POKE, which tells the Apple to use the main and auxiliary hi-res displays, is the key to double-hi-res graphics.

Your screen should now look like figure 3. The white vertical bars are physically located in the Extended 80-column card, and the black bars are in the main circuit board. Unfortunately, Applesoft commands have no effect on the extended memory, so HGR cleared only the main memory to black.

For yet another example, type in HCOLOR=3: HPLOT 0,0 TO 279,160, after which your screen should look like figure 4. Rather than turning out as a continuous diagonal line, the line is dashed, because the Hplot command works only with main memory.

The most dramatic difference with double hi-res is the availability of 15 different colors, giving an entirely new look to hi-res graphics:

REGULAR HI-RES

Black 1	Violet	Black 2	Blue
Green	White 1	Orange	White 2

DOUBLE HI-RES

Black	Violet	Brown	Med. Blue
Dark Green	Pink	Magenta	Lt. Blue
Green	White	Orange	Aqua
Grey 1	Grey 2	Yellow	Dk. Blue

A pixel is equivalent to a bit, but a bit has no room for color information. Bits can either be on (represented by a 1) or off (represented by a 0), but they have another property beside their on/off status, namely their position in memory.

On the regular hi-res screen, a pixel that falls on an even plotting position is violet, whereas a pixel on an odd plotting position is green. Two adjacent pixels make white. The invisible bit in each screen byte generates the two additional colors, orange and blue. If the shift bit is off, the pixels are green or violet; if it is on, the whole byte turns orange or blue. This method of producing colors leads to problems when you try to mix green or violet with orange or blue.

In double hi-res, the invisible bit is ignored, so you won't run into color-shift problems. Four bits determine the color of a dot in double hi-res, taking us back to the 140-dot horizontal resolution of the regular hi-res screen.

A single bit within this group of four generates a red, brown, dark-green, or dark-blue pixel, depending on its position in screen memory. The other colors are combinations of these four. For example, adjacent red and brown pixels result in an orange-colored pixel in the 140 × 192 mode. If you add a dark-green bit, the pixel will turn yellow.

These combinations do not follow the color-mixing rules that painters follow but are based on "color bleeding" and other equally mysterious television-engineering terms. Only assembly-language programmers, who must deal with bits and bytes, need concern themselves with the various combinations of bits. The rest of us must rely on software tools to accept a color command or to select the proper color for drawing and creating double-hi-res graphics.

Next month, we'll look at the software packages that generate double-hi-res graphics. +

Technical consultant: Peter Joselow

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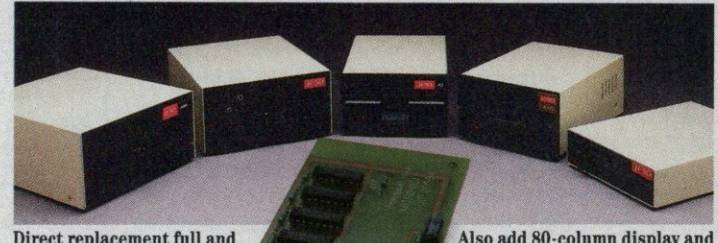

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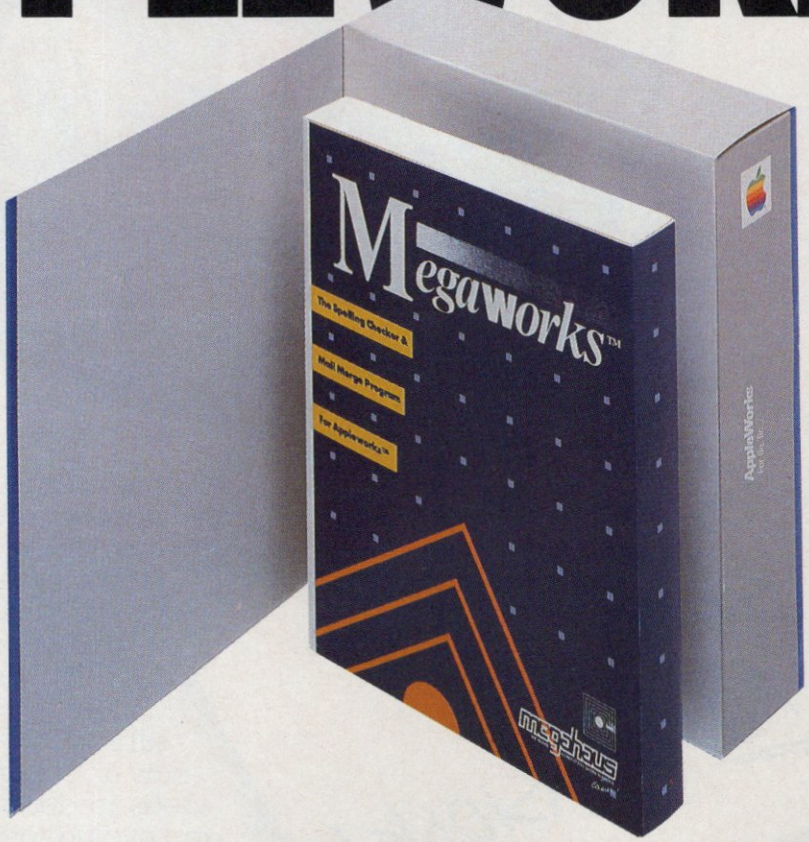

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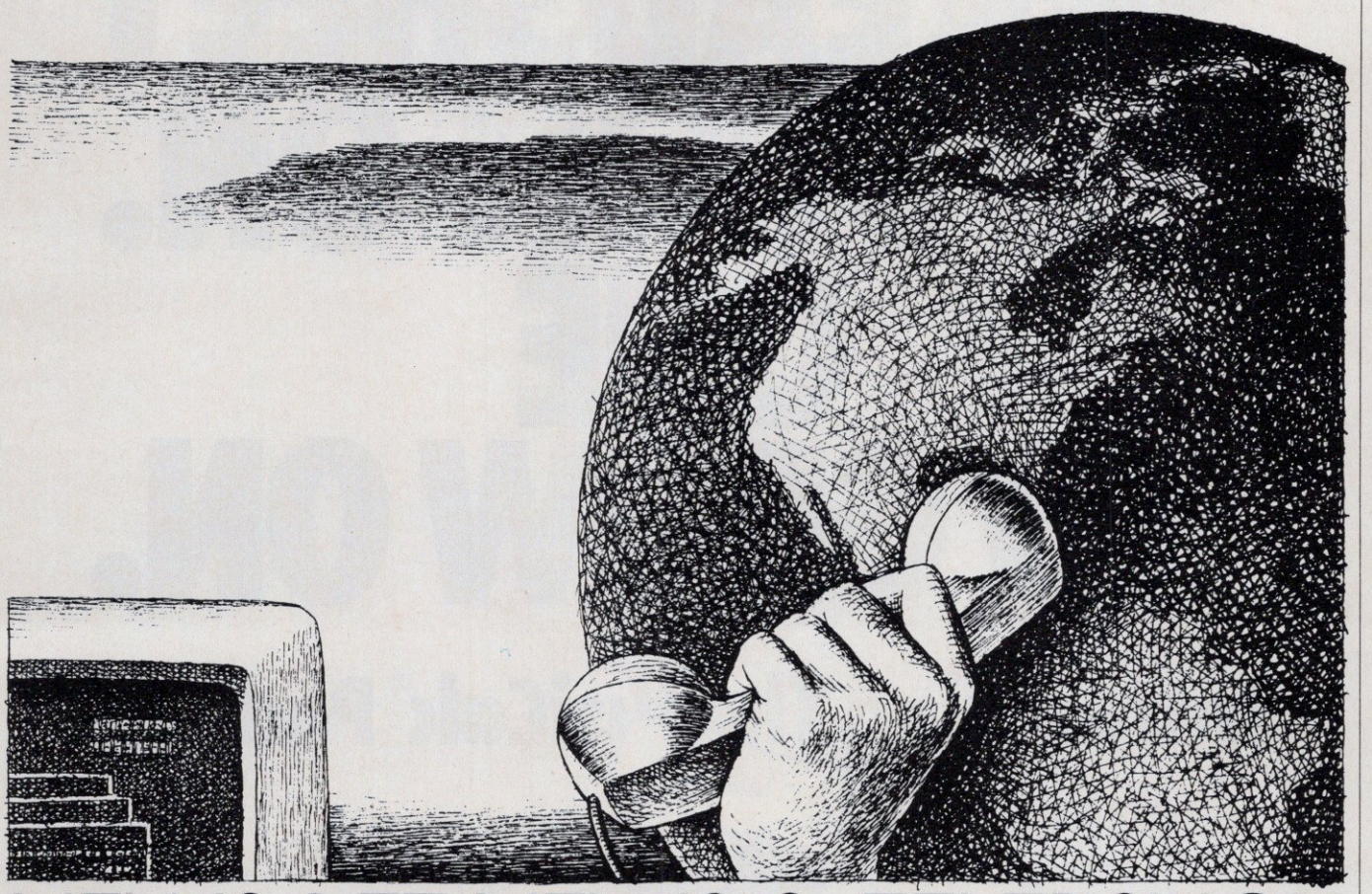

NEWSOFT NEWS & TELEPSYCH

As the holiday season rolls along, with Thanksgiving giving way to Hanukkah, then on to Christmas, and over to New Year's Day, the shopping, decorating, cleaning, and visiting sometimes take their toll. You need a little chuckle, something to keep your spirits bright.

Well, look no further than the Apple and the modem sitting on your desk. Two new telecommunications services, Newsoft News Service and TelePsych, offer the kind of help you need to combat the holiday blues and keep you smiling all year round.

NEWSOFT NEWS SERVICE

Newsoft News Service (NNS), from Newsoft, is a unique service designed to bring daily news and information to local bulletin-board systems (BBSs). It offers short articles on topics generally related to computers and high technology. These articles run about a paragraph each and are much like the abstracts you can read on such esteemed and high-priced services as The New York Times Information Service, Dialog, Information Access Company, and Bibliographic Retrieval Service.

Newsoft News Service and TelePsych offer the kind of help you need to combat the holiday blues and keep you smiling.

NNS styles itself as a wire service, like Associated Press and United Press International, and sets up different columns to hold different topics. NNS claims its writers have more than 30 years of experience in journalism, and indeed, the writing style is crisp.

Grab a Few Bytes

So far, NNS contains six columns—Newbytes, Tekbytes, Oldbytes, Daybytes, Scibytes, and Fembytes—and one bulletin section.

Newbytes is a computer-news column with entries Monday through Friday. Some of these nuggets of information appear in your local newspaper, but others do not. For example, here's a snippet from NNS that did not appear in my local paper:

"The telephone companies continue to work on a plan for a special data network which would provide both long distance and local data-only transfer over special lines at about half the price of current voice lines. Not much is known yet about cost, data transfer

MEL FURUKAWA

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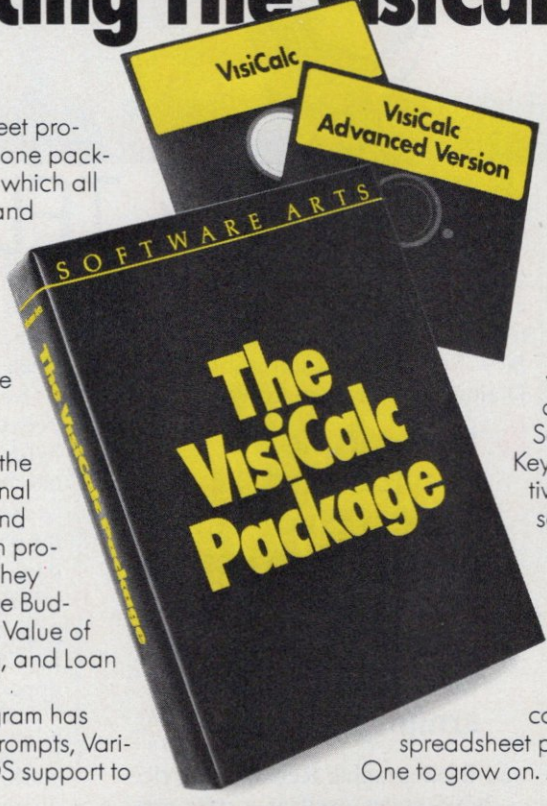

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rates, or expected startup time . . . but research and development are continuing."

Tekbytes provides "hardcore hackers' technical information." Well, sort of. Actually, it reads much like Newbytes, giving information about new developments in the computer field. For example, one story noted that Motorola had introduced a new graphics-controller chip set, compatible with the 68000 series of microprocessors, displaying 650 × 500-pixel resolution with 32 colors out of a palette of 4096 colors.

Oldbytes is a daily trivia column that asks four questions per day and provides answers the next day. Trivial Pursuit and TP-clone buffs will thrill to questions such as "Who is Louis Cristello?" and "What was the name of the frigate rammed by the Nautilus in *20,000 Leagues Under the Sea?*" (answers at the end of the column).

Daybytes provides little-known facts about historical events that occurred on a particular day and about famous people who have birthdays on a given day. For example, Michael Jackson, Elliot Gould, and Oliver Wendell Holmes all have their birthdays on the same day, which is also the day that the movie *Mary Poppins* debuted and Mormon leader Brigham Young approved polygamy.

Scibytes brings forth information from the frontier of science and technology. Capsule descriptions of events, research, and discoveries, most of which are not related to computers, keep you up to date.

Michael Jackson, Elliot Gould, and Oliver Wendell Holmes all have their birthdays on the same day, which is also the day that the movie *Mary Poppins* debuted.

Fembytes is a weekly column covering science and technology's effect on women, including medicine, computers, physics, physiques, economics, and electronic life-styles.

Finally, the bulletin section informs you about changes and enhancements to NNS. Although I was unable to preview new columns, the bulletin section anounced that NNS is bringing out three new columns on sports, the American life-style, and the popular-music scene.

NNS also provides a message center where you can leave electronic mail for the system operator.

The Cost

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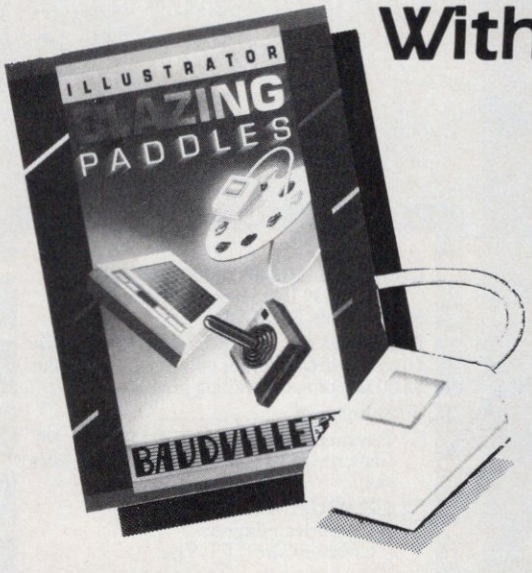
I like NNS and the idea of local BBSs setting up the service and then charging a dollar or so per month per subscriber. The local BBSs can make money to cover the costs of their labor of love, NNS makes money and increases the quality and variety of its



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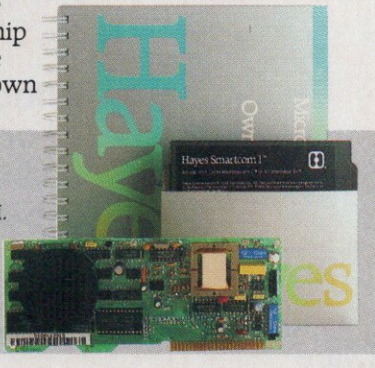

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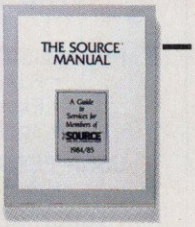

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service, and you—the subscribers—receive information at an affordable price.

TELEPSYCH

TelePsych is a new service that provides consultation with a clinical psychologist named Dr. Timothy Miller, California license #PS 8283. Rest assured, it is *not* a computer-simulation program such as Eliza or other counseling software. Miller is a practicing psychologist and indeed a real live human being.

Miller does not intend that TelePsych replace face-to-face counseling. He started the service for those who do not have access to a counselor, cannot afford traditional counseling, cannot fit regular appointments into their schedule, or are uncomfortable with face-to-face counseling.

Potential clients receive several psychological tests and a biography form for background information. Clients type their messages on a word processor and upload them to TelePsych. Miller provides a reply within seven days for the client to download.

Although the method of communication is different, the topics are the same as those that arise in face-to-face counseling, including stress, relationships, anxiety, parenting, and others. Miller notes that although the first contact is somewhat tentative, clients find that an intimate therapeutic relationship develops over time.

Telecommunications counseling has its advantages and disadvantages. You can take your time composing your message, saying exactly what you want to say. You do not have to keep regular appointments, for TelePsych is there when you need it, 24 hours a day. Miller notes that just thinking over a situation can be inherently beneficial. Finally, reading is faster than talking, cutting the cost of the therapy dramatically.

On the negative side, Miller cannot respond to nonverbal clues, and the spontaneous give and take of face-to-face counseling is compromised.

Miller assures complete confidentiality, within legal limits, and claims that TelePsych is "virtually break-in-proof."

Information Now

TelePsych also contains 16 "electronic pamphlets," each of which discusses a single topic. This information

Although the method of communication is different, the topics are the same as those that arise in face-to-face counseling.

is available free of charge to all callers of TelePsych, not just clients. The topics include computer addiction, sexual problems, how to quit smoking, anorexia and bulimia, anxiety, infidelity, and weight problems.

The pamphlets convey the topics in easy-to-understand, laymen's terms. They are professional presentations and serve as a good introduction on how a problem starts and what you can do to help yourself. These are not end-all cures—they express only the opinions of Miller and should not be considered a substitute for professional consultation. Nevertheless, they are a good starting point.

TelePsych costs 7/10 cent per word you send to Miller and two cents per word for Miller's reply, which works out to about $50 per hour. Fees are not re-

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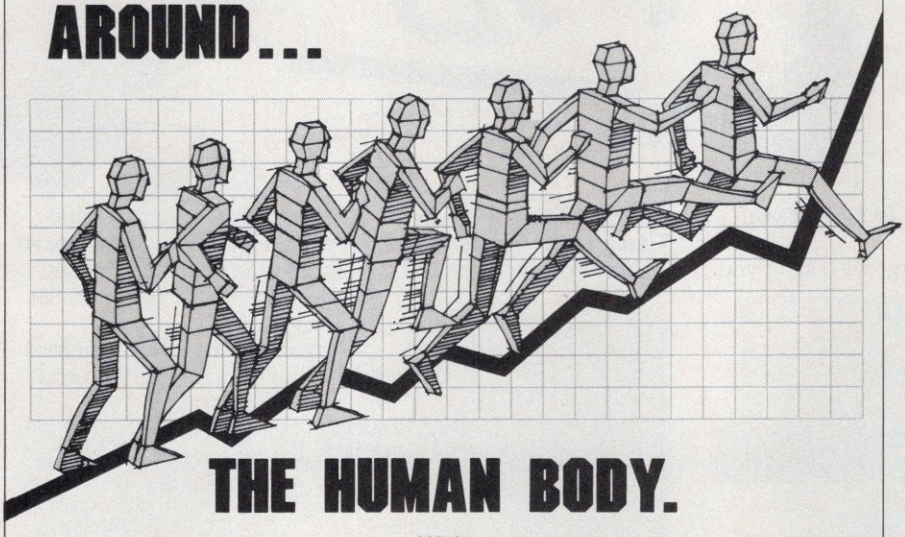

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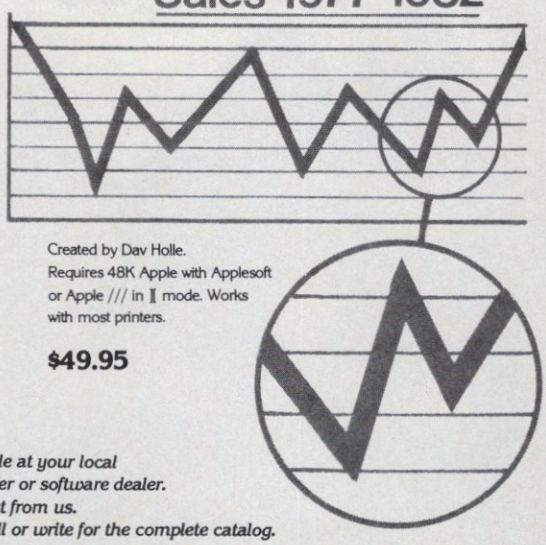

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imbursable by medical insurance but are "probably" tax-deductible as a medical expense, according to Miller.

Miller notes that responses are usually limited to a page and a half (about $18), although in many cases they are shorter. Do not forget to take into account the cost of telephoning TelePsych, which adds a couple of dollars.

TelePsych can aid people who find they need occasional counseling and do not want to bother to set up face-to-face appointments or are uncomfortable

The pamphlets themselves are worth a call, addressing problems in clear and consise terms. TelePsych fills a real need.

about doing so. The pamphlets themselves are worth a call to TelePsych, addressing problems in clear and concise terms. TelePsych fills a real need.

THE READERS STRIKE BACK

A+ subscribers are active readers and want to get involved with the magazine. Certainly your letters indicate as much. What I'd like is some feedback on my bimonthly telecommunications column about the things you've liked or disliked; where you would like to see the column go; and, above all, suggestions for improvements.

I promise to read every letter and to start projects if the demand is there. Please take a few minutes to send me your views. Address your comments to Russ Lockwood, c/o *A+* Magazine, 11 Davis Drive, Belmont, CA 94002.

Incidentally, the answers to the trivia questions are Louis Costello (as in Abbott and Costello) and *The Abraham Lincoln.* +

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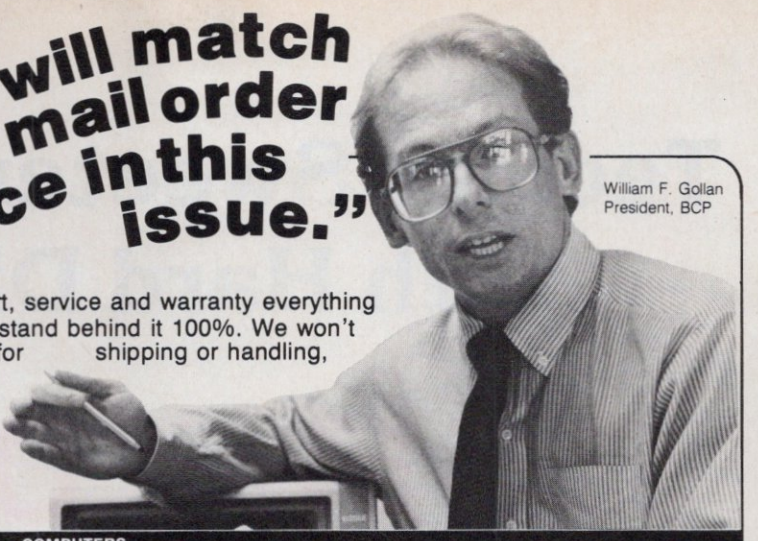

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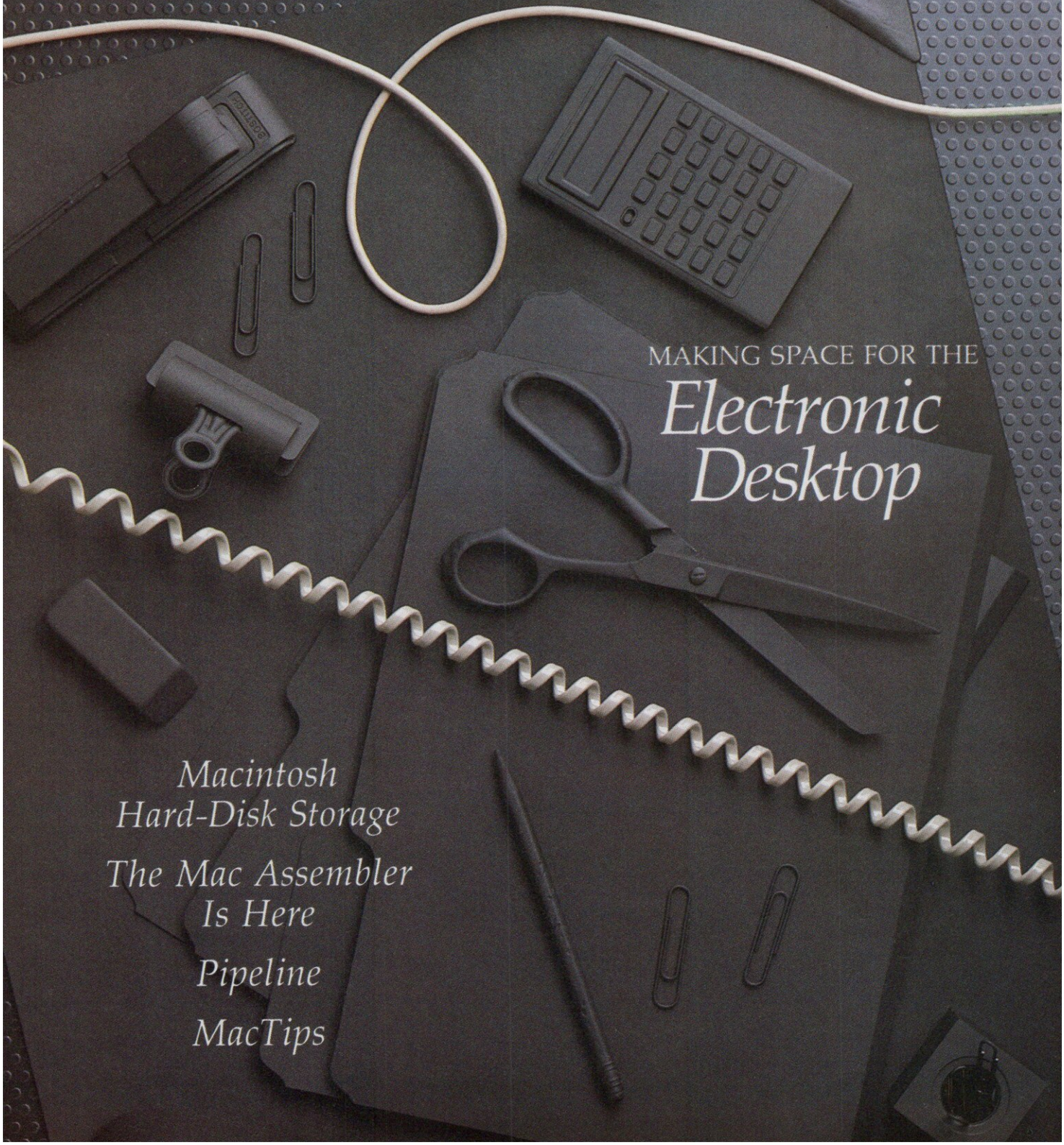

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Expand Your Memory the Hard Way

Hard-disk storage systems for the Macintosh

One of the most significant improvements you can make to your Macintosh is to add a hard-disk storage system. Given the amount of space that the system folder and various applications take up, a microdiskette can fill up awfully fast. Constant disk swapping and increasing stacks of microdiskettes may prompt even first-time computer users to investigate hard disks, and anyone who deals with vast amounts of data is already shopping around.

Storage capacities for Mac hard disks range from 5 to more than 90 megabytes, and prices start at around $1800. This sum may seem like a lot of money, but consider what you get. The most obvious advantage is more disk-storage space. A 5-megabyte disk can hold as much information as 12 of the Macintosh's micro-floppies can. Because we refer to it as a hard "disk," we generally forget that we're getting the drive as well. Comparing a hard disk to twelve micro-floppies in 12 disk drives makes the price more palatable.

In addition to providing more disk space, a hard disk will save you time, not only because you can skip the disk swaps, but also because it reads and writes faster than does the Macintosh's floppy-disk drive. A hard-disk drive spins more than ten times faster than a floppy drive. You'll notice this speed improvement when you open applications and load files. Furthermore, because the read/write heads never actually touch the disk, data storage is more reliable.

If a Macintosh is your first computer, you should keep in mind the difference between memory and disk storage. Having a hard disk won't rid you of that Almost out of memory message that refers to the Mac's internal memory, or RAM. Whenever your computer has to write to disk, you'll benefit from a hard disk—even when you're printing something out, since a print file goes to your disk. For the most part, adding a hard disk will reduce the Please insert the disk or The disk is full, please delete some documents messages you've come to despise. You'll be able to see many more file listings at a glance (and a slide of the scroll bar, of course). You can forget forgetting what's on which disk.

The one thing you have to lose, at least temporarily, is use of your modem port. Since current versions of hard disks for the Mac connect to the modem port, you won't be able to use the hard disk and the modem simultaneously. If you plan to employ your Mac hard disk to download large files from external databases, you won't be able to do it just yet.

These considerations should help you determine whether or not you're ready for a hard disk. If you're simply looking to avoid disk swaps, a second drive is what you need. If you'd like to have immediate access to a lot more stored information, a hard disk is the likely candidate.

Several companies are developing hard-disk systems for the Macintosh, and I had the opportunity to examine three of them: a ten-megabyte Davong Mac Disk, a five-megabyte Tecmar Mac Drive, and a five-megabyte Corvus OmniDrive.

Before I get into the differences among the three, let's look at what they have in common and at some other preliminaries.

Each product comes with everything you need to get it running: the drive, an interface cable, a power cord, documentation, and software. You need software because the operating system on your current system diskette doesn't know that a hard disk can be connected to the modem port. Installation is easy—plug the drive in and follow the instructions, which, in all cases, are reasonably straightforward. Now you're ready to begin copying all those files from all those diskettes.

Since I was interested in mass storage, I set out to see just how much of my information these products could deal with. Once I'd started actually using the disks, I found some good news and some bad news. The good news is that life without disk swaps is wonderful. The bad news is that I ran into bugs and glitches and things that went bump in the night.

Original icons disappeared during the duplication process, and the infamous bomb appeared on the screen with no error message at all. I kept getting a message that there wasn't enough memory to insert my micro-floppy. How could I copy my floppy disk if I couldn't insert it? I used the Clean Up command to try to get

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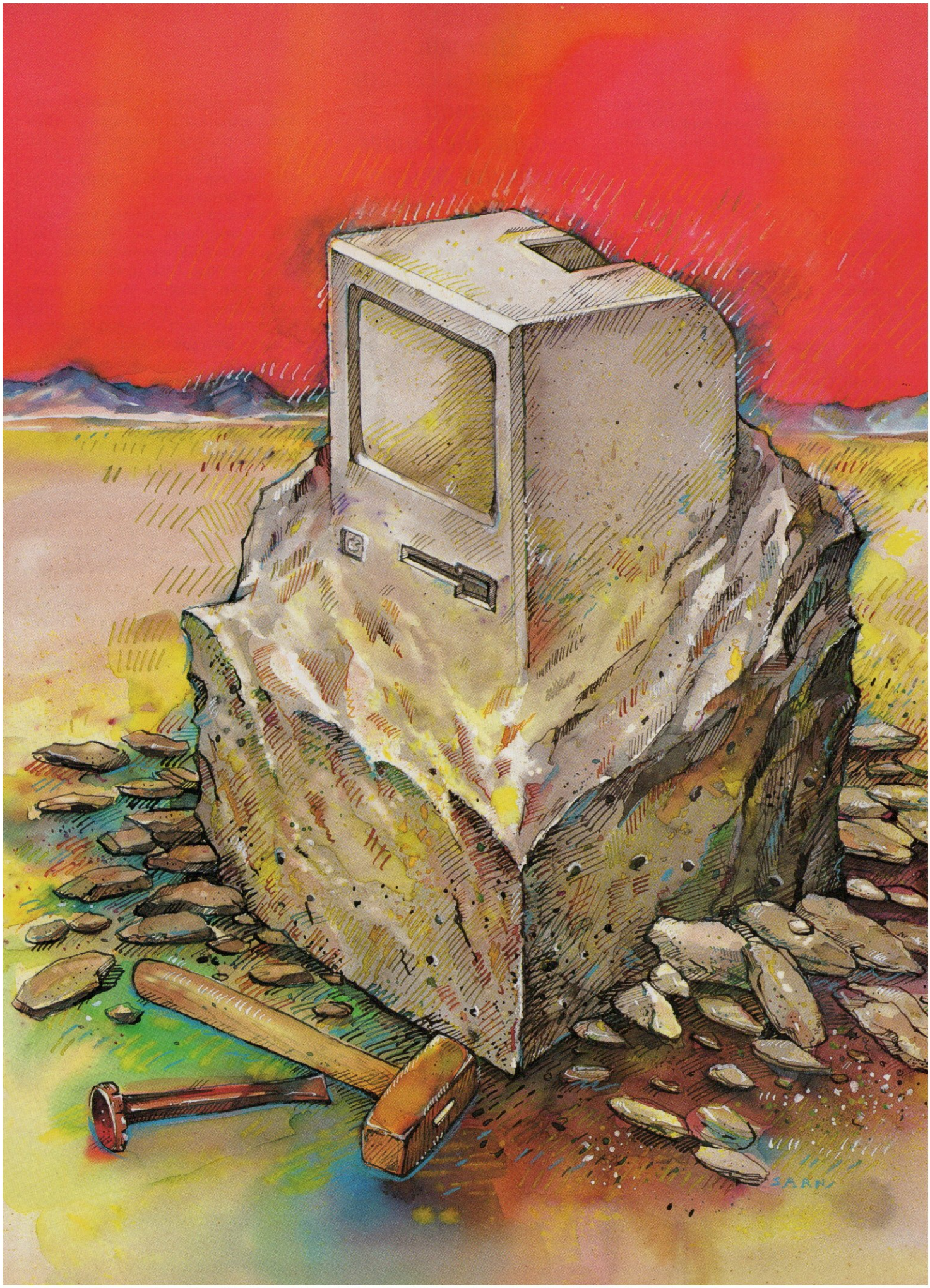
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around the problem. With one of the hard disks, the process took five minutes; with another I gave up and rebooted after 45 minutes.

Finders, Losers

Eventually I tracked down the source of these seemingly unrelated difficulties. The culprit is the current version of the Macintosh's operating system, which is known as the Finder (version 1.12, as of this writing). The Finder was developed before hard disks were made for the Mac, and it is not designed to work with the amount of information they can store. Consequently, after you've entered a certain amount of data, the Finder begins to lose track of things. Apple is currently working on a new version of the Finder, but, in the meantime, anyone who purchases these products will have to deal with the difficulties. Unfortunately, not one of the problems with the Finder was mentioned in any of the documentation for the hard disks I received.

The major limitation of the Finder lies in the number of different files it can handle. Once you cross a certain threshold (somewhere around 128 directory listings), you've got problems. The worst situation is when you have many small files. I was working with MacWrite files, which are necessarily limited in size, so I had files that ranged in size from 3 to 20K. Had I been using large files—300K databases, for example—the problems wouldn't have come up. The problem is not with the size of files, but with the number of icons the Finder must deal with. Asking the Finder to "clean up" 200 icons was a presumptuous demand on my part. Keeping this foible in mind, let's take a look at the three disks.

After you've entered a certain amount of data, the Finder begins to lose track of things.

Davong Mac Disk

Four indicator lights on the front panel of the Mac Disk inform you when the power is on, when a read/write operation is in progress, when data is passing through the serial port, or when a flawed area of the disk surface is being remapped to prevent errors.

Once you've completed the installation procedures and booted Davong's Mac Disk system diskette, you open the Mac Disk icon and insert your own diskette. At this point you're likely to get a message that reads There isn't enough memory to work with another disk. The message is disconcerting, to say the least. How can you copy your own files if you can't use your diskette? To proceed, you must first remove the icon representing the Davong system diskette.

Opening and closing any application from the hard disk will fool the Finder into thinking the hard disk is the system disk, which solves the problem. After you've played this trick, you can eject the Davong system diskette, throw its icon into the trash-can icon, and insert your own diskette. The manual fails to inform

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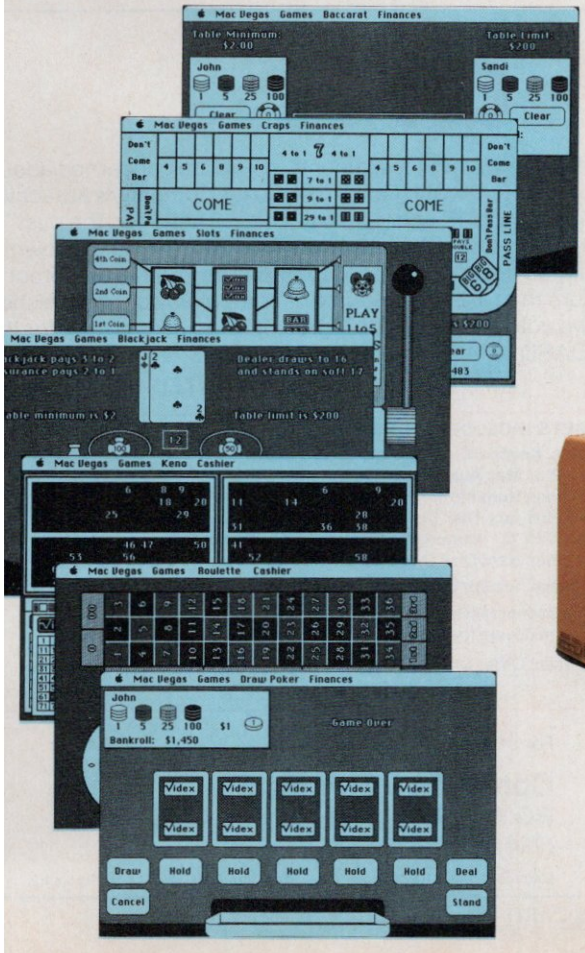

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you of this procedure.

Once I'd loaded the diskette, copying files to the Mac Disk was as easy as dragging icons from one window to another. Until I had about 120 files, that is. At that point, I happened to be duplicating files. After I'd selected a group of five icons and had chosen the Duplicate command, the five copies appeared on the screen, and three of the original icons disappeared. Obviously, I had reached the invisible threshold of the Finder. No error messages informed me of that fact, however.

This situation was particularly disconcerting since I had a ten-megabyte disk and still had 5604K available on it. If you plan to use a large number of small files, you'll be able to use only about half of the space on a ten-megabyte disk. If you have much larger files, however, you won't run into this problem.

One additional limitation of the Davong is that the smallest amount of information it can access appears to be 20K. My MacPaint files on diskette ranged from 6K to 20K, and after I transferred them, they were all listed as 20K. MacWrite files from 6K to 11K all became 41K on the Davong.

Once I'd loaded the diskette, copying files to the Mac Disk was as easy as dragging icons from one window to another.

This problem may seem trivial—after all, you have ten megabytes of space—but it can make your life miserable when you're trying to copy things back to a microdiskette. I had a disk full of MacPaint files, which took up 282K on my microdiskette. I put them in a folder and transferred them to the Mac Disk, where they took up 587K.

When I tried to copy that folder back to a microdiskette, I got a message that read There is not enough room on the disk to duplicate or copy the selected documents. This quirk is not only a Finder problem, but also one that involves the way that the Davong Mac Disk allocates space for files.

Tecmar Mac Drive

Tecmar produces both five- and ten-megabyte hard disks in a variety of combinations of fixed and removable disks. The five-megabyte removable version that I tested had only one indicator light, a minor inconvenience you'll get used to, but one that stood out in contrast to the other products. The removable disk combines the advantages of a hard disk and a floppy. You can, for example, purchase two removable disks and use one as a backup.

Pursuing my quest for true mass storage, I managed to get 212 items onto the Mac Drive. When the disk was full—that is, when no more storage space was available—I got a message that announced There is not enough room on the disk to duplicate or copy the selected item(s). Thus, even with my 200 tiny files (plus applications), I was able to make use of all of the hard disk's storage space. Once you get that many

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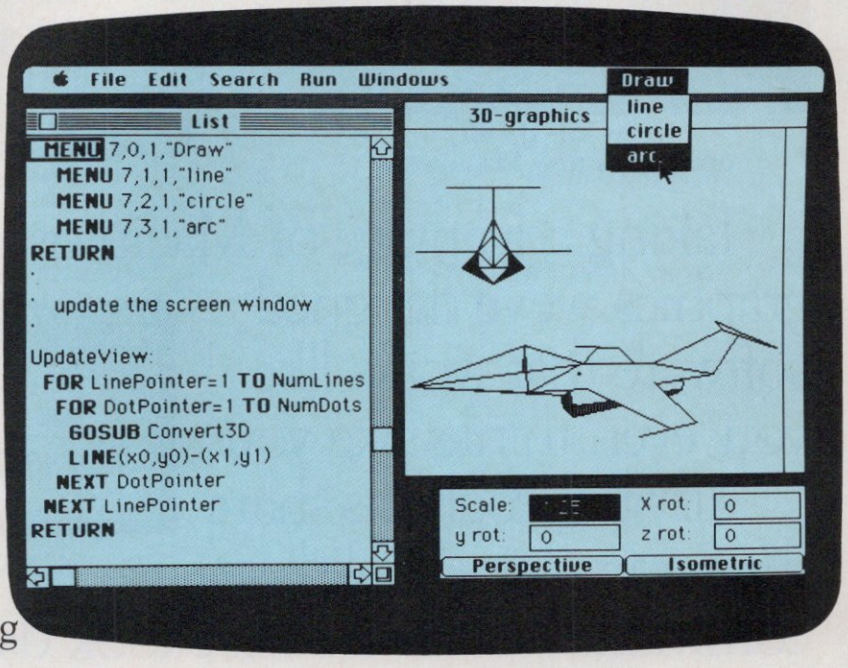

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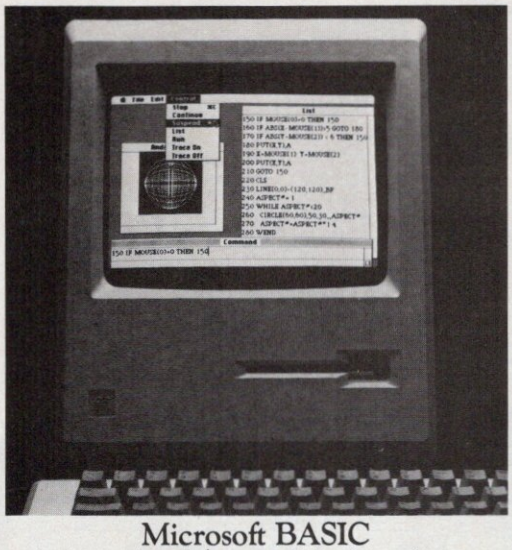

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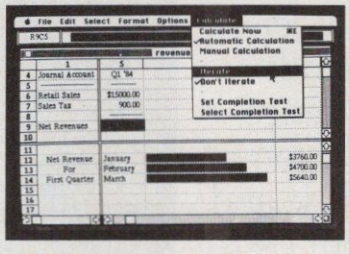

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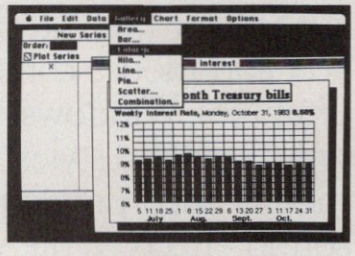

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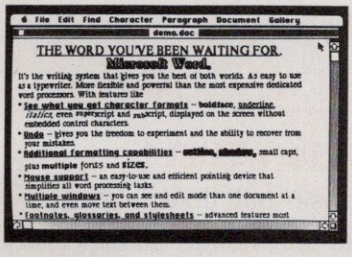

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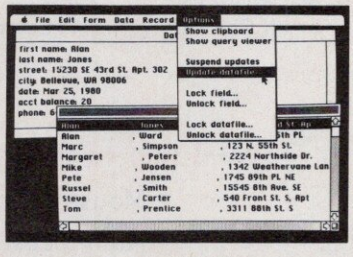

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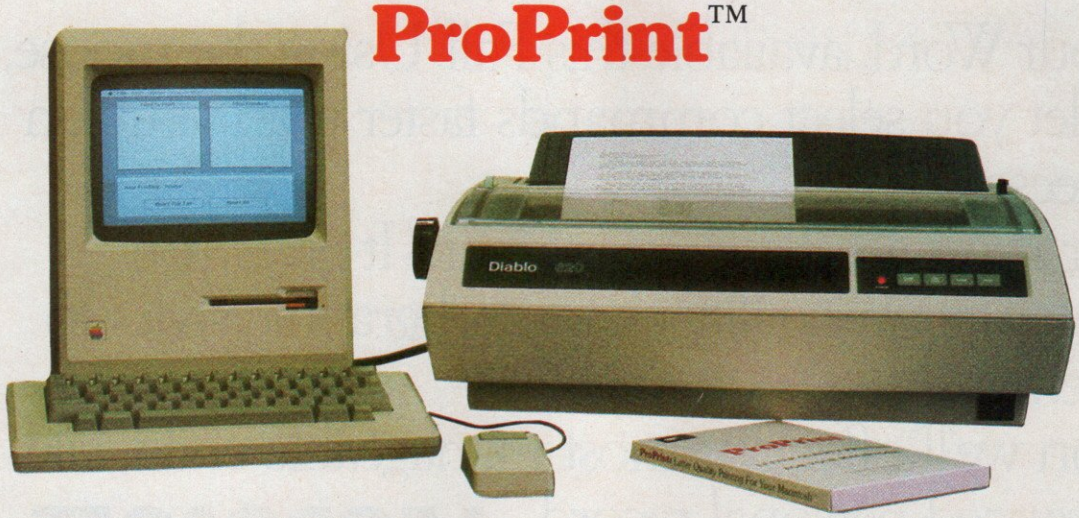

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By this time, I'd become used to things happening without warning; in fact, I was expecting it.

icons on the screen, the system is considerably slower, but that's to be expected.

Having come this far without a hitch, I decided to try the Clean Up command. After 45 minutes, I gave up and rebooted. Things weren't cleaned up, but they were all still there; I didn't lose any files. The Tecmar hard disk converted the size of all my MacWrite files to 20K, which created the same difficulty I'd had with the Davong. My five files, 48K in total, took up more than twice as much space on the Tecmar.

Corvus OmniDrive

The OmniDrive comes in 5-, 11-, 16-, and 45-megabyte sizes. Indicator lights show you Ready, Busy, and Fault. The most important feature of the OmniDrive is that it is divided into 1.25-megabyte sections called volumes. A first glance through the manual gives novices the impression that these volumes are going to unnecessarily complicate life, but in view of the Finder difficulties, these volumes turn out to be immensely useful. The five-megabyte version contains four volumes. You can think of a volume as being similar to a diskette. The smallest volume on the smallest OmniDrive holds more than twice as much information as one regular disk does.

In search of that unfortunate threshold of the Finder, I opened up a volume, added the system information and MacWrite, and started adding files. After I had 93 items (1232K) in the volume, I noticed that as I continued to duplicate files, the amount of space available on the volume stopped decreasing. I supposedly had 36K remaining, and even though I duplicated more and more files, I still had 36K remaining.

Suspecting I had crossed the line, I tried to open the last file I had created. I was met with This document cannot be opened. As it turned out, all of my files after number 87 had the same problem. By this time, I'd become used to things happening without warning; in fact, I was expecting it.

This problem appears to be a bug, however, and Corvus will probably be working on it by the time you read this article. On the positive side, I was able to use all the storage space in the volume, and I had three more volumes at my disposal. The Clean Up command actually worked, though slowly (it took five minutes).

The volume format limits the number of volumes that you can "mount" at once—you should mount only one at a time. When you mount a volume, its icon is on the screen, and data can be read from and written to that volume. The Macintosh, therefore, has smaller amounts of information to deal with at once, which lets you circumvent the Finder difficulties and is essential for large-capacity (i.e., more than five-megabyte) hard disks.

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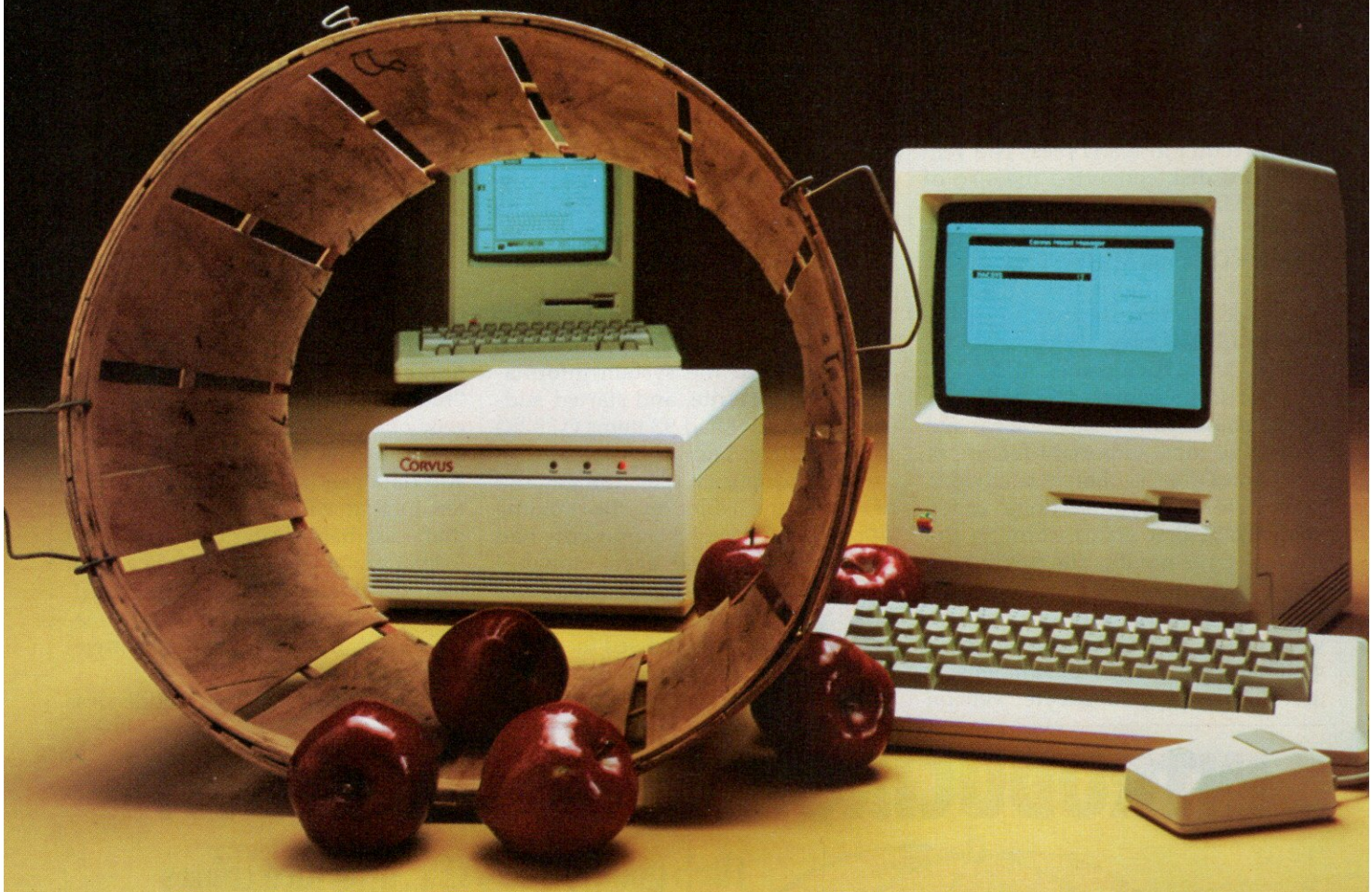

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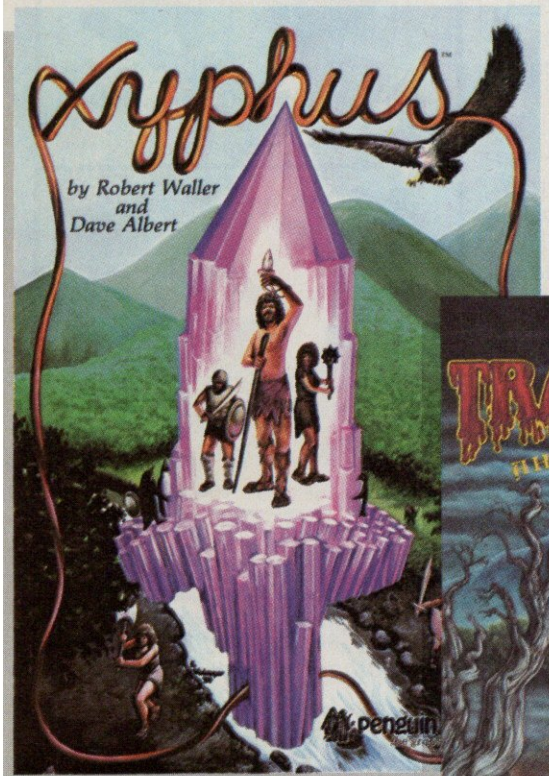

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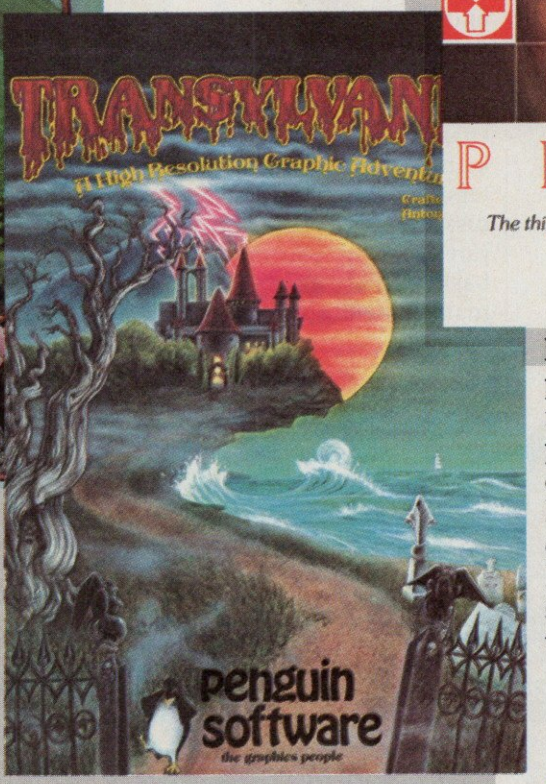

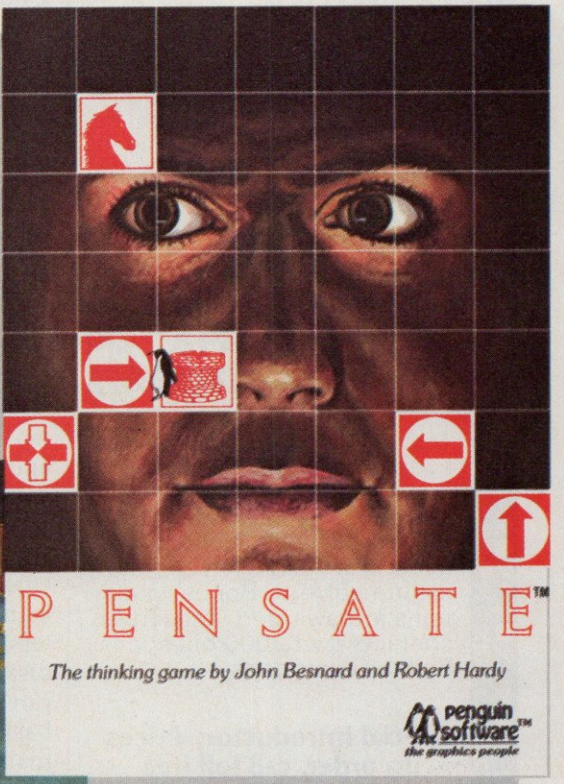

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space to files you copy to it. My 13K files turned into 16K, and my 6 and 9K files turned into 12K.

To Buy or Not to Buy

Many of the difficulties I've mentioned will disappear with a new version of the Finder that is designed to work with hard disks and other mass-storage devices. For the time being, however, users have to live with the Finder's current constraints. Some guidance in the documentation would have reduced my frustration level considerably. In spite of the problems, if you know you're going to need mass storage, purchasing a hard disk now is not a bad idea. If you're prepared to deal with the Finder problems, you'll be able to make use of the products now, and eventually Apple will revise the Finder.

The products from Tecmar, Davong, and Corvus are all in the same general price range, although prices vary, depending on memory capacity. Some of the Tecmar drives have a removable five-megabyte cartridge, and the Corvus provides formatted volumes. These major distinctions will help you decide which product is right for you. If you decide not to purchase now, you'll have more choices in the future. Davong is planning a tape drive for backing up your hard disk and a Backup and Restore feature to help you copy and restore backup files, as well as a volume-management program.

Other hard disks are on the way. Quark Incorporated is producing the QC10, which is Macintosh-compatible. You can divide the disk into volumes of any size and password-protect them.

SUN*DISK from Sunol Systems comes in sizes from 8 to 92 megabytes. Sunol is working on a networking interface that will allow several Macs to share a single SUN-*DISK.

Symbiotic Computer Systems is creating the Mac Symbfile. The Symbiotic Mac IIc Adaptor will reportedly allow you to connect a hard disk to your second floppy port, freeing the modem port for other use.

Because the Macintosh is unique and still rather new, solving the interface problems will take some time. As more products arrive on the scene

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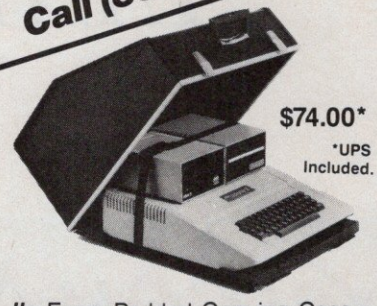

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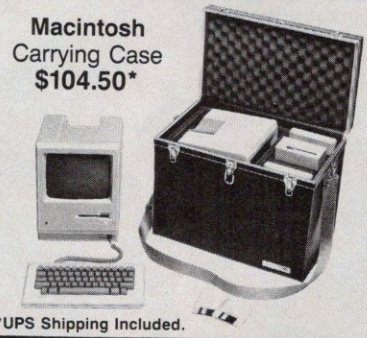

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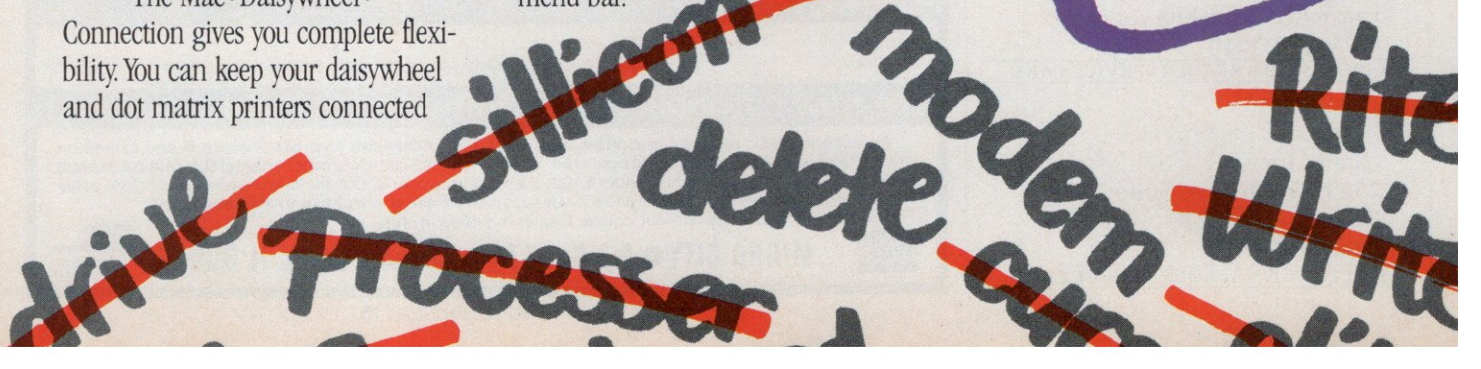

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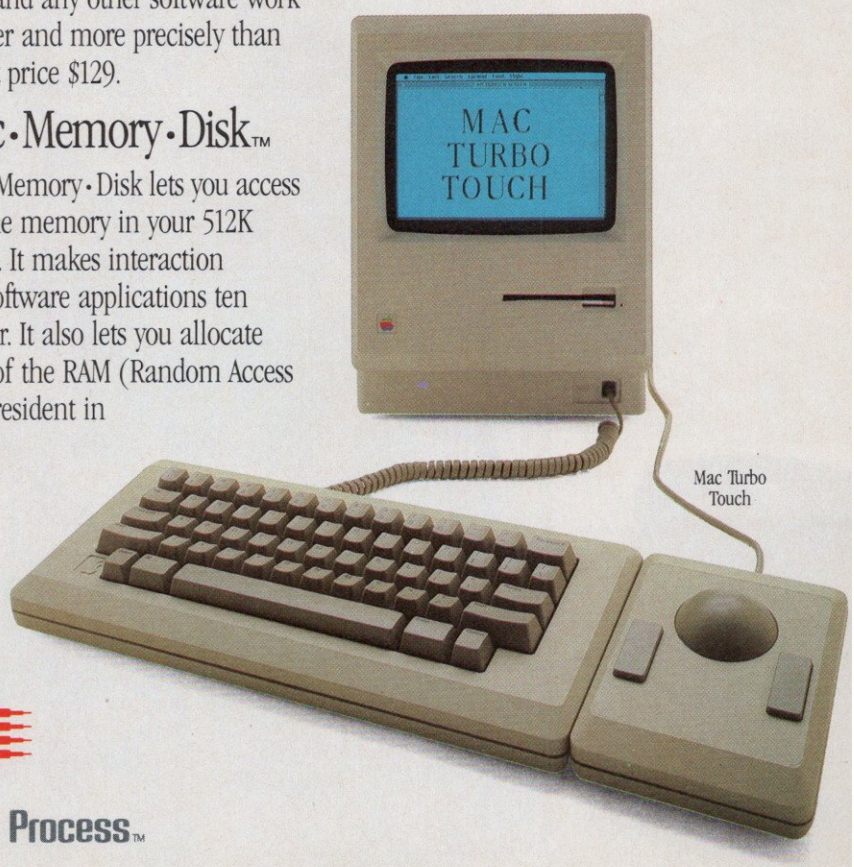

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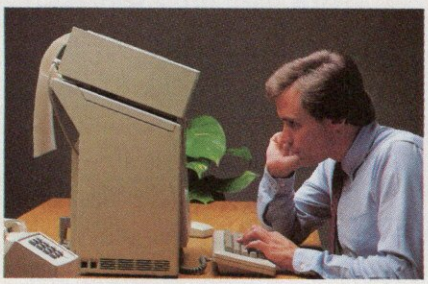

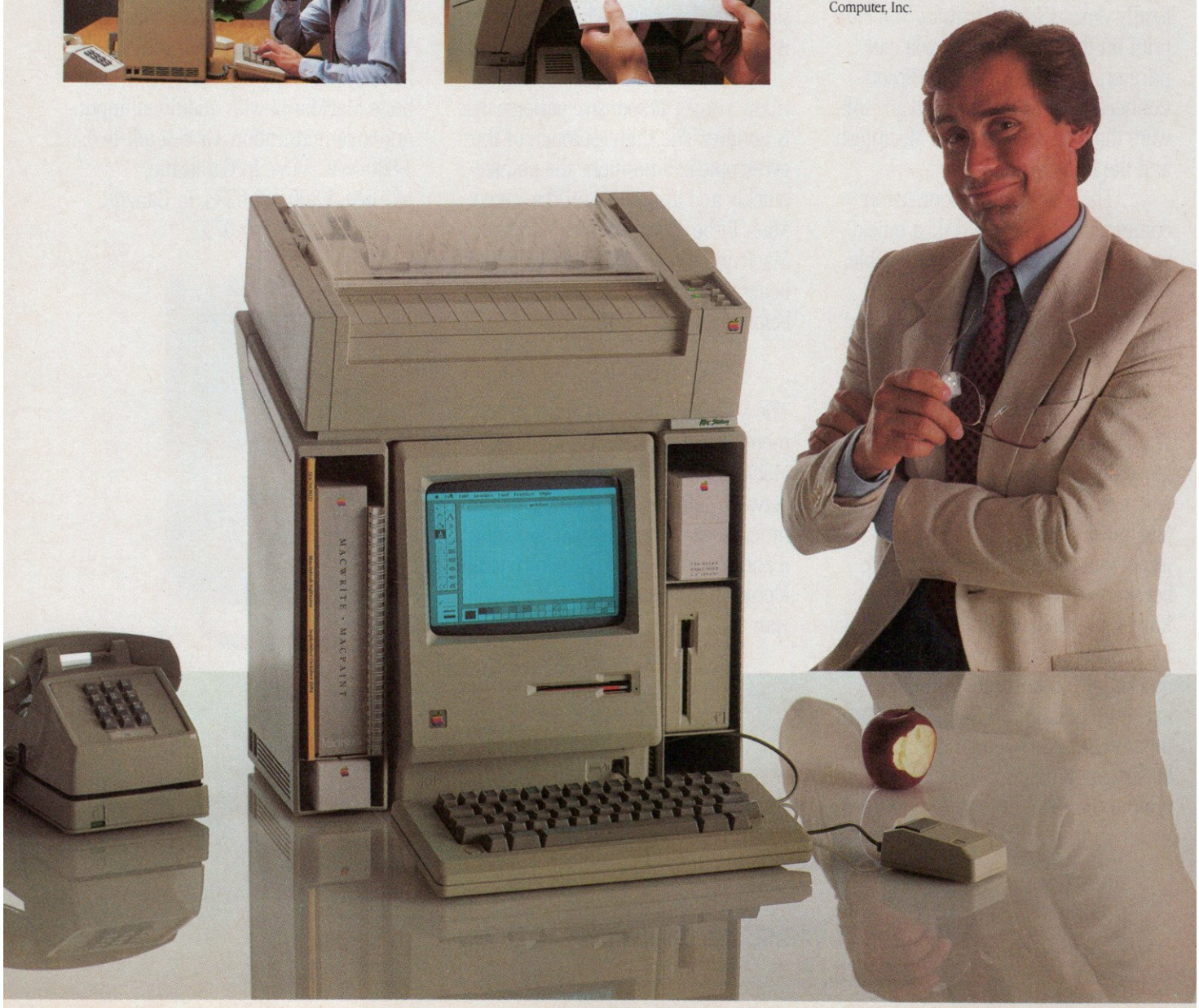

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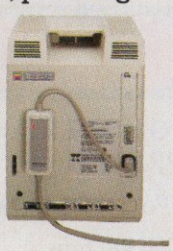

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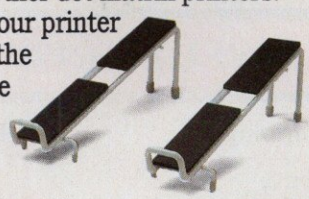

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Move Over Lisa, the Mac Assembler Is Here

Apple's new assembler package allows you to create sophisticated application software with your Mac

Normally, I write this column only every other month, but this month is special: Apple is finally releasing its assembler package for the Macintosh.

Since you'll want to experiment with the assembler as soon as you get it, I thought I'd write briefly about how you program with it.

First, the good news: Using the Mac assembler is a relatively straightforward process. The manual does a fairly good job of describing what you do, so I won't belabor that subject here. Actually, the process closely resembles the way software developers have been using the Lisa assembler to create Mac products:

- Use the editor to create your source code.
- Assemble and link your code.
- Use RMAKER to create the resource file and to stuff the code into the resource file.

The procedure for using RMAKER is described in a chapter of *Inside Macintosh* entitled "Putting Together a Macintosh Application."

Those of you who got early copies of *Inside Macintosh* should take note that Apple updated the manuscript in August to reflect changes in the software. Thus, some versions of the chapter on RMAKER may provide outdated and confusing information. If you happen to be stuck with the old manual, you may want to write to Apple to request an update.

OK, you have your 68000 assembly-language handbooks handy, your copy of *Inside Macintosh* turned to the application chapter, and your Mac turned on and running the assembler disk. Now what?

Well, that's the bad news.

Nowhere in any of the documentation I've received from Apple do the authors attempt to put the whole Mac development environment together to tell you what comes first, what goes second, and so on. I'll use the rest of the limited space I have available this month to try to provide some answers to these questions.

First, you need to tell the assembler about the Mac-specific calls it is going to encounter in your program. Therefore, the first thing in your source code should be a set of INCLUDEs, so that the assembler will understand Mactalk:

```
INCLUDE MacDefs.D
INCLUDE HeapDefs.D
INCLUDE MacTraps.D
INCLUDE ToolEqu.D
```

and so on, one INCLUDE statement for each of the definition files Apple has provided and that you need in your program. If, for some reason, you aren't going to use the toolbox

```
     CLR.W  -(SP)                ; clear space on stack for
                                 returned handle
     PEA    Name                 ; put name of the resource
                                 file onto stack
     _OpenResFile                ; open the file
     MOVE.W (SP)+,D0             ; get handle off stack and put
                                 in register for later use
NAME .BYTE 12
     .ASCII 'Resourcefilename'   ; substitute your filename
     .BYTE 0
```

Figure 1: Opening your resource file

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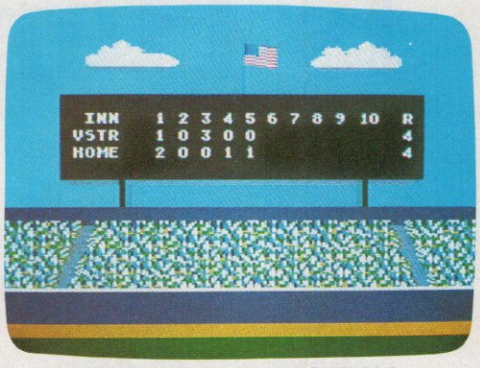

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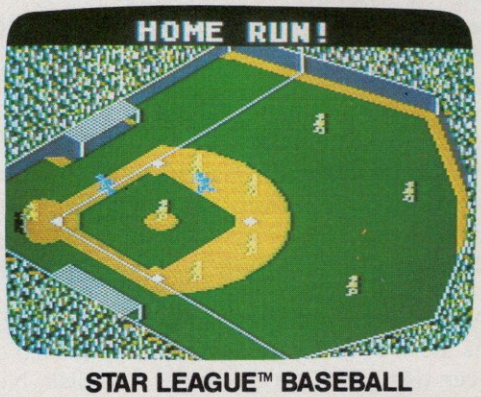

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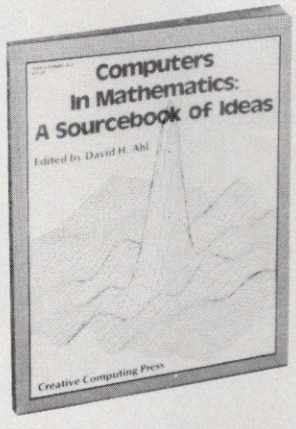

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Using the Mac assembler is a relatively straightforward process.

goodies Apple provides, you can omit the INCLUDE ToolEqu.D statement, for instance. I strongly suggest that you print out each of the definition files and have them by your computer for reference as you begin to program. *Inside Macintosh* uses Pascal, not assembly, terminology, so you'll see DisposWindow in the definition file. If you're not watching for these small changes, you're going to get stuck real quick.

Now for some quicky hints to round out this month's offering:

1. First, initialize all managers you'll be using: _InitGraf, _InitFont, _InitWindow, _InitMenu, _InitDialog, _TEInit, and so on. Remember, some of these managers have parameters that must be on the stack before initialization.

Although *Inside Macintosh* uses Pascal terminology, you can see how to convert it to assembly language by noting that each argument (the material in parentheses) in a Pascal function is "pushed" onto the stack in order. Thus, in assembly, you simply push that same information (or pointers to it) onto the stack in the order you desire.

2. Open your resource file second (see figure 1, page 35).

3. Set up your menus third. Now you're ready to dictate what comes next by writing program specifications.

Next month we'll put together a simple application that consists of nothing more than a menu and a dialog box. From there we'll build to bigger and better programs. ✚

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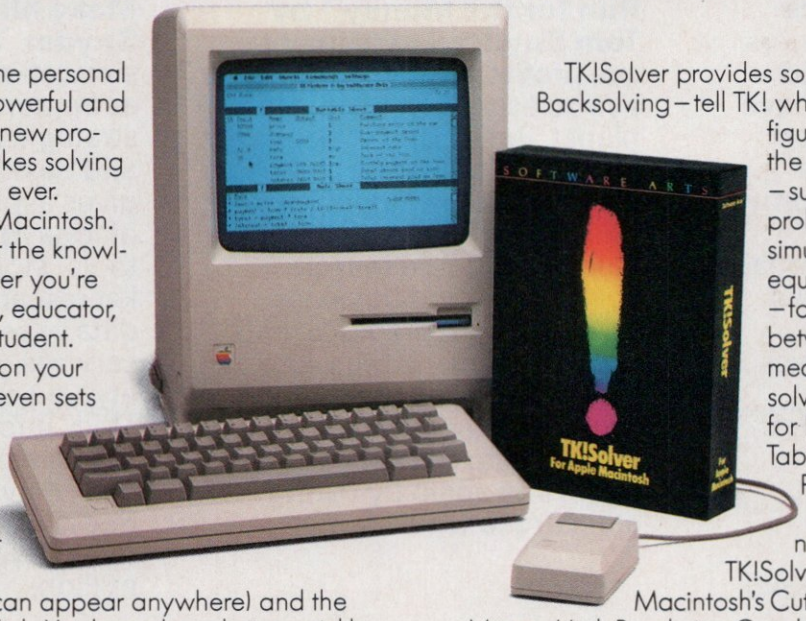

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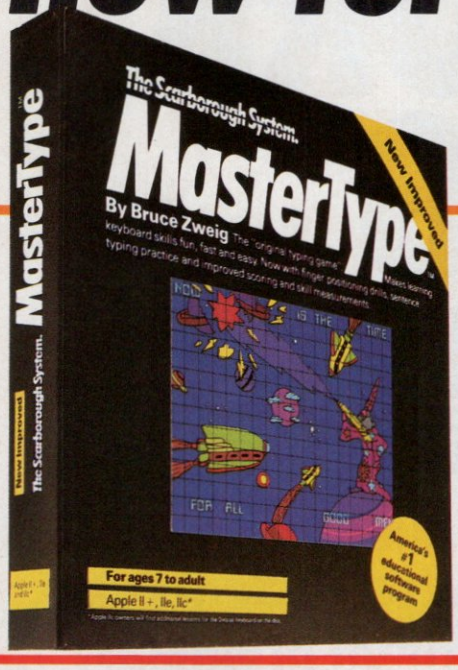

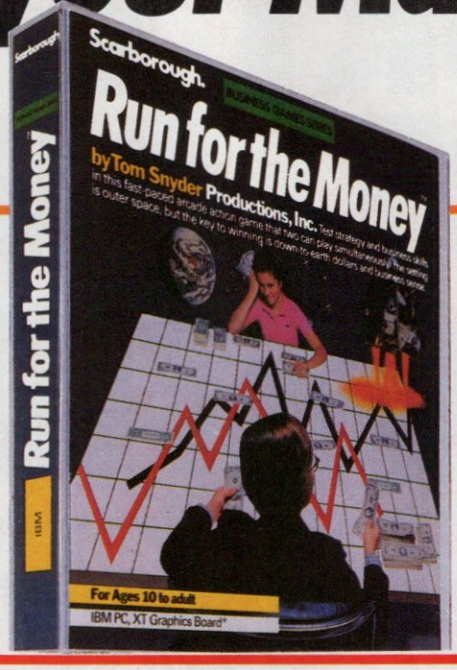

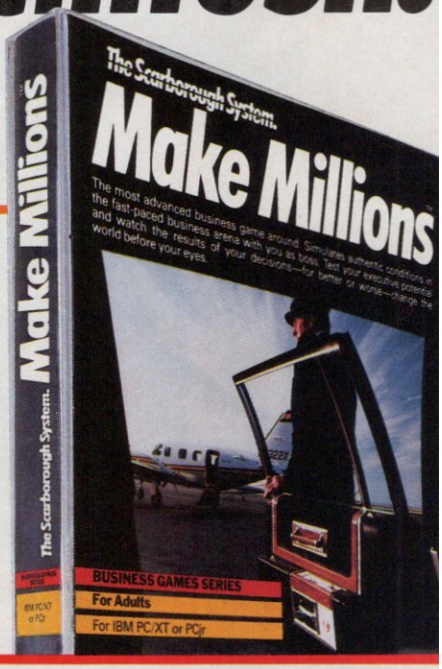

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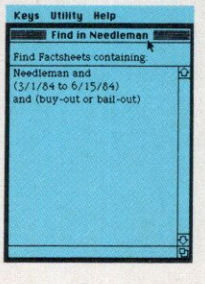
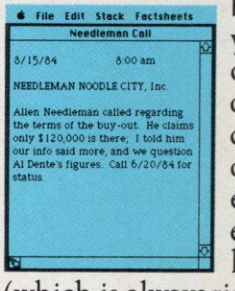


Then, when you need to find all the clients you have who hate olives or live in Denver; when you want to collect your notes on pasta merchandising; when you need the name and number of that guy who's looking for leveraged buyouts, it's yours in a few seconds, at your index fingertip.



Let's say you've had a significant breakthrough on your project. (Or case, or campaign, or analysis.) You click Factfinder on, jot down the essentials on our electronic equivalent of a notepad (which is always right where you want it and never runs out of paper or gets runny because somebody put coffee on it).

When you've finished keying in your notes on the Needleman Plan (or Needleman vs. Nardoff or the Needleman Noodles campaign) in any length you want, you click the mouse on a few key words—"fallout," "bail-out," "roll-out," leveraged buyout," "March 14," whatever.

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Needleman

Then, any of those words or even part of those words will bring you a stack of any notes you've made that include "Needleman," or "leveraged buyouts," "national rollouts" or miracle "bail-outs." Or you can request Factfinder to get you the Factsheet that contains "Needleman" *and* "bail-out" *and* "March 14." Or you can ask for anything that mentions "bail-out" or "Needleman."

And Factfinder has all kinds of features like zoom and automatic wrap and things to help you manipulate the heck out of your data, and make it whatever size and shape you want.

Contact your Macintosh™ software dealer for a demonstration, or call 1 800 MACWARE to find out where you can get Factfinder in your area. From Forethought, Inc.

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Making Space for the Electronic Desktop

Four productivity programs for the Macintosh can replace your telephone directory, calendar, and notepads.

If any machine, even a Macintosh, wants to claim a share of the scarce space on the office and professional desktops of the world, it must displace some of the items that are already there. That's exactly what several of the first "productivity" packages for the Mac claim to do: replace books and pads traditionally found on physical desktops with improved equivalents on the Mac's electronic desk.

Intermatrix's MacPhone is an all-in-one address book, calendar, and auto-dial telephone that also records and reports billing information. Haba Systems' Habadex also combines an address book, a calendar, and a dialer, but this program places special emphasis on working with address lists. Factfinder, from Forethought, Inc.'s Macware line, wants to edge out your card file and the blotter or notepad where you jot your notes. Living Videotext's ThinkTank has eyes on your yellow pad.

You can get along for now without any of these packages if you're fond of the scratching of a sharp #2 pencil. Unlike word-processing programs and structured databases, these programs won't so vastly and immediately change the way offices work that those who don't use them will be quickly left behind. Instead, they're tools that can, if they match the ways and rhythms of how you work, make your day run a bit more smoothly and productively.

Habadex and Macphone both let you type in your telephone list once and then let your Mac electronically thumb through the pages to find and dial numbers. An adapter box that plugs into the speaker jack of your Mac does the actual dialing.

Habadex's main image shows an address book (the Habadex Directory), a calendar book (labeled Habadex Appointments), and the usual Macintosh pull-down menu strip across the top (see figure 1, page 148).

One of Habadex's outstanding features is its addressing and sorting capability. You'll notice, in fact, that the address book is deservedly the largest item on the main Habadex desktop screen.

As a first step, of course, you have to enter your address list into the Habadex. Using a predefined form provided by Haba, you can enter the name, address, phone, account number, and three other short identifiers for each person on your list. Then you can look through your list in order, by first name, last name, category, company, ZIP code, account, or three miscellaneous identifiers. You can rearrange the list as often as you like; each time you do, the address book on the screen shows the appropriate tabs for dividing your list into about 20 subsections.

If you have an Apple modem, an equivalent modem, or Haba's own Habadex Adapter, you can even have your Mac actually dial the phone. If you call up a name from your address book, you can tell Habadex to dial that person's home or business number (either directly or using a discount long-distance service).

Once you have entered your list, you can use it for more than looking up and dialing phone numbers. Using the Print menu, you can produce several kinds of mailing labels, a printed name-and-address list, or even a merged form letter.

In the Calendar mode, Habadex lets you pick a month, then zoom in on an individual day within the month, and then list your appointments for the day. If you enter the time for each appointment when you close up the calendar, Habadex keeps track of your next two entries, listing

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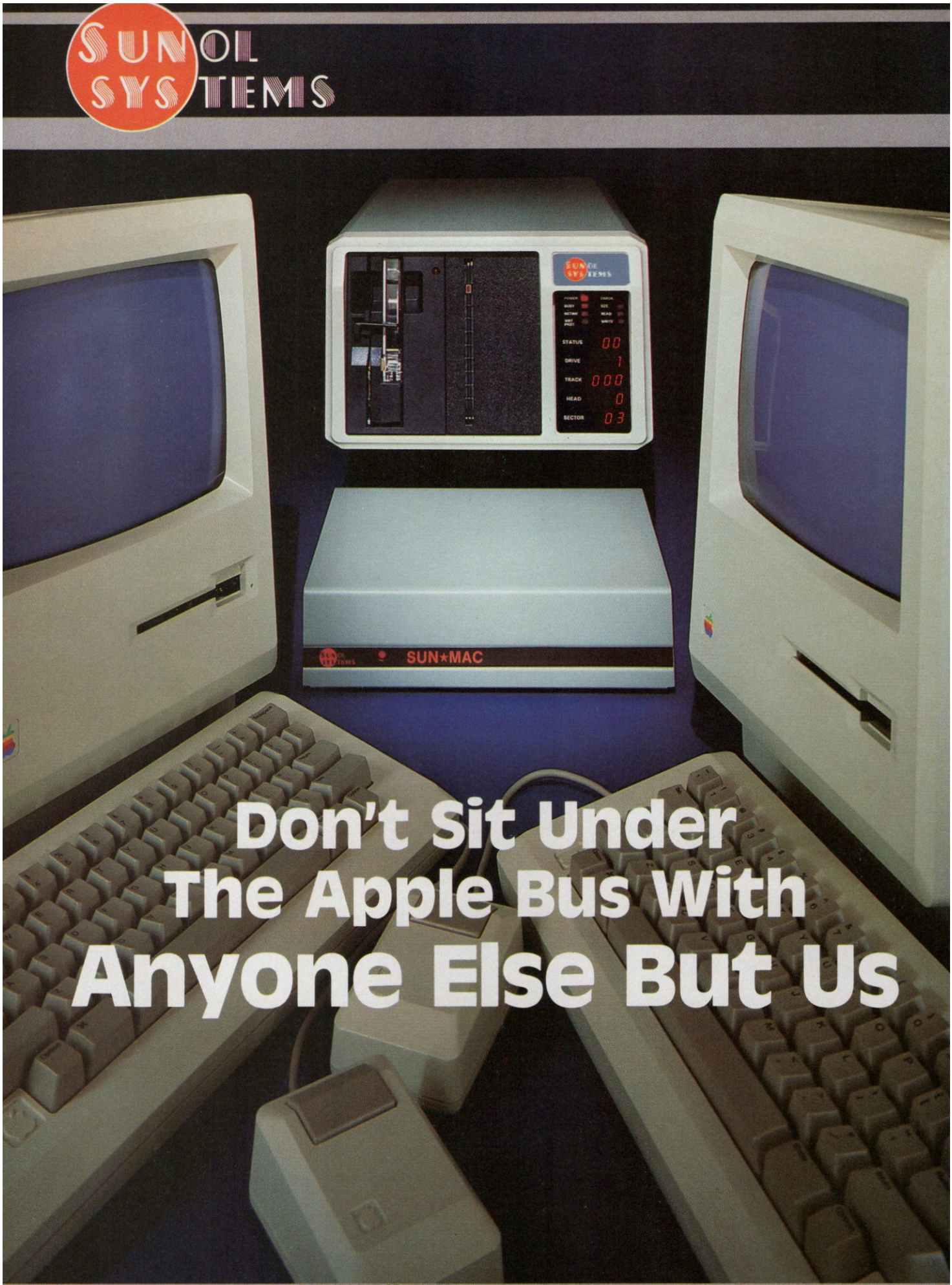

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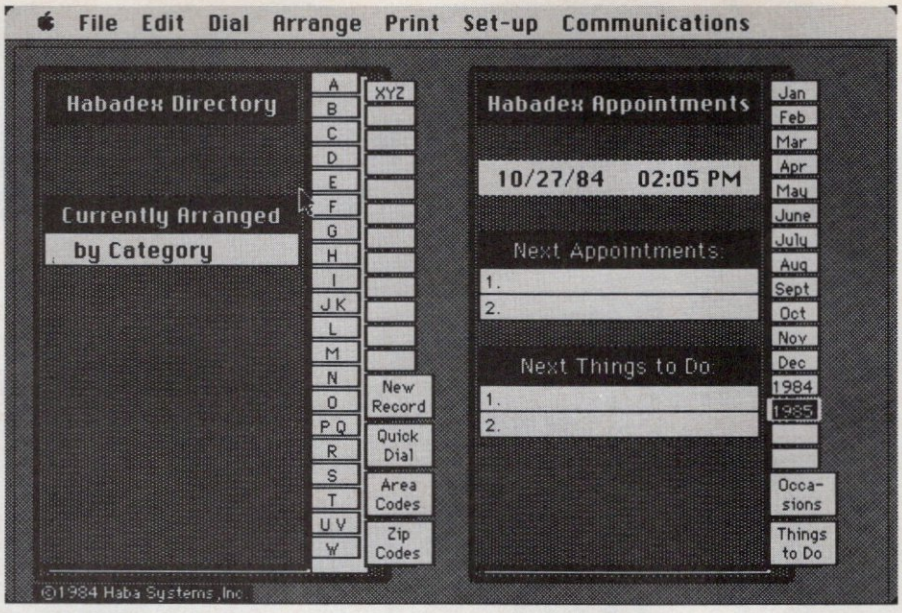

Figure 1: Habadex's main image

a shortened form of your entries under the name Habadex Appointments.

You can also pull up a Things to Do list, where you enter your projects in order of priority. The two top items on this list also show up on the main Habadex screen, along with your impending appointments. There's no elegant way to print out the calendar pages or the Things to Do list yet, so you have to use the standard Macintosh screen-print routines (pressing the ⌘, Shift, and 4 key for direct printout or the ⌘, Shift, and 3 key to send the image to a MacPaint document).

Habadex turns out to be extremely easy to use, if at times a bit clumsy. If you make a lot of additions or changes to your lists and your calendar, however, you'll find that you really need a hard disk or a lot of patience to make effective use of the program. With a floppy, I found adding and changing data to be painfully slow.

For example, when you add new names to your list, the program indexes each entry eight different ways so you can call it up from your address book in any of eight arrangements. On a floppy, with 100 names on file, this process takes an excruciating 30 seconds per name—on a Davong hard disk, it takes a more acceptable 1½ seconds. Similarly, it takes the Mac up to two minutes with a floppy to put away what you've been working on and another minute to boot up Habadex; the same procedure takes only a few seconds with the hard disk.

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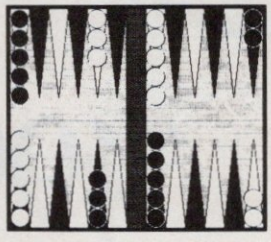

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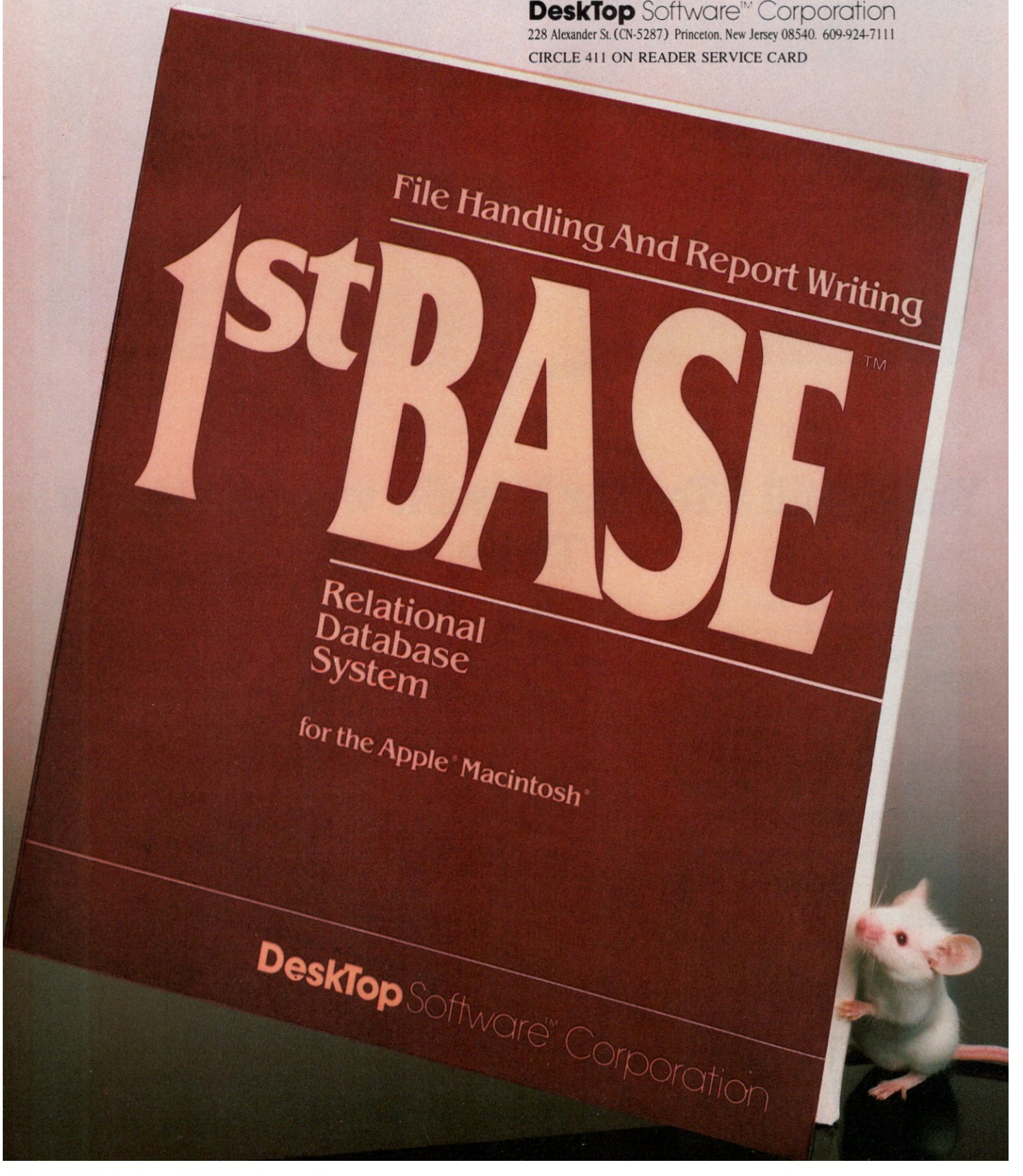

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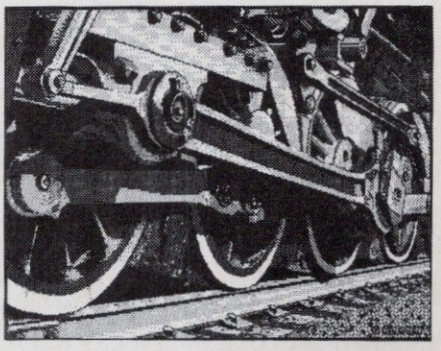

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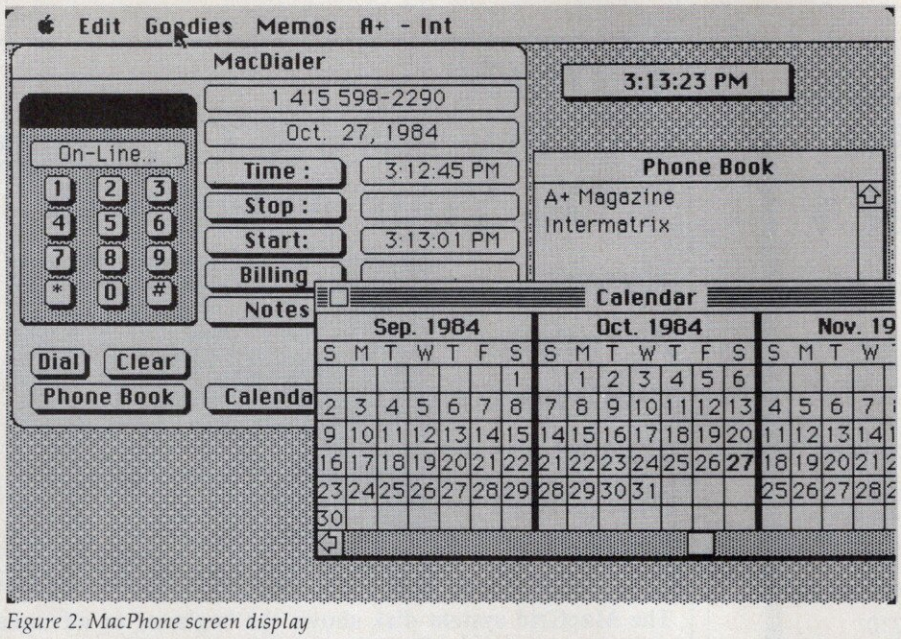

Figure 2: MacPhone screen display

ing and a complete call log. In addition, if you enter the telephone rates, it can display and log the cost of each call. If you charge consulting fees for your time on the phone, MacPhone can also compute what the fee should be at your usual rates.

Intermatrix's MacPhone adapter is a lightweight electronic handset and base unit about the size of a software binder that adheres onto the side of your Mac with double-sided tape. You plug it into the Mac's speaker output and connect it to the phone line (and you need to supply power to it through its included AC adapter). If you like your own phone better than Intermatrix's, you can substitute yours by plugging it into the standard jack on the base unit.

Dialing out with MacPhone is fast and easy. All you do is pick a name from your phone list, and MacPhone dials the number (see figure 2). If the number is busy, it stays selected, so you can redial without finding the name and number again. If you have several long-distance services or wish to alternate between using a service and dialing directly (using your default long-distance service, usually AT&T), MacPhone lets you enter several services and pick among them.

During your call, you can take notes with MacPhone, using the Mac as a simple word processor. These notes become part of the phone log MacPhone accumulates, giving you a record of whom you called, when, how long you spoke, what the charges were, the amount of your consulting bill (if you've filled in the values), and your notes.

Along with telephone management, MacPhone includes a calendaring function similar to the one in Habadex. Instead of a closed calendar book with tabs for a year, however, you get a three-month open-calendar display when you select MacPhone's calendar. Just as with Habadex, to add items or examine a particular day, you

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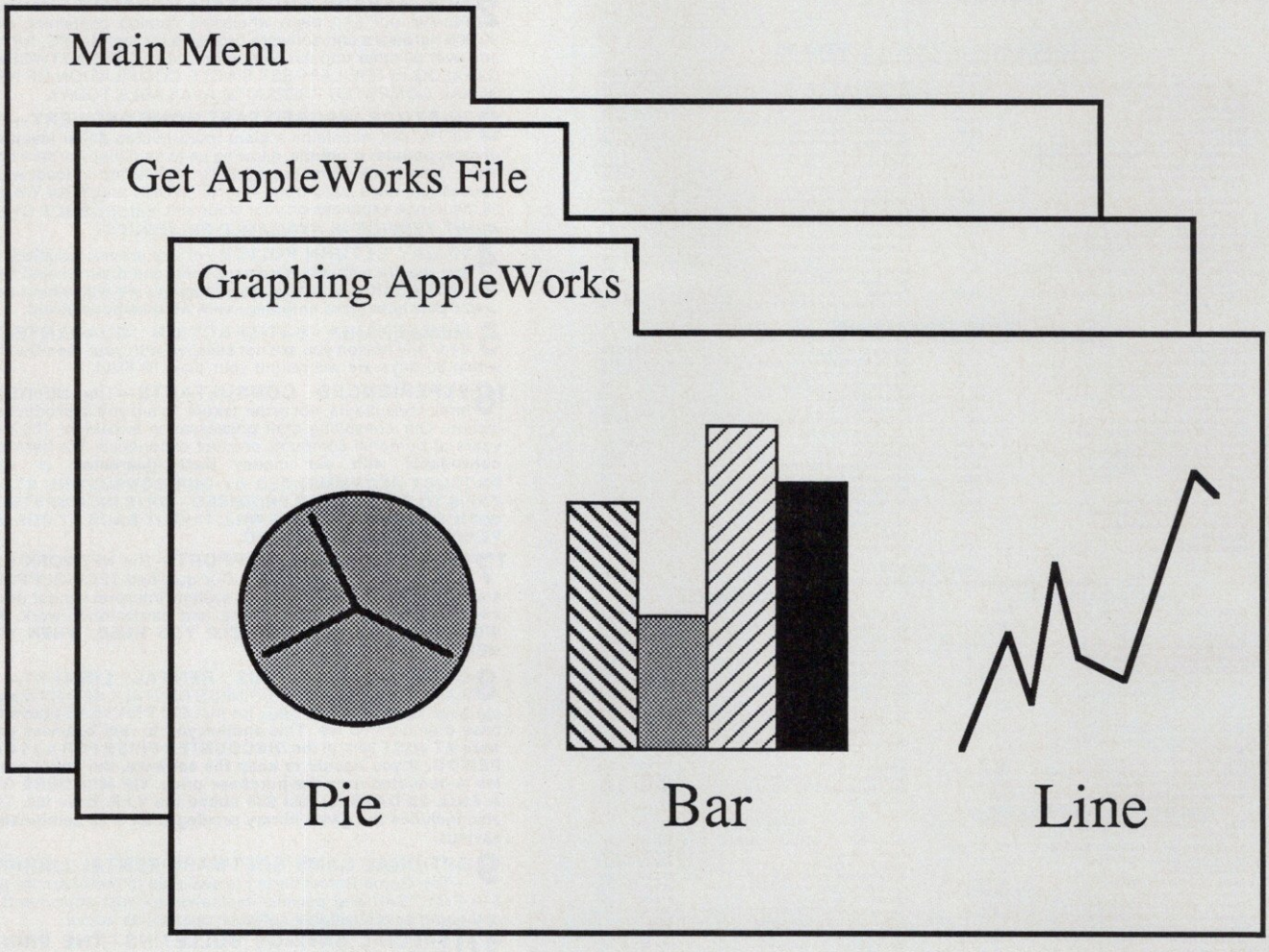

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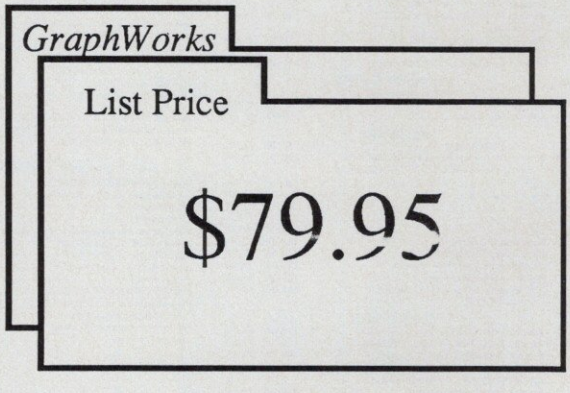

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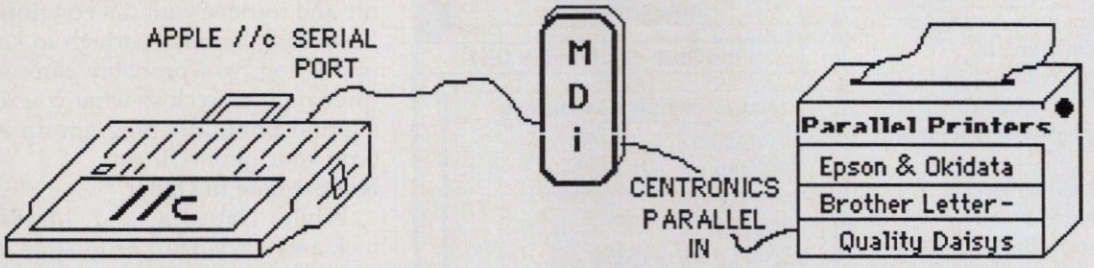

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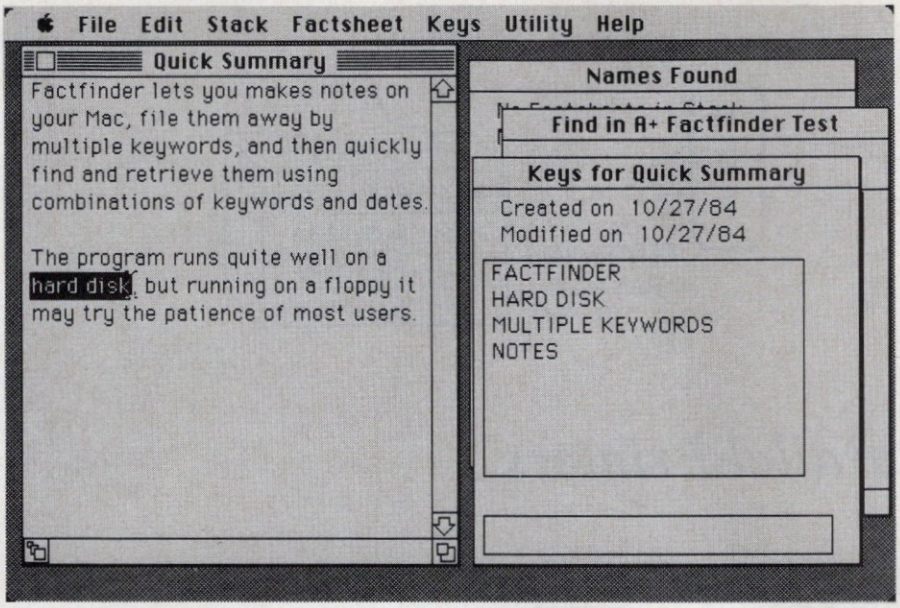


Figure 3: Factfinder screen display

zoom in by clicking on the selected day with the mouse. MacPhone also lets you create and store longer memos for future dates—they will appear automatically on the appropriate day.

If you spend most of your time on the phone and are willing to keep your notes up to date, this program can be a great help. The built-in accounting system works adequately for figuring time charges if you keep a strict relationship between phone-connect time and charge, but it cannot handle the complexity of long-distance rates.

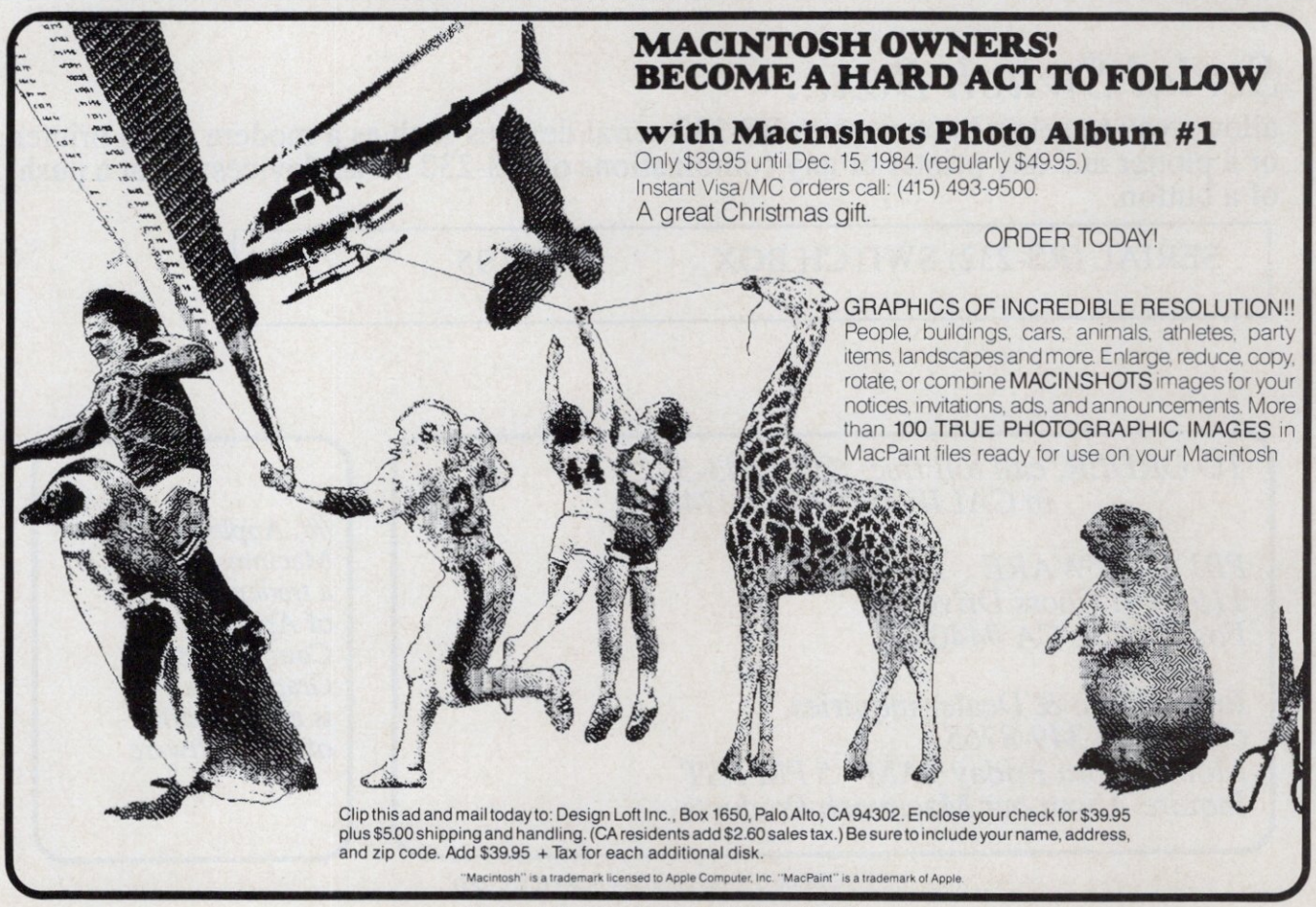
Just as with the other desktop programs, a hard disk or at least a dedicated machine will help you get the most out of this product. If your calendar or phone log becomes very long, it can take a minute or longer to file and retrieve your data on floppies. Last, if you're busy enough to keep a phone log, you probably can't spare three minute to close what you're doing and bring this program up every time your phone rings.

Notes Made to Order

While Habadex and MacPhone tuck away lists with neat name, date, or address pegs, Factfinder promises to help you straighten out all those scribbles about less-structured information. The program is basically an electronically indexed, erasable, reusable notepad.

Factfinder's electronic metaphor is a stack of papers that represent a complete word-processing document or a complete file within a database. You can rearrange the sheets in the stack, sort them, temporarily or permanently winnow out certain sheets, print the stack, or even send part or all out as a text file for inclusion in a MacWrite document.

To enable Factfinder to quickly sort through and arrange your stacks, after you enter the notes on each sheet with a simplified word processor, you assign each sheet one or



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more "keys." The keys are either terms that appear in the text or concepts under which you want to cross-reference that particular sheet. Then, when you want to find something in the stack, you give Factfinder the keys and let it electronically sift through the stack (figure 3, page 158).

Marking the keys is easy. You can mark words as you type in your notes, use the mouse almost like a highlighter pen to mark them later, or type your keywords directly into the keyword window (this method lets you use keywords that don't appear in the text).

Along with simply searching for all the sheets in your stack that include your specified key, you can also select ranges of data values and Boolean (*and* and *or*) combinations, and you can limit your search to previously found subsets. Curiously, the initial version has no negation operator, so if you want to search for sheets that do *not* include a keyword, you have to start with the complete stack and temporarily delete what you don't want.

If you want to see the results on paper rather than as fleeting phosphorescences on the screen, Factfinder can print the complete stack or a portion of it. Using a formatting option, you can even choose to print the first several lines with a set amount of space between the sheets—an ideal way to combine a structured mailing list with an unstructured collection of notes about each person on the list. You can also print your list of keywords or the titles you gave to each sheet in the stack.

I start considering a computer to be slow and unresponsive if response time is more than about two seconds.

The program is a wonderful idea, but once more, a hard disk is a great help for most practical applications. For example, in a stack of only 20 sheets, moving from one page directly forward to the next takes about 18 seconds with a floppy, and making a new keyword selection takes the better part of a minute. With a hard disk, the times for these tasks are less than two seconds and less than five respectively. Since I start considering a computer to be slow and unresponsive if response time is more than about two seconds, these floppy-disk intervals seem positively glacial. It also means that reading a dozen short pages of notes might take a good five to ten minutes, instead of the one to two it would take with 3 × 5 cards.

Having Second Thoughts

ThinkTank, by contrast, doesn't want you to leave your information as disconnected jottings, but instead seeks to help you get your ideas in order. This electronic outline processor keeps track of indentations and hierarchies as you type in your outlines. If you want to see overall structure, you can "collapse" parts of the outline, temporarily hiding more detailed headings while you look at the overall structure.

ThinkTank does assist with outline making admirably in its Apple IIe and IBM PC versions, but I think you'll be somewhat disappointed in the version written for the original 128K Macintosh. Unlike its predecessors, Macintosh ThinkTank 128 lets you make an outline but doesn't let you

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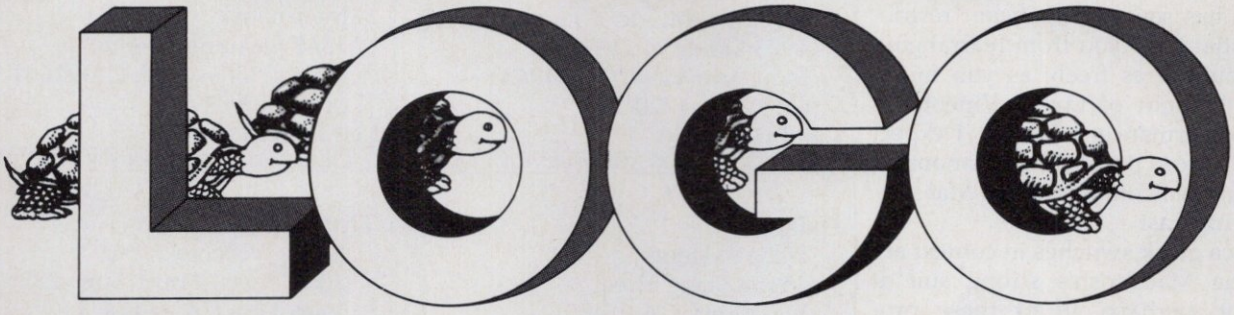

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flesh it out with text. The program doesn't use the same user interface that most Macintosh programs do, and it has several significant restrictions that keep you from rearranging your outline as freely as you might wish. In light of Living Videotext's past performance, however, I expect to see a more powerful and smoother version forthcoming for the Mac.

Standing Fast

Since quick switches in context are not the Macintosh's strong suit at present, perhaps all of these programs need to be regarded, for now, not as items on an electronic desk, but as possible desks in themselves. Unless you have a limitless supply of Macintoshes, though, and space to put them in, the question becomes whether any of these applications can justify dedicating a machine to a single application.

One drawback of MacPhone and Habadex is that they cannot listen for tones while they are dialing. Particularly when you dial through a switchboard or through a long-distance service, which may involve unpredictable delays, these products often fail to dial correctly. They seem to work fine, though, when you dial directly or when any delays for second dial tones are short and predictable.

Most of the programs worked strikingly better with a hard disk. If you can afford an upgraded system, running these programs on the Mac means working with a nimble partner rather than dealing with a friendly slowpoke. In addition to response time, a hard disk gives you room for larger files and more programs ready at once—giving you, in effect, a bigger and better electronic desk.

If you can't see shelling out the money for a hard disk right now, but you're clever, fortunate, and restrained enough to have established a relaxed work schedule, then any of the first three desktop aids may seem worthwhile, even on floppies. But if you're like most of us and can't spare those extra minutes, then you may want to pencil a reminder onto your calendar now to take another look at these programs when they come out in faster versions or when you can buy an affordable hard disk that works well with the Macintosh. ✚

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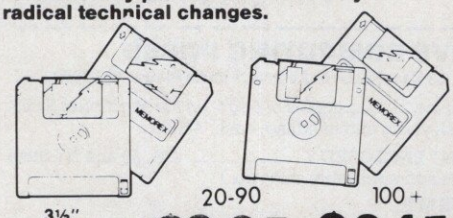

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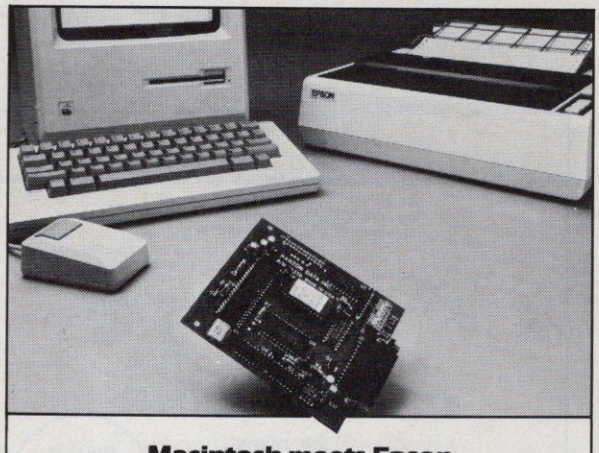

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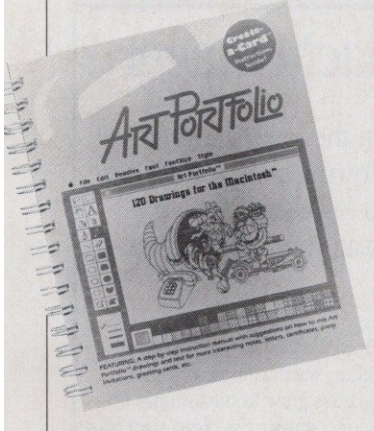

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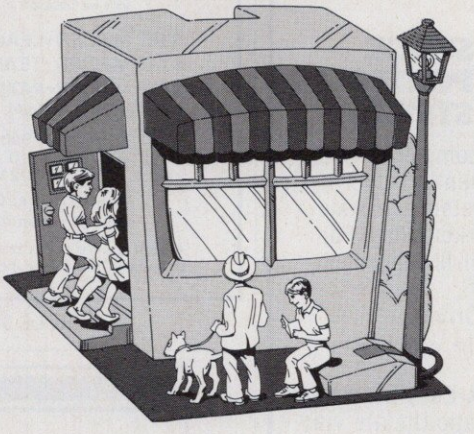

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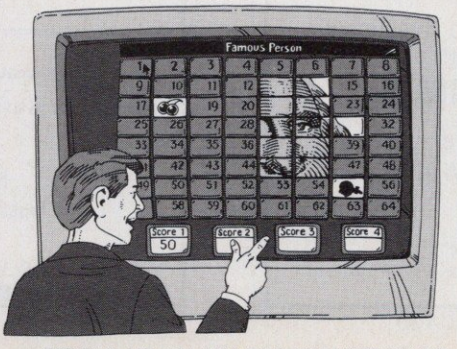

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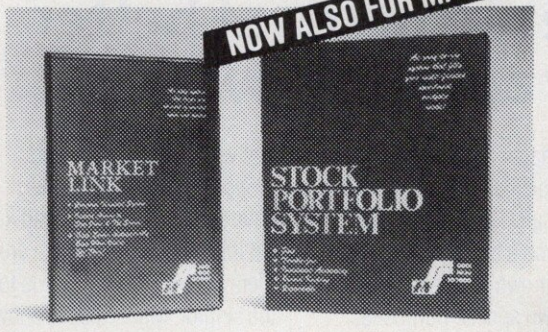

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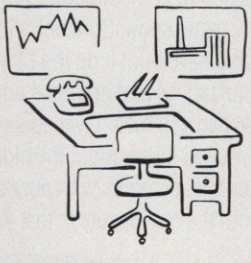

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Nashua, NH 03061
(603) 889-8530
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Main Street Filer Price Reduction

Main Street Software has reduced the list price of its Main Street Filer data-management program for the Macintosh from $249.95 to $199. This filing system and report generator can handle up to 64,000 records, with up to 36 fields in each record. It offers several report formats including columnar reports, mailing lists, labels, envelopes, and Rolodex cards.
Mainstreet Software
One Harbor Drive, Suite 304
Sausalito, CA 94965
(800) 824-8757
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AYN Interface

Using the AYN Interface, you can connect an Epson FX-80 printer to your Macintosh. The interface includes: serial-interface card; shielded cable; and Finger Print, which gives you fingertip control of special printer functions. *(List Price: $99.95)*
Dresselhaus Computer Products
837 East Alosta Avenue
Glendora, CA 91740
(818) 914-5831
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Fluent Fonts

A set of 18 font styles resides on this disk, including display fonts for graphic arts, text, and foreign languages in various point sizes. Several fonts come in two versions—one supports languages included in Apple's Geneva font and the other supports English only. Fluent Fonts provides a Cyrillic alphabet in three sizes for word-processing tasks in Russian and two sizes of Hebrew characters, although a right-to-left word-processing ability is not included. Two different-size fonts of electronic symbols aid circuit design in MacPaint and MacDraw. *(List Price: $37.50 plus $2 shipping charges)*
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Star Micronics Printer Interfaces

The new MacStar interface for the Macintosh is a high-resolution, quad-density interface that allows you to print clear bit-image graphics. For normal text printing, the MacStar's Draft mode allows your printer to run at high speed. The new interface also supports Imagewriter and Mac graphics. *(List Price: $99.95)*
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MacType

An interactive touch-typing tutorial for the Macintosh, MacType teaches basic keyboard layout and typing skills for beginners on QWERTY, Dvorak, and extended-character-set keyboards. At intermediate levels it improves accuracy, and at advanced levels it helps increase typing speed.

MacType offers tests for speed and accuracy at specific achievement levels. Many students can use a single disk, and when you become an accomplished typist, MacType prints a certificate of achievement. *(List Price: $49.95)*
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Pensate

A strategy game developed specifically for the Macintosh, Pensate is an original thinking game of evasion. The object is to get to the top of an 8 × 8 grid while avoiding all the other pieces on the board. You use the mouse to choose options such as Practice or Tournament mode, one- or two-player game, and skill level, from pull-down menus. *(List Price: $39.95)*
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(312) 232-1984
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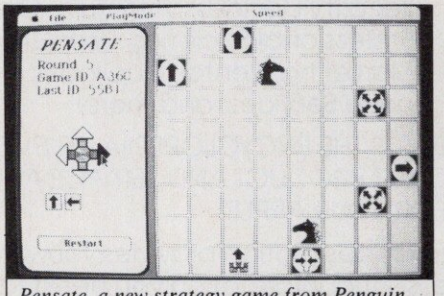

Pensate, a new strategy game from Penguin Software

MacProColor

The MacProColor Package allows anyone with a 35-mm camera to create professional-quality computer graphics. The tutorial manual's step-by-step program teaches the basics for creating graphics and gives you background knowledge pertaining to

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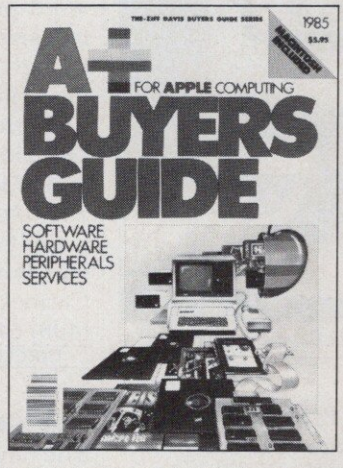

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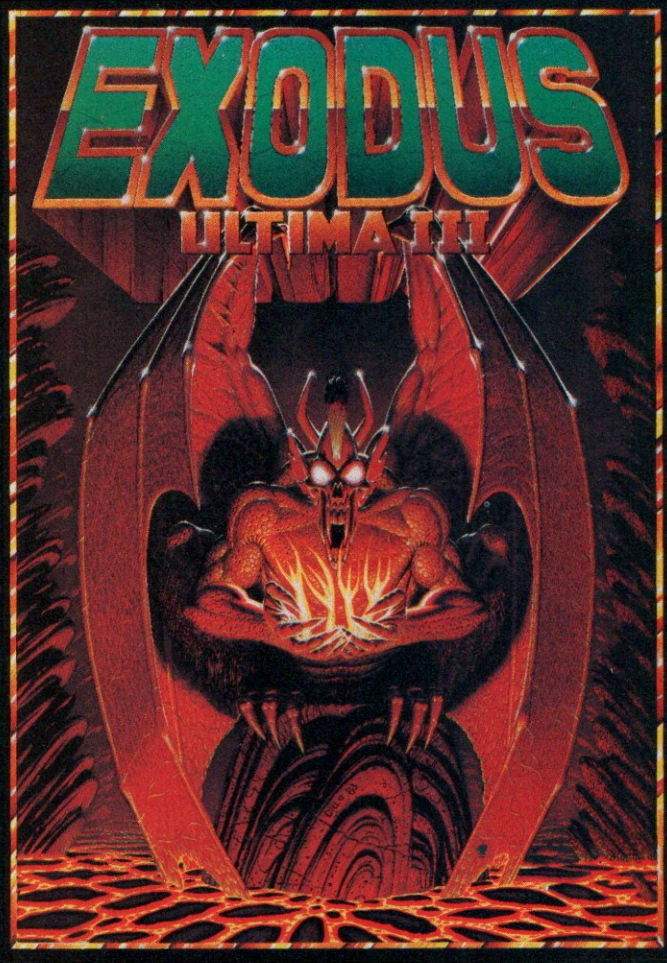

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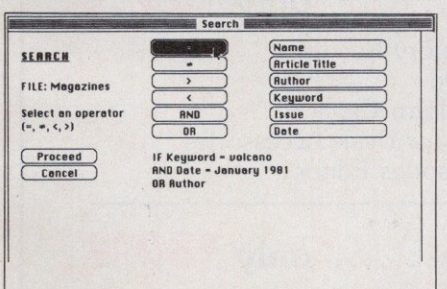

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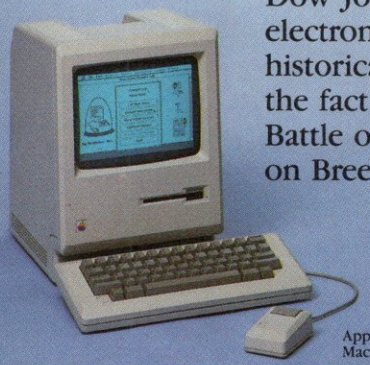

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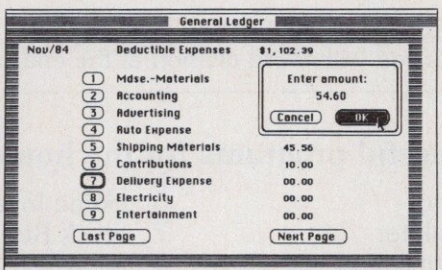

General Ledger, from Dimensional Disks' Mac Business I

Reference Manual for Macintosh Fonts
Macintosh Typefaces, a Reference Guide to Shapes, Sizes and Styles includes in-depth descriptions of how the Macintosh deals with fonts on the screen, in memory, on disk, and on the Imagewriter printer. It includes more than 80 pages of complete font listings and many useful appendices. Written for the nontechnical user, the manual describes the differences between bit-mapped and character-generated displays and explains the internal Macintosh toolbox ROM routines for font sizing and stylistic variation. *(List Price: $14.95)*
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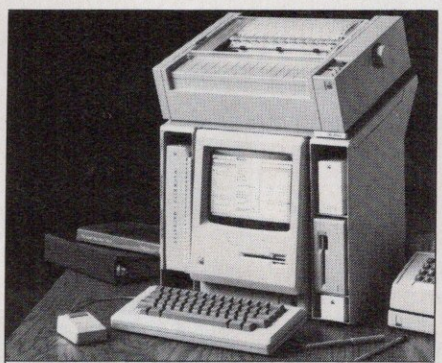

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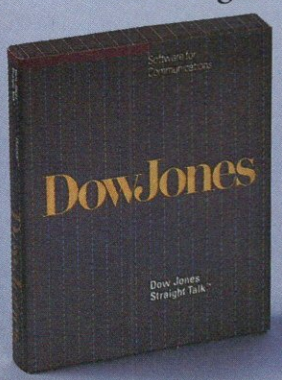

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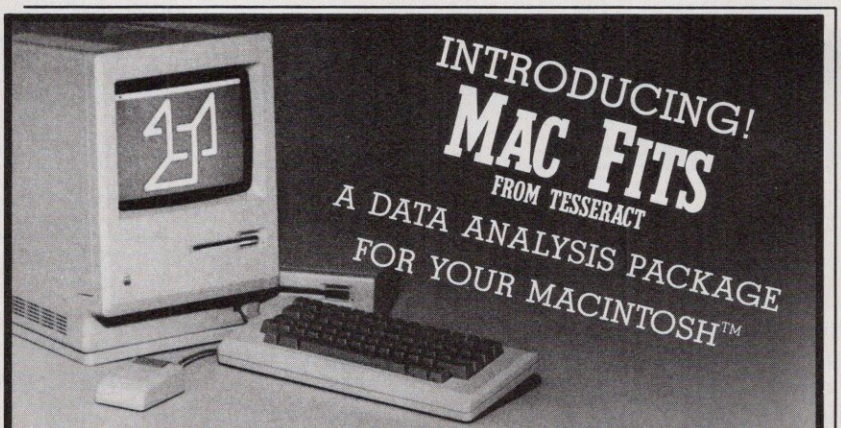

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Now you can turn any printed image into a detailed, high-resolution Macintosh graphic.

Just roll your original into your Imagewriter.

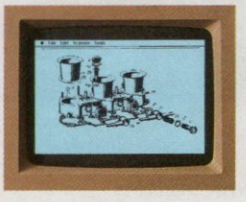
ThunderScan scans and digitizes the image.

Presto! A high-resolution MacPaint document.

No doubt about it, Macintosh is one great graphics machine. But until now, Mac graphics have been limited to what you can draw with a mouse and what someone else has put on a disk. Consequently, taking full advantage of Mac's graphics capabilities has been tough. But now there's ThunderScan. The new optical scanning device that lets you feed your Mac a steady diet of graphics that are useful to you.

ThunderScan turns Mac's Imagewriter printer into an image reader. So you can digitize any printed image and turn it into a detailed, high-resolution MacPaint document. Anything, including forms, half-tones, photos, mechanical drawings, maps, floorplans, logos, signatures and more. From black and white and color originals. ThunderScan reproduces them at over 200 dots per inch and in 32 shades of gray.

ThunderScan's application software, written by Mac-team-member, Andy Hertzfeld, makes it an extremely versatile and useful tool. You can generate full-page images or selected parts of them. Enlarge and reduce them. Manipulate them. Control the contrast and brightness. Create your own personal image disk. "Cut" and "paste" images together, creating new documents. And print them out on your Imagewriter. Or send them by modem to another Mac. The possibilities are nearly endless.



No lights, no camera, just action.

What you see here is the complete ThunderScan system. You don't have to buy an expensive video camera. Just pop out your Imagewriter's ribbon cartridge, snap in ThunderScan and you're set. It can even work in the dark (maybe you can think of an application for that).

If you bought a Mac at least partly for its graphics, only to find you couldn't take full advantage of them, now you can. With ThunderScan.

At an introductory price of just $229, it's a small price to pay for a whole new graphics capability.

For more information or a ThunderScan of your own, see your dealer or call us today.

(415) 254-6581

ThunderScan

Thunderware Inc., 19 G Orinda Way, Orinda, CA 94563

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Pipeline

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Communications features of the processor include transfer rates up to 9600 bits per second, half- or full-duplex communications, multidrop or point-to-point network links, and a synchronous RS-232-C interface. *(List Price: $1095)*

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Toronto, Ontario
Canada M5H 2S8
(416) 361-5002

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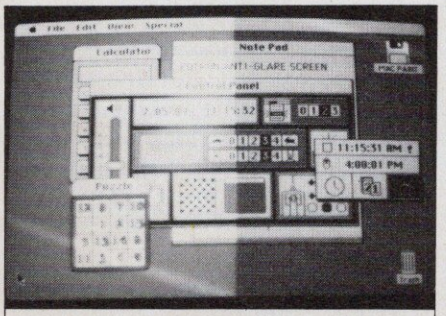

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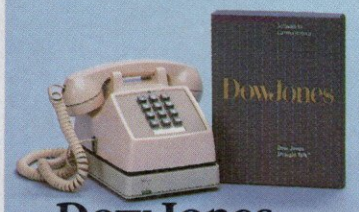

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ATTENTION

Macintosh Aficionados

A+ would appreciate receiving any tips, hints, shortcuts, or suggestions that you have for using the Macintosh computer. We would like to publish these pearls in our MacTips feature in our Macintosh section. You'll receive credit in the magazine, and we'll pay $50 for each MacTip that we use.

Send your tips to:
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11 Davis Drive
Belmont, CA 94002

Pipeline

The Cube
The Cube, a disk-storage box that holds up to 50 Macintosh disks, is made of solid oak and has a handsome natural finish. It also has plastic dividers for disk organization. *(List Price: $34.95)*
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(415) 342-2591
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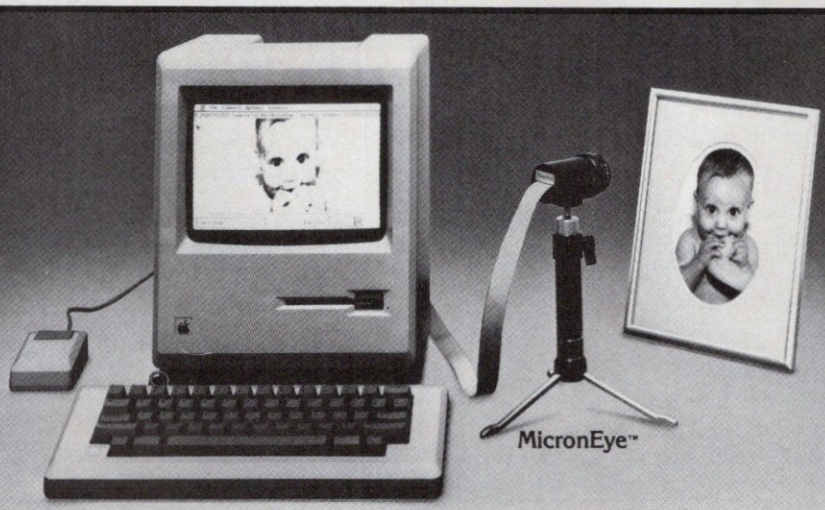

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The MicronEye™ is also available for these computers: Apple II, IBM PC, Commodore 64, TRS-80CC and TIPC (trademarks of Apple Computer, Inc., International Business Machines, Commodore Corp., Tandy Corp. and Texas Instruments respectively).

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D-Basket and C-Basket Carrying Cases
The D-Basket is a carrying case for the Macintosh, with external disk drive, modem, cords, and accessories. This plastic-sided, foam-lined case weighs 10 pounds and measures 19.5 × 12.5 × 15.5 inches.

The C-Basket holds an Apple IIc, monitor, and stand. It weighs 8 pounds and measures 15.5 × 12.5 × 15.5 inches. *(List Price: D-Basket, $130; C-Basket, $100)*
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334 Main Street
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(516) 883-2299
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D-Basket and C-Basket, from Justin Case

Murder by the Dozen
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MacASM
An assembly-language-development system for the Macintosh, MacASM offers an integrated, full-screen programming environment. The assembler, editor, linker, compiler, and debugger can all be accessed from within the MacASM environment. The assembler has full macro capability, and the editor is compatible with MacWrite. *(List Price: $100)*
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MusicType
MusicType, a music-utility kit for use with MacPaint, turns your Macintosh into a music typewriter. It allows you to produce professional-quality music copy in almost any format, from single voice to full orchestra. Notes and other symbols are entered with a single keystroke. You can also add text, lyrics, or chord symbols to your scores. *(List Price: $49.95)*
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Trav-L-Cases have plywood sides covered with scuff-resistant vinyl, metal protection on the edges and corners, key-draw bolt locks, and at least one inch of foam padding on all sides to protect the equipment. They are designed to be handled by one person and fit inside the trunks of most cars. *(List Price: Macintosh Trav-L-Case, $269; Lisa Trav-L-Case, $289)*
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5650 Indian Mount Court
Columbus, OH 43213
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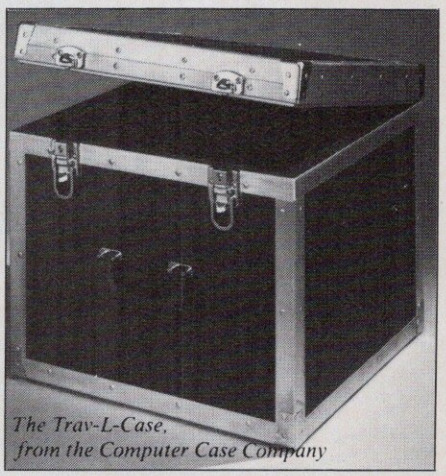
The Trav-L-Case, from the Computer Case Company

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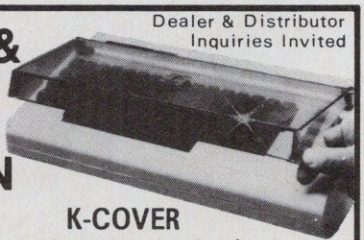

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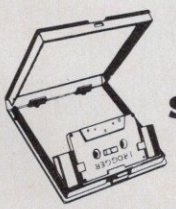

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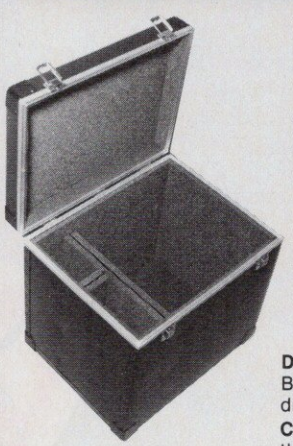

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MACTYPE FROM PALANTIR. THE TYPING TUTOR THAT IS

F

FIRST

Palantir knows that if your Macintosh™ is to be fruitful, you must first conquer the keyboard. And for many, that means learning how to type. So, Palantir created MacType. It's the first typing tutor for the Macintosh to put to use benefits of proven teaching techniques that speed up learning. Simply, MacType uses mental patterning to reinforce manual exercises. It teaches your fingers and your brain rather than your eyes, and you learn more quickly. If one of your first tasks on the Macintosh is to learn how to type, think of MacType first.

A

ADVANCED

Palantir designed MacType to be the most advanced typing tutor for the Macintosh that is available today. MacType takes full advantage of Macintosh's flexible screen displays and the simple functioning of its mouse to teach you how to type. All the know-how that has gone into the most complex Palantir Software was used in the development of MacType. You're getting state-of-the-art technology even in this basic program. It takes advanced skill to create a fundamental program that is both fun and mental for the user. And you get MacType's advanced features at a price that is very competitive.

S

SIMPLE

Palantir has also designed MacType so that it is amazingly simple to learn and use. Because of the teaching principles inherent in the program, you will get up to an effective typing speed in a very short time. You can also use the skills you learn on MacType to operate any typewriter keyboard, not just the Macintosh. Compared to the other typing tutors, MacType will actually let you enjoy learning. You may like it so much that even after you've mastered its touch-typing technique, you'll go back to the MacType exercises to sharpen your skills and increase speed. MacType shows that working smart can be working simple.

T

TESTED

Palantir thoroughly tested MacType to insure that it will work for you. With it you will learn to type fast. MacType should be your first choice. It is based on advanced programming technology and is still simple to learn. MacType is another quality, "No Bull" product from Palantir. If you want to learn more, contact

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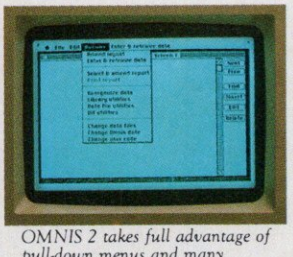
Need to reformat your layout? Do it whenever you want to. Even after entering data. Need to update records? OMNIS 2 handles multiple updates with ease. It even guards against improper data entry.



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Mac Tips

Suggestions from our readers

Protect Your Mac Picture

Suppose you draw a neat picture and you want to quit for a few minutes, but you don't want anybody to disturb your drawing. All you have to do is open one of the desk accessories and drag it all the way down to the lower right-hand corner so that it is almost totally off the screen. MacPaint will not be accessible until you put the desk accessory away.

R. Dan Webb
Lawrence, KS

Self-Centering

If you want to find the exact center of the drawing screen (to center text, for instance), draw a dot anywhere on the screen and circle it with the lasso. Choose Cut from the Edit menu and then Paste. The Paste command automatically centers images on the drawing screen. Actually, the exact center of the screen is the lower right-hand corner of the dot, since the screen is an even number of pixels horizontally and vertically.

R. Dan Webb
Lawrence, KS

Columns of Text in MacWrite

Creating MacWrite documents with two columns of text while utilizing word-wrap-around can be quite a hassle. If you're going to print the document, however, you can get around this problem easily.

Choose full justification from the alignment boxes in the ruler. Then set the right margin at 3¾ inches. After you've entered the text, insert a new ruler at the top of every page except the first. On the second page, set the left margin at 4⅜ inches; on the third, set the right margin at 3¾ inches; and so on. Then, using the cut-and-paste technique, rearrange the pages so the pages with the text on the left are all grouped together, followed by the pages with the text on the right.

Print the document by choosing Print from the File window. When the dialog box appears, check Continuous Paper Feed and type the page range of the first half of your document under Page Range. For example, if your document is ten pages long, choose a number between 1 and 5 for the page range.

After the printing, tear off these pages and refeed them into the printer. Printing again, after choosing a number between 6 and 10 for the page range, will place the right-hand columns next to the preprinted left-hand columns.

Trish Anargirou
Signal Hill, CA

Wide-Column Multiplan

This tip allows you to print Multiplan columns with up to 128 characters on a single sheet of paper, using the wide-print option.

1. Select the Show Values option.
2. Set the column width to half the final value that you want; for example, set the column width to 50 characters if you want 100 characters as a result.
3. Select the Show Formulas option, and the column width will double; for example, a column width of 50 characters will become 100.
4. Notice that invoking the Column Width command results in an Invalid Column Width message, even though the program works fine and the spreadsheet prints properly.

Michael E. Penney
Randolph, MA

Dual-Disk-Drive Ejection

After I added an external disk drive, the process of ejecting disks before turning off my Mac really began to irritate me: eject, wait . . . , select, eject, wait . . . , done. If all desktop windows are closed, however, both disks could be ejected at the same time with ⌘-A (select all) and ⌘-E (eject). It uses fewer keystrokes and then proceeds unattended.

Lisa R. Christensen
Oakland, ME

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Hobby

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Merlin Pro	55.00
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Business

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The Business Accountant	159.00
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The Market Analyzer	225.00
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	Our Price
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BPI	
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CBS	
Mastering the SAT	97.00
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Micro Speed Reading	84.00
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Plato Series	Call
COUNTERPOINT	
Early Games	20.00
Matchmaker	20.00
Piece of Cake	20.00
Fraction Factory	20.00
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Speed Reader II	44.00
Word Attack!	32.00
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Spell-It	32.00
DESIGNWARE	
Spellicopter	26.00
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Spelling Wiz	22.00
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Novation Apple Cat II	199.00
Novation 212 Apple Cat II	399.00
Pro Modem 1200	345.00
ERA 2 by Microcom	399.00
Networker (Zoom Telefonics)	99.00
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Microsoft 16K Ramcard	68.00
Microsoft Premium System //e	299.00
ALS Cards	Call
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Neptune 80 Col. 64K Card	190.00
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6100	425.00
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KPX-1091	325.00
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MICRO SCI	
A2 143K	199.00
A20 164K (New!)	175.00
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AP 100A Full Height	199.00
AP 105A Slim Line	210.00
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Color 600 (RGB)	469.00
Video 300G Green	135.00
Video 300A Amber	149.00
DVM RGB Interface (II or III)	130.00
BMC	
Color Plus Monitor	239.00
Green Screen	95.00
TEKNICA	
MJ-22 RGB Color	425.00
SAKATA	
SC-100 Color	245.00
SC-200 RGB Color	455.00
SG-1000 Green	95.00
SA-1000 Amber	105.00
STS-1 Stand	35.00
TAXAN	
RGB Vision III (Hi-Res)	420.00
210 13" Color (Lo-Res)	275.00
Green (Hi-Res)	120.00
Amber (Hi-Res)	135.00
410-64 RGB-2 Interface	199.00

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Dollars and Sense (II+, //e)	68.00
Dollars and Sense (//c)	78.00
The Accountant	62.00
Time is Money	64.00
Money Street	75.00
Networth	55.00
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The Write Choice	29.00
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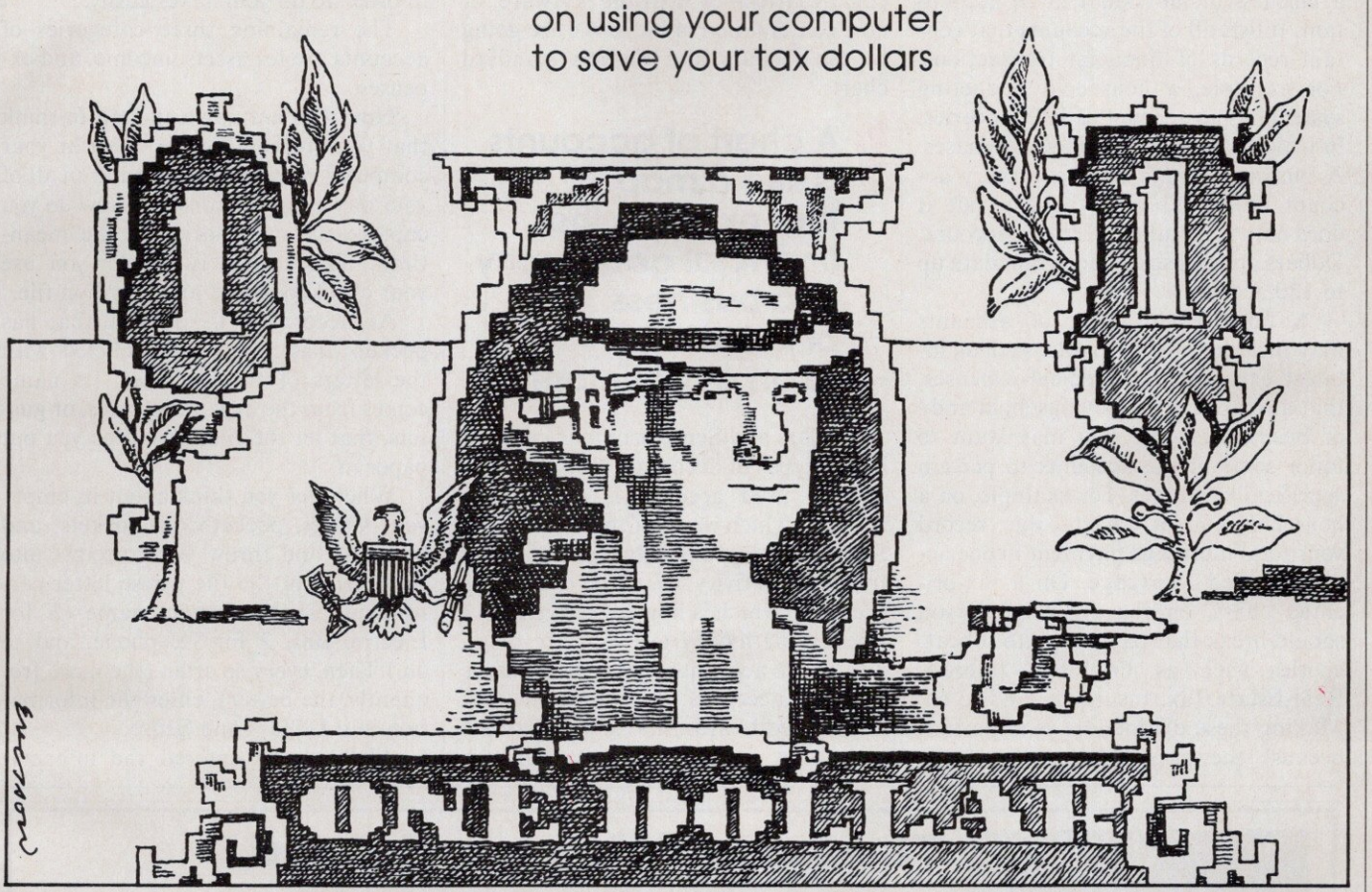
CIRCLE 283 ON READER SERVICE CARD

MONEY MATTERS
BY KENNETH M. LANDIS
First in a three-part series on using your computer to save your tax dollars



GETTING ORGANIZED

Merry Christmas and a Happy New Tax Year! Tax Year? That's right. January 1, 1985, at 12:01 A.M. is the beginning of a new calendar and a new tax year. Tradition dictates that the new year requires a New Year's resolution.

If I may, let me suggest one: "My New Year's resolution is to keep my tax records in order so I can save money and, in case I'm audited, have my records organized enough that the Internal Revenue Service won't consider sending me to Alcatraz."

You're probably saying to yourself, "No problem—Alcatraz is closed and the new 'white collar' prisons look like country clubs." If the IRS had its way, though, Alcatraz would be reopened, and you or someone you know would be an inmate.

Every year, everybody gripes about keeping tax records. Most of us just throw our receipts into a drawer and sit down at the end of the year, collate them, add them up, and wonder what happened to the receipts that we can't find.

A few people are a little more organized. They throw their receipts into a drawer and add them up monthly.

Then we have the hard-core record keepers who add up their receipts weekly, put them in an envelope, and add them all up at the end of the month.

If the IRS had its way, Alcatraz would be reopened, and you or someone you know would be an inmate.

All three systems have merit, and their result is the same: At the end of the year, you have a set of numbers and shoe boxes full of receipts you need to do your taxes. Organizing them and adding them up is a headache, though—a headache that can turn into a bigger headache if you don't take care of it promptly.

Also, because you are probably looking at your mass of receipts after the beginning of the year, you don't have a chance to do any tax planning. With few exceptions, you can't do anything to change your tax liability for the previous year after January 1.

Turning Over a New Leaf

Let's look at a way you can be prepared next year. How? With an automated, tax-deductible, inexpensive record-keeping system that will keep you apprised of your current financial situation. The system we will use is Dollars and Sense from Monogram of Inglewood, California.

Dollars and Sense does a lot more than just keep tax records. You can also use it for household budgeting or for doing the books of a small business. The

CELESTE ERICSSON

only difference that distinguishes the three uses of the program is the chart of accounts for each function.

A chart of accounts is like a map that explains the financial geography of a business or individual to an accountant. It lists all of the accounts that contain records of financial transactions. For example, a household budgeting system has an account called Groceries, in which you record all food purchases. A business doesn't have a grocery account unless it's a restaurant, but it does have a furniture/fixtures account. Dollars and Sense can accommodate up to 120 accounts.

A tax-oriented chart of accounts may include some accounts, such as interest expenses and medical expenses, that also appear on the household and/or business charts. You may want to tailor some of the accounts to pertain specifically to taxes. For example, on a household-budget chart, you record your total mortgage payment in one account called Mortgage. On a tax-oriented chart, on the other hand, you should break that payment into subcategories such as Principal, Interest, Real-Estate Tax, Insurance, and so on. Making these distinctions is important because the principal portion of the payment is not tax-deductible, but many of the other parts are.

To use Dollars and Sense for tax purposes, you can create your own chart of accounts from scratch, use the chart that comes with the software, or do a combination of both. We are going to use Dollars and Sense's standard chart.

A chart of accounts is like a map that explains the financial geography of a business or individual to an accountant.

Dollars and Sense uses four categories, or types of accounts. The most frequently used account is a checking account, which is one of the Dollars and Sense base accounts. Dollars and Sense tracks the activity in and out of the base accounts, which is how it keeps track of where your money goes and for what. The other accounts that usually serve as base accounts are money-market funds, credit cards, and so on. Any account that you can use to pay bills can be a base account.

By tracking transactions through these base accounts and by knowing what is and isn't tax-deductible, you can assemble the information you need in order to do your taxes easily.

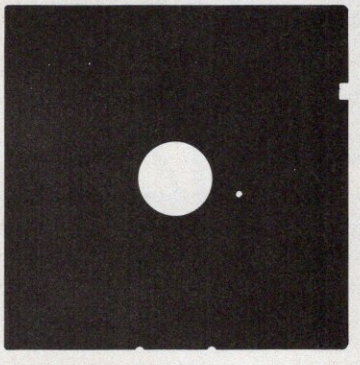
The remaining three categories of accounts are for assets, income, and expenses.

Now, I'm not naive enough to think that you are going to sit down at your computer every night and enter in all of your day's transactions. So, how do you capture the information in the meantime? The answer is simple: you use your checkbook and an accordion file.

An accordion file is a file that has pockets that are usually labeled with the letters of the alphabet. Its name comes from the expanding sides, or gussets, that let the file expand as you put paper in.

Whenever you think about it, empty your wallet, pocketbook, pockets, and briefcase and throw your receipts into the section of the file whose letter corresponds to the account name (*E* for Electric Bill, *T* for Telephone, and so on.) Then, every so often (the more frequently, the better), enter the information into Dollars and Sense.

After you've entered the informa-



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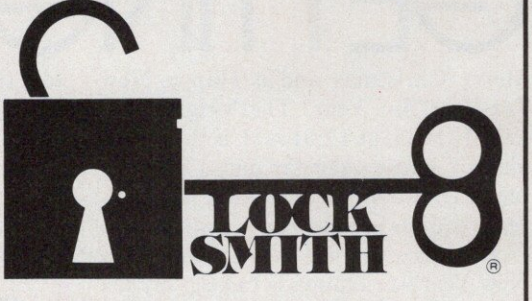

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Alpha Logic Business Systems Inc.
4119 North Union Road
Woodstock, IL 60098
(815) 568-5166

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As the manufacturer of Locksmith, we invite all dealer inquiries.

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CIRCLE 259 ON READER SERVICE CARD

tion, bundle the receipts up and save them. If you ever get audited, you will find that it helps to have receipts, as well as canceled checks, in order, in one place.

Why not wait until the end of the year or not use Dollars and Sense at all? Because you will miss opportunities to save on your taxes. Remember, with very few exceptions, you can't change your taxes from last year.

By entering into Dollars and Sense each check you write and each tax-related charge you make, you create a chronological record of your transactions. Even more important, you get a reporting capability that allows you to prepare your taxes quickly and easily.

Also, if you have your return prepared professionally, giving your accountant the reports Dollars and Sense has generated will probably save him or her time, which will lower the fee (your accountant will undoubtedly hate this program).

Using the Program

Now that you understand what you are trying to do, let's assess how Dollars and Sense can help you.

Whenever you enter your transactions, you must choose between two types of transactions, unique or recurring. Unique transactions can be for almost anything: a purchase, a repair bill, a donation. Recurring transactions, as the name implies, happen over and over again. Examples of recurring transactions are your paycheck, mortgage payment, and car payment.

Whenever you enter a transaction, you have to break it down into components such as the cost of the item or service, the income, the taxes, and the like.

Consider a car payment, which consists of a loan-principal repayment and interest. To record this payment, you take the amount of the payment out of your checking account and distribute the principal repayment to a loan account and the interest to an interest-expense account.

Car payments recur, so why should you type the same entry, month after month? Well, you don't have to. Dollars and Sense lets you set up automatic transactions that take care of this distribution for you. You can use these automatic transactions for mortgage payments and paychecks (FICA, federal tax, state tax, and so on). You can build up to 25 sets of 100 automatic transactions each.

Let's assume that it's April 14, 1985, and you have been using Dollars and Sense all year long. You know that doing your record keeping during the year was easier than putting it off till the last minute and that Dollars and Sense was easy to use and did a good job.

By pressing just a few keys, you will get a complete, itemized financial history of the previous year.

The first report you need is a year-to-date summary of how much money you've spent, and for what. Figure 1 shows Dollars and Sense's year-to-date account summary. Take a look—the aggregate totals you need to figure out your taxes are right there, along with your balances and, if you set them earlier, your budgets.

In addition, you can generate a personal-income statement, a balance sheet, a cash-flow analysis, and an item-by-item listing of every transaction all year long. Just think of your accountant's face when you pull that out of your briefcase.

As a bonus, Dollars and Sense comes in handy during the year for graphically analyzing why you invariably go over your budget.

So far, so good. You have an excellent record-keeping system for taxes, but you don't have any way of forecasting or doing tax-planning "what ifs." Not this month, anyway. In February, we will revisit Dollars and Sense and an accompanying tax-planning program from Monogram called Forecast.

For now, though, you have an orderly, auditable set of records that is easy to work with. Not bad for less than $150 and a little bit of time during the year. +

ACCOUNT YTD SUMMARY FOR: Fred and Mary Smith
DATE LAST ENTRY: 05/31/83

<---------- ACCOUNT ---------->			LAST	NUM	<----- TOTAL FOR YEAR ----->		CURRENT/TAX
NUM	NAME	TYPE	UPDATE	ENT	ACTUALS	BUDGETS	BALANCE
100	Personal Checking	Check	05/30/83	142	758.88	0.00	2,008.88
200	Cash	Asset	01/01/83	0	00.00	0.00	50.00
201	Credit Union	Asset	05/22/83	20	< 4,057.00>	< 245.00>	343.00
202	Stocks & Bonds	Asset	05/04/83	5	3,000.00	3,000.00	90,135.00
203	Stock Savings Plan	Asset	05/04/83	10	2,000.00	2,000.00	26,115.93
204	Home	Asset	01/01/83	0	0.00	0.00	204,900.00
603	Rental [A]	Asset	01/01/83	0	0.00	0.00	157,000.00
703	Rental [B]	Asset	02/27/83	0	0.00	0.00	140,000.00
300	Mortgage	Liability	05/04/83	5	400.00	400.00	140,706.00
301	Auto Loan	Liability	05/20/83	5	1,000.00	1,000.00	3,750.00
302	Visa	Liability	05/30/83	27	< 1,422.00>	0.00	1,672.00
303	American Express	Liability	05/31/83	32	< 70.88>	0.00	490.00
604	Mortgage [A]	Liability	05/04/83	5	335.00	335.00	106,665.00
704	Mortgage [B]	Liability	05/04/83	5	270.00	270.00	89,730.00
400	Gross Income	Income	05/04/83	10	26,500.00	26,500.00	26,500.00
401	Interest Income	Income	05/22/83	5	68.00	60.00	68.00
402	Dividends	Income	05/10/83	5	3,500.00	3,500.00	3,500.00
403	Check Interest	Income	05/16/83	5	16.00	30.00	16.00
600	Rent [A]	Income	05/16/83	5	4,500.00	4,500.00	4,500.00
700	Rent [B]	Income	05/16/83	5	4,000.00	4,000.00	4,000.00
500	Mortgage Interest	Expense	05/04/83	5	6,100.00	6,100.00	6,100.00
501	Auto Loan Interest	Expense	05/20/83	5	360.00	360.00	360.00
502	Taxes—Federal	Expense	05/04/83	10	3,500.00	3,500.00	3,500.00
503	Taxes—State	Expense	05/04/83	10	1,250.00	1,250.00	1,250.00
504	FICA	Expense	05/04/83	10	2,500.00	2,500.00	2,500.00
505	Taxes—Property	Expense	04/09/83	1	1,200.00	1,200.00	1,200.00
506	Medical/Dental	Expense	05/04/83	10	845.00	1,000.00	845.00
507	Auto Expenses	Expense	05/30/83	5	500.00	625.00	0.00
508	Gasoline	Expense	05/30/83	11	449.00	375.00	0.00
509	Entertainment	Expense	05/31/83	23	2,065.00	1,500.00	0.00
510	Clothing	Expense	05/08/83	5	1,335.00	1,000.00	0.00
511	Groceries	Expense	05/29/83	20	2,453.00	2,000.00	0.00
512	Household	Expense	05/29/83	10	3,241.00	1,000.00	0.00
513	Misc. Expenses	Expense	05/30/83	13	830.00	500.00	0.00
514	Check Charges	Expense	01/01/83	0	0.00	0.00	0.00
515	Electric	Expense	05/04/83	5	225.00	250.00	0.00
516	Telephone	Expense	05/04/83	5	460.00	250.00	0.00
517	Natural Gas	Expense	05/04/83	5	287.00	250.00	0.00
518	Misc. Utilities	Expense	05/22/83	5	75.00	100.00	0.00
519	Insurance	Expense	05/04/83	10	375.00	375.00	375.00
601	Repairs [A]	Expense	05/26/83	2	775.00	250.00	575.00
602	Insurance [A]	Expense	03/30/83	1	200.00	200.00	0.00
605	Mort. Int. [A]	Expense	05/04/83	5	3,015.00	3,015.00	3,015.00
606	Taxes [A]	Expense	04/09/83	1	700.00	700.00	700.00
701	Repairs [B]	Expense	04/25/83	3	350.00	250.00	0.00
702	Insurance [B]	Expense	01/01/83	0	0.00	0.00	0.00
705	Mort. Int. [B]	Expense	05/04/83	5	2,680.00	2,680.00	2,680.00
706	Taxes [B]	Expense	04/09/83	1	600.00	600.00	600.00

Figure 1: A sample Dollars and Sense year-to-date account summary

PRODUCT INFORMATION

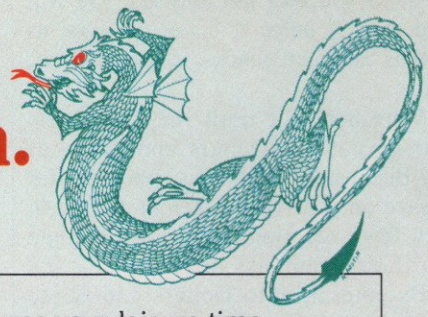
Dollars and Sense
Monogram
8295 South La Cienega
Inglewood, CA 90301
(213) 215-0529

List Price: Apple II, II Plus, and IIe, $100; Apple IIc, $119.95; Macintosh, $149.95

Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive; printer

CIRCLE 501 ON READER SERVICE CARD

Big Game Hunting? Try Baggin' Our Dragon.



It's the biggest game in town

Our dragon, of course, is Wizardry—that unique series of computer recreation programs designed for Apple users who are seeking the ultimate "big game" challenge.

Since its debut, Wizardry has been the best-selling computer game of its kind.

For a very good reason:

Because Wizardry is more than just a game, more than a diabolically clever maze.

Wizardry is a complex world of variety and depth. A world of richness and pleasure.

Packed with suspense, full of surprises, Wizardry is enchanting—a compelling diversion that turns your leisure time into prime time.

Wizardry is powerful and sophisticated. A simple command system, 3D maze displays and superb programming provide you with month after month of involvement and satisfaction.

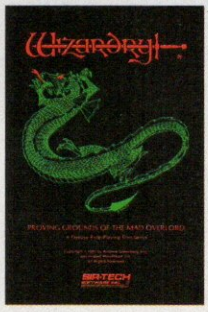
Four years old and still growing, the game is already recognized by critics and game lovers as a classic.

Simply stated, Wizardry is the finest fantasy role-playing computer game you can buy.

Set your sights on the best. Track down Wizardry—the biggest game in town.

Enter the World of Wizardry®

A Classic Encounter

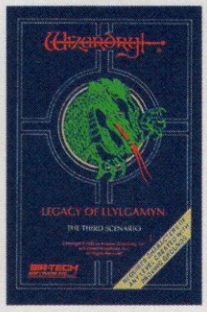


Proving Grounds of the Mad Overlord

The First Scenario

Unlike any other game you have ever played. A fascinating 10-level maze full of monsters, sorcery, traps and treasures. As you gain skills, the characters you create grow stronger, richer, wiser and better able to survive. The final goal is elusive. Your experience . . . unforgettable.

Twice voted "All Time Most Popular Computer Program" —Softalk Readers

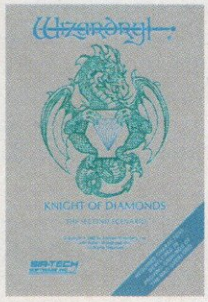


Legacy of Llylgamyn

The Third Scenario

A spellbinder that advances the classic traditions of Wizardry. Find the great dragon L'kbreth and save the people of Llylgamyn. Includes full screen maze display and Windo-Wizardry, the revolutionary pop-up window graphics system. Requires brave adventurers of any level developed in PROVING GROUNDS.

". . . A Landmark in Graphics Advancement" and "The Best Yet" —Softalk

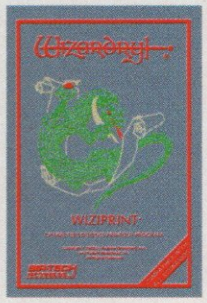


Knight of Diamonds

The Second Scenario

This classic journey should only be attempted with those Wizardry heroes who have attained the 13th level of ability in PROVING GROUNDS. Their challenge—and yours—to adventure through a six-level maze and become the Knight of Diamonds. First-rate fantasy!

Awarded "Best Adventure Game for the Home Computer"
—Game Mfrs. Association of America



Wiziprint

Character Statistics Printout

A helpful utility program that prints the possessions, attributes and known spells of all your Wizardry characters. Quick, neat and easy-to-read. For use with 80-column printers. Compatible with all Wizardry scenarios. A real timesaver!

"Wiziprint is a very handy utility disk for ardent Wizardry players"
—Roe R. Adams III, Softalk

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A+ THAT'S

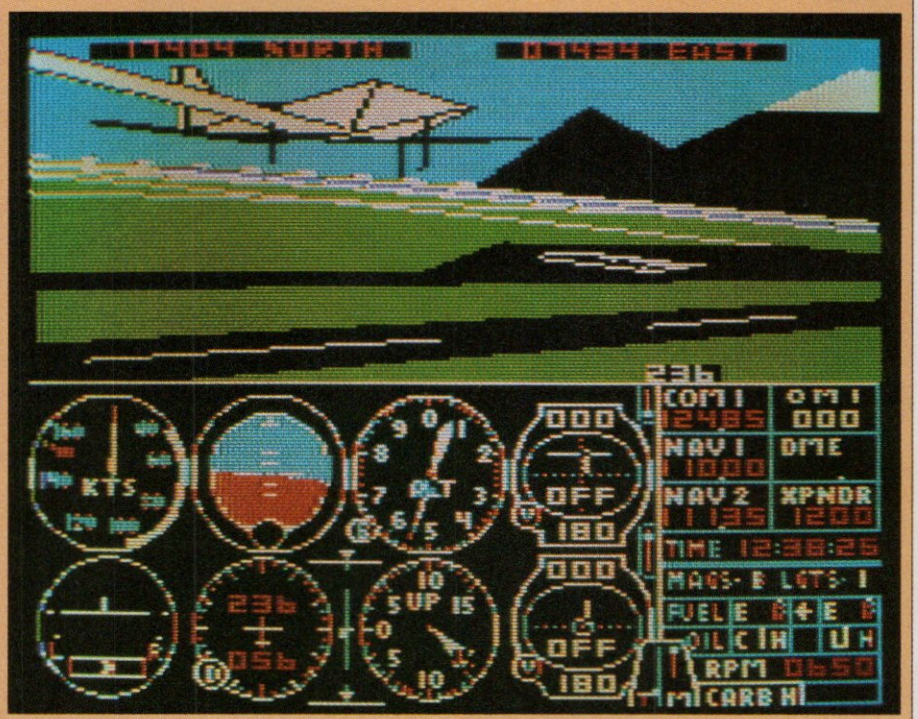
ENTERTAINMENT

GAME REVIEWS

FLIGHT SIMULATOR II

SubLOGIC Corporation
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8482
List Price: $49.95
Requires: Apple II, II Plus, IIe, or III in Emulation mode, 48K RAM; one disk drive; one joystick optional

CIRCLE 538 ON READER SERVICE CARD



Take notice, all you would-be Charles Lindberghs and Amelia Earharts, here's your chance to take the controls of an airplane and log flight hours without risking life and limb.

Flight Simulator II from SubLOGIC Corporation lets you sit in the pilot's seat of a simulated Piper PA-28-181 Archer II that is capable of cruising at 148 miles per hour. Flight Simulator II provides a set of features and capabilities that cover a wide range of interest levels—from the "I've always wanted to feel what it's like to fly" person, to the student pilot who wants to hone basic flight procedures, to Snoopy-esque flying aces itching for a dogfight. According to the people at SubLOGIC, instrument-rated pilots fly Flight Simulator II to keep their instrument skills current.

You can fly out of one of more than 70 airports in four metropolitan areas: Chicago, Los Angeles, New York, and Seattle. For you fighter pilots, the World War I Ace game features an aerial fighting grid laid out to facilitate bombing raids and aerial skirmishes. When you fly out of the cities, major topographical features give you visual points of reference that add interest to an otherwise dull flight. I'd like to see more ground features to enhance the flight simulation, but at least you can circle Seattle's Space Needle or cruise by the Empire State Building.

If you can successfully fly Flight Simulator II, you may be a latent Chuck Yeager—you've got the right stuff.

Flying, of course, is the principal feature of Flight Simulator II. Getting airborne is a cinch, as it is in a real airplane. The difficulty begins, again as in a real flight, in controlling the airplane for straight and level flying—and, even worse, for landing. The most critical difference between real flight and Flight Simulator II is that real flying is decidedly easier. Straight and level flight in Flight Simulator II is an unrealistic challenge. Landings are devastating. I'm a licensed pilot with, admittedly, only 70 hours of logged flight time; but I've never crashed. (I'm writing this, aren't I?) With Flight Simulator II, in more than 60 attempted landings, I've only landed four times—and not once on a runway. All the other times—splat! That's not counting the time I flew into the Sears Tower or the several times I was shot down after taking on too many enemy fighters. The point is, if you are seriously trying to reinforce flight training or master simulated flight, Flight Simulator II is a real test and then some. If you can successfully fly Flight Simulator II,

you may be a latent Chuck Yeager—you've got the right stuff.

Besides being difficult to fly, Flight Simulator II has at least one irritating bug. On a couple of occasions, in what I had intended to be a controlled bank, the wings went into an uncontrollable teeter-totter motion that gave me vertigo. I was so relieved when I crashed because I would have needed one of those small paper bags airlines provide, if it had gone on much longer. A SubLOGIC employee told me to use the keyboard instead of the joystick for controlling turns; but that takes away much of the tactile simulation, and I chose not to listen because I like the joystick. I just learned to use a delicate touch. Real airplanes are not so sensitive and are easier to control.

Aggression, the Better Part of Valor

In World War I Ace, I encountered another problem. I flew into enemy territory, bombed a factory and a fuel depot, and then engaged in several dogfights. I downed two enemy fighters and came away virtually unscathed, save for a few minor hits. No biggie—I was still flying. But horrors! My fuel gauge read empty. Since there are two fuel tanks, I quickly grabbed the manual to learn how to switch to the full one. The documentation details the keystrokes, but in World War I Ace, switching tanks doesn't work; so I helplessly crashed in enemy territory.

If I'm going to crash and burn, I might as well do it with honor.

Nevertheless, I enjoy World War I Ace—at least when I maintain the proper perspective. There's nothing like a couple of bombing runs after a tough day at the office to soothe the nerves and work up an appetite for dinner. I just don't plan on making it home in one piece. My choices are limited. I can plan my flight so that after leveling a factory or two, I hightail it back to friendly territory. The only problem with this strategy is that my chances for landing are slim or none—remember my safe-landing percentage? My other choice is to be macho and wreak as much havoc as possible by dropping all five of my bombs and tangling with (instead of avoiding) all the fighters that are sent out to turn me into winged flambé. Then, when the fuel runs out or my plane is riddled with holes, I turn kamikaze. If I'm going to crash and burn, I might as well do it with honor. Banzai! A well-placed dive makes short work of an enemy fuel depot. I only wish I could get points for such bravado.

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PREPARED SEPTEMBER '84 — PRICES SUBJECT TO CHANGE

CIRCLE 120 ON READER SERVICE CARD

(A subtle merchandising ploy)

TO OUR MANY LOYAL SUPPORTERS, to new computer owners, and to everyone who still believes in the potential of personal computers to make the world a better place, we extend the following, somewhat uncharacteristic offer:

Buy 2, Get 1 Free.*

FINANCIAL COOKBOOK™
New. Powerful & versatile financial decisionmaker.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

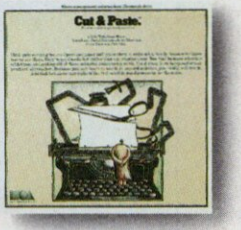
LARRY BIRD & JULIUS ERVING GO ONE-ON-ONE™
The best-seller.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

SKY FOX™
New. 3-D flight & combat simulation with 5 skill levels and 15 different scenarios.
ApII, II+, IIe & IIc

"ARCHON™
Best-seller. Award-winner in Omni, Creative Computing, & Softalk.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

ARCHON II: ADEPT™
New. Graduate school for Archon addicts. More magic, new icons and battlefields.
C-64 & Atari

MUSIC CONSTRUCTION SET™
Composition for anyone who can point a joystick. Multi award-winner.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari



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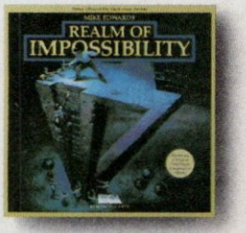
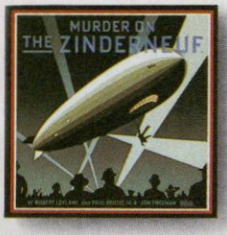
Fast, practical & easy to learn word processor. Creative Computing award-winner.
IBM-PC, PCxt, PCjr, ApIIe & IIc C-64 & Atari



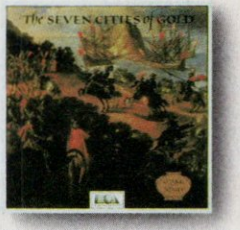
REALM OF IMPOSSIBILITY™
New. Action & adventure in world of 3-D illusions. Unique 2 player cooperative mode.
C-64 & Atari



MURDER ON THE ZINDERNEUF™
A mystery novel in computer graphics. Hotline award-winner.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

PINBALL CONSTRUCTION SET™
The classic. Rolling Stone, Omni, Infoworld & Creative Computing awards.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

M.U.L.E.™
"Strategy Game of the Year" in Infoworld & Video Review for 1-4 players.
C-64 & Atari



SEVEN CITIES OF GOLD™
New. Deep, rich discovery simulation with more than 2800 screens.
ApII, II+, IIe, IIc, C-64 & Atari

ELECTRONIC ARTS™

*HOW IT WORKS: Buy any 2 EA products before Jan. 15, 1985 and send in the coupons enclosed in the packages along with your sales receipt and $3.00 to cover insured shipping. We'll send you any EA product you choose (except Get Organized!) for free.

Trademarks and their holders: IBM, PC, XT, and PCjr; International Business Machines, Inc. Apple II, II+, IIe, IIc; Apple Computer Corp. Commodore 64; Commodore Business Machines, Inc. Atari; Atari Computer Corp. Financial Cookbook, Larry Bird and Julius Erving Go One-On-One, Sky Fox, Archon, Archon II: Adept, Music Construction Set, M.U.L.E., Seven Cities of Gold, Cut & Paste, Realm of Impossibility, Murder on the Zinderneuf; Electronic Arts, Inc.

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INCREDIBLE DATABASE VALUE

Powerful, Flexible, Versatile - A FULL DATABASE at a Fantastic Price!

Everyone knows how effective a database can be. But until now, they've either been powerful but hard to use, or just simple personal filing systems.

Now VersaForm has made the database both powerful AND easy to use. Because it's based on your own knowledge of business forms, you can tailor it to your own needs. And because it's a full-featured database, it can do the jobs that lightweights just can't handle.

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For over 3 years, VersaForm has been used by manufacturers, bankers, doctors, farmers, and many others. It's THE program for serious business tasks such as invoicing, to your own needs. And because it's a full-featured database, it can do the jobs that lightweights just can't handle.

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- Prevent errors by checking entries before accepting them.
- Save time by doing calculations automatically.
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- If you're not fully satisfied with VersaForm, return it within 30 days and we'll refund your money.
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Compare at over $300. **$69**

Multi-File version $99 (IBM PC Only)

Note: Prices subject to change after 60 days.

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Applied Software Technology (408) 370-2662
170 Knowles Drive, Los Gatos, CA 95030
Yes! RUSH me VersaForm
for the IBM PC ($69) ____(128K, 2 drives)
* Apple II (+,e,c) ($69) ___*(64K, 2 drives)
VersaForm XL (MULTI-FILE)
for the IBM PC ($99) ____*(196K, 2 drives)
Enclose check or money order with coupon.
Include $4.50 for U.S. postage and handling, $7.00 for C.O.D. California residents add 6.5% tax. (Allow 3-4 weeks for delivery.

___ My check or money order is enclosed.
Charge my: ___ MasterCard ___ Visa ___ C.O.D.
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PLEASE PRINT CLEARLY
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CIRCLE 121 ON READER SERVICE CARD

A+ THAT'S ENTERTAINMENT

Neither Wind, nor Rain. . .

Flight Simulator II allows the serious flyer to specify a variety of flying conditions—including aircraft position, altitude, attitude, reliability, and environmental controls. The Reliability mode simulates engine and other sundry aircraft problems; reliability is specified as a percentage that regulates how often something unhealthy happens. You can set a range from a totally reliable aircraft to a terribly unreliable aircraft (good luck).

Using environmental controls, you can specify seasons, two cloud layers, and three wind levels. You define each cloud layer by its bottom and top altitudes; each wind level gets its own altitude, velocity, and direction. Also available is a reality mode that, when switched on, makes flying more difficult by activating subtle factors such as an engine that dies when too much throttle is applied too quickly.

It soars in terms of the motion, visual perspective, and instrumentation of flight simulation.

Flight Simulator II stores various combinations of flight conditions in user-mode categories. Ten user modes, 0–9, are preset. They include conditions from easy flight, to dusk flight, to bad-weather flight. You can set and save 15 additional user modes of your own choice.

For instance, I'm going to define a set of conditions that puts me 1000 feet above ground level, one mile from a runway, and perfectly lined up for a successful landing. Then I'll just specify my user mode and automatically be set in a position to practice crashing, uh . . . I mean landing.

Is It Real, or Is It . . .?

Flight Simulator II nosedives because of the exaggerated difficulty of controlled flight and landings. Conversely, it soars in terms of the motion, visual perspective, and instrumentation of flight simulation. The topographical graphics are ho-hum, but the simulation graphics are truly amazing. Your view out of the airplane's window accurately depicts the airplane's physical attitude (banking, climbing, descending, or spinning). Plus, at any given moment, you can look out of the airplane in eight directions that cover the full 360-degree panorama. As if that weren't enough, you can also select ground radar, which tracks your position directly beneath your airplane. The radar zooms in and out, which is most helpful when you are taxiing around an unknown airport—you zoom out to see where your airplane is in relation to the entire airfield.

Not only do the instrument panel and radio stack comply with FAA regulations for visual and instrument flight rules, but their actions are also authentic. They are so comprehensive and authentic, in fact, that SubLOGIC is currently seeking FAA approval for accepting the logging of Flight Simulator II instrument approaches.

You can fly in color or monochrome; color is desirable but not essential. Mechanically, all the controls are handled at the keyboard. As might be expected, becoming fluent with these controls requires a certain period of adjustment. I like the optional joystick because of the yokelike feel of working the ailerons and elevator.

Flight Simulator II's documentation comes in two manuals. One is a basic flight manual; and the other contains explanations on the physical dynamics of flying, eight basic flight lessons that cover takeoffs through instrument-landing-system approaches, and an introduction to aerobatics. Both manuals are adequately written in a serious tone. Additionally, you get area charts for the four metropolitan cities and a flight-reference card.

Nothing surpasses flying in a real single-engine aircraft. To experience it, you can contact a local flight service for a scenic ride or bear the expense of flight lessons. If neither of these choices suits you, but you still want to discover the sensation of small-aircraft flight, Flight Simulator II is the next best choice.

Byron Ryono

["Hi, we're from Europe. Where's the gold?"]

A SECOND CHANCE *to* GET *the* NEW WORLD RIGHT.

IF COLUMBUS HAD LANDED IN NEW JERSEY; if Cortez had been nicer to Montezuma; if Pizarro had been a more generous soul, would the world today be any different?

If you've ever wondered about things like that, you'll like *Seven Cities of Gold* very much indeed.

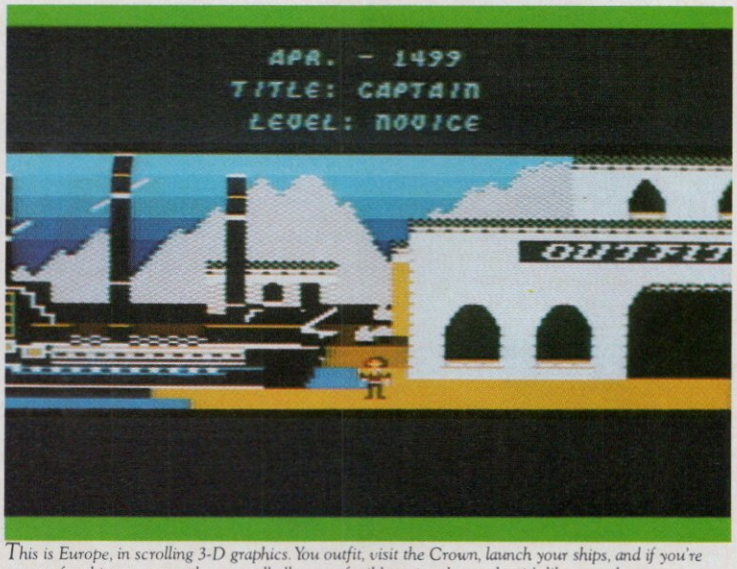
It's a kind of adventure. An unusually rich and technically impressive one with new continents to explore, natives to encounter, resources to manage and trade routes to establish. But beyond all the neat stuff *Seven Cities* throws up on the screen, there's something else happening here.

It feels quite odd to look at the map and see nothing. Of course you have to explore the more than 2800 screen new world in order to map it. But the way the natives act, the way you get older, the way seasons change and your men behave, and the way your reputation preceeds you gives you a sort of feeling that's unexpected in computer games. It's deeper. Maybe a little disquieting. It plays as much in your head as it does inside your computer.

Seven Cities does all this with the real world or, better still (since the "new" world really isn't anymore), it will construct any number of completely detailed hemispheres for you to try your hand with.

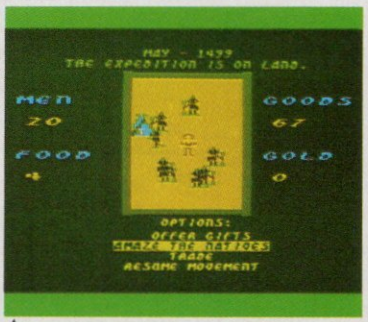
Designed by Ozark Softscape (the people who made M.U.L.E., *Infoworld's* "Strategy Game of 1983"), *Seven Cities* is about as near a recreation of history as has ever been accomplished, with or without a computer.

Find it. Stomp around in it. See if you can't do a better job than all the celebrated figures who got us into the mess we have to deal with today.

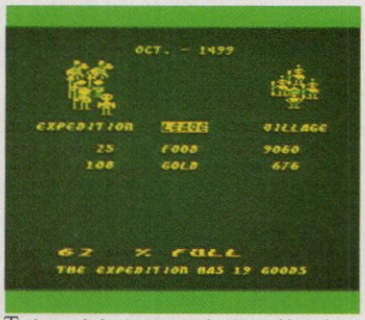


This is Europe, in scrolling 3-D graphics. You outfit, visit the Crown, launch your ships, and if you're cut out for this, you return later to tell all sorts of wild stories about what it's like over there.

There are over 2800 screens to explore in the new world. As you scroll through them, seasons change.



Animated natives surround you. They have no reason to trust you. The drum beat quickens.



Trading with the Aztecs is tricky. You could wind up with enough gold to build an empire. Or as soup.

Home again you view your maps, pat yourself on the back, and consider your place in history.

SEVEN CITIES *of* GOLD™

from ELECTRONIC ARTS™

MACHINE REQUIREMENTS: *Seven Cities of Gold* is available for the Apple II, II+, IIe & IIc, Commodore 64 and Atari home computers.

Seven Cities of Gold and M.U.L.E. are registered trademarks of Electronic Arts. Apple is a trademark of Apple Computer Corp. Commodore is a trademark of Commodore Business Machines, Inc. Atari is a trademark of Atari Computer Corp. For a free product catalogue, send a stamped, self-addressed #10 envelope to Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403.

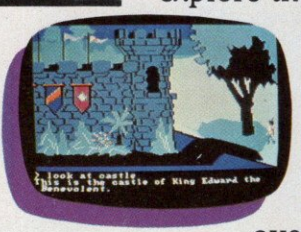
CIRCLE 350 ON READER SERVICE CARD

King's Quest.™
Opening doors to a new dimension.

King's Quest marks a milestone in text and graphic adventures.

". . . a breakthrough in graphics-oriented adventure games...offers the best quality graphics in an adventure thus far." —Compute!

Packed full of high-resolution, 16-color graphics, it pushes even 128K Apple II's to their limit. Through a revolutionary simulation of three-dimensions, and astounding animation, storybook characters come alive.



". . . a significant advance. Rating: 10 (pure gold and about as good as a game could be)." —Electronic Hotline

By joystick or keyboard, guide Sir Graham on his quest for lost treasures. Make him walk, climb, duck, even swim. Through keyboard commands, using even whole sentences, explore the Kingdom of Daventry as you unravel its many mysteries. Unlike other adventures, you'll enjoy King's Quest over and over again.

Each time, uncover new twists, as well as more ingenious solutions to each challenge. If you do, you'll improve your score.

"A+. This revolutionary breakthrough should be at the top of your software shopping list...It's like playing an animated cartoon...

In fact, this game does more than just point the way for graphic adventures of the future-it opens up a whole new sub-genre." —Computer Games

Now available for IBM PC, Apple IIe, IIc.
Requires 128K.

SIERRA™

King's Quest

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CIRCLE 404 ON READER SERVICE CARD

PICKING THE PERFECT GIFT

Christmas time is here. Time for presents, time for cheer. Time for the crowds, the umpty-umpth rendition of Silent Night, the department-store employees wearing desperate smiles, and the street-corner Santas tinkling their little bells. And maybe, you hope, time to find the perfect gifts for everyone.

(*My* perfect gift, by the way, would be one pair each of Macintoshes and Lisas, networked of course, with three hard disks, two turtledoves, and a partridge in a Peachtree. But I digress.)

So what are some "perfect gifts" to buy for your computer-loving friends, spouse, or children? We at *A+* are well aware of the difficulties of deciding on the right gift for the hacker who has everything, or the beginner who has nothing. That's why we're offering you this *A+* Christmas list. With luck and a little help from your friends, you'll be able to cut your shopping time and the size of your shopping budget down to a mere fraction of their former size. Nothing on this list costs more than $250, and most cost less than $70, so you won't have to sell your soul to make Christmas special. Read on, make your list, and check it twice.

MARTINELLI PHOTOGRAPHY

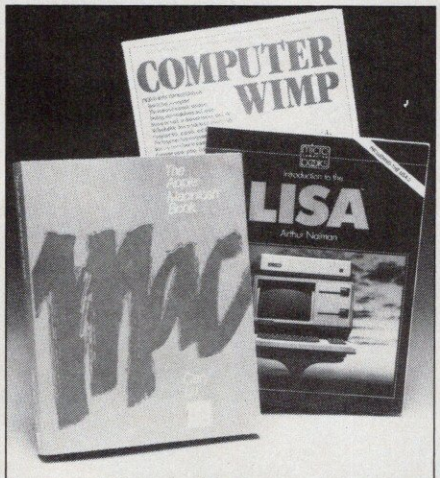
CUT DOWN YOUR SHOPPING TIME AND BUDGET TO A MERE FRACTION OF THEIR FORMER SIZE

BOOKS

When in doubt, buy a book. This time-honored trick works even better in the computer world, where someone has written a book for almost every possible application or interest. We won't bother to list books for every specialty, but instead offer a sampling of more general tomes, suitable for reading while curled up next to a warm CPU.

Introduction to the Lisa, by Arthur Naiman; $9.95 from Addison-Wesley. This copiously illustrated book clearly explains the Lisa's hardware and software features and describes each of its applications. Good for Lisa owners or prospective Lisa owners.

The Apple Macintosh Book, by Cary Lu; $18.95 from Microsoft Press. A simple, readable compendium of what you need to know to work with your



Computer Wimp, *by John Bear*

Macintosh. Also a good gift for your friends who've been slavering over the possibility of getting a Macintosh. Help them suffer happily.

Computer Wimp, by John Bear; $9.95 from Ten Speed Press. This witty wandering through the seamy side of owning a computer entertains as well as it teaches, splendidly in both cases. We wish we'd been the ones who'd had the fun of assembling the collages of clip art to illustrate this book. Good for any computer owner.

Hackers: Heroes of the Computer Revolution, by Steven Levy; $17.95 from Doubleday. If the names Ricky Greenblatt, Lee Felsenstein, and John Harris don't mean anything to you, they should—these people are some of the "hackers," in the true meaning of the word, who created the computers, programs, and computer languages we blithely use today. The Hacker Ethic's four commandments—hands on at all costs, information should be free, mistrust authority, and computers can change the world—have collided with other more mundane commandments lately. This book is a hagiography of hackers.

The Unofficial I Hate Computers Book, by Rich Tennant and John Barry; $4.95 from Hayden. This is a great computer gag gift, best presented to people who think computers make them gag. *The Unofficial I Hate Computers Book* is better than *The Official I Hate Cats Books*; in fact, as you'll see from the cover illustration, this book could be considered the cats' revenge. Cartoons to illuminate every nasty fantasy you had about what to do with that fershlugginer computer.

Apple II User's Guide, by Lon Poole, Martin McNiff, and Steven Cook; $17.95 from McGraw-Hill. A hands-on resource book not only for the II, II Plus, and IIe, but also useful for the IIc. Explains all the basic features of your Apple.

Fire in the Valley: The Making of the Personal Computer, by Paul Freiberger and Michael Swaine; $9.95 from McGraw-Hill. In interviews with Silicon Valley pioneers such as Steve Jobs, Gary Kildall, Bill Gates, and others, Freiberger and Swaine trace the slow mustering of forces and the sudden, explosive growth of the microcomputer. A fascinating read. (See the excerpt in this issue, pages 55-68.)

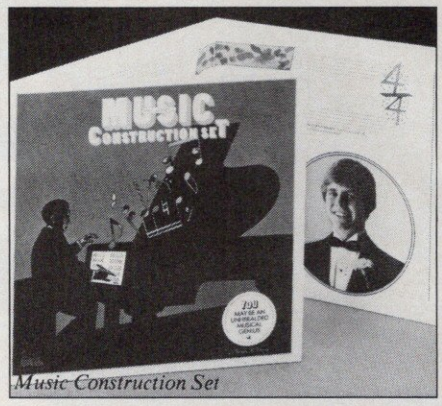
The Book of Adventure Games, by Kim Schuette; $19.95 from Array, Inc./The Book Division. This is a dangerous book: for the uninitiated, because it lures you into the world of adventure gaming, and for the aficionado, because it gives away a few (but not all) of the answers. You may not agree with the author's assessments of the games, but you get enough information to make your own choices.

SOFTWARE

We hesitate to offer you too many hints on software. Hundreds of packages are available, and you know your needs better than we do. For gifts, a good rule of thumb is to buy something the recipients may want but can't bring themselves to buy. On that note, we'll mention the following:

Rocky's Boots, from The Learning Company, listed at $49.95, for the II Plus and IIe. *We* want this one. It painlessly teaches you the basics of computer logic and electronic circuitry. You build machines, plug "spare parts" into each other, and play "games" that let you play with hardware and wiring. Especially good for kids, but you might try it too.

Music Construction Set, from Electronic Arts, listed at $39.95, for the II se-

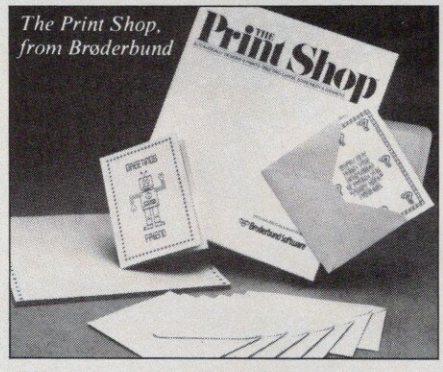


Music Construction Set

ries. Construct your own melodies with this icon-oriented program. Most fun for budding musicians or closet music lovers. They laughed when you sat down at the keyboard—but they'll cry when they hear your rendition of "Tears on my Apple."

Sargon III Chess, from Hayden Software, listed at $49.95, for the Macintosh and Apple II series. Chess, for beginners or experts, with nine levels of difficulty. You can replay historic chess games, let the computer suggest good moves for you, or practice openings, midgame strategy, or endgame moves. You'll be glad we pawned this one off on you.

The Print Shop, from Brøderbund, listed at $50, for the II series. Buy this program right away for yourself, and you can make your own Christmas cards. Buy it for other people, and they'll have



The Print Shop, from Brøderbund

different type styles, formats, border designs, and graphics to experiment with and make cards, invitations, flyers, and logos. (See review, page 95.)

COMPUTER ACCESSORIES

If you (or a friend) are a relatively new computer user, or if your potential gift recipients have been using computers for so long they've run out of basic supplies, a trip to your office/computer-supply store could make Christmas very, very happy. Always in demand are

Floppy disks. Vanilla (or should I say

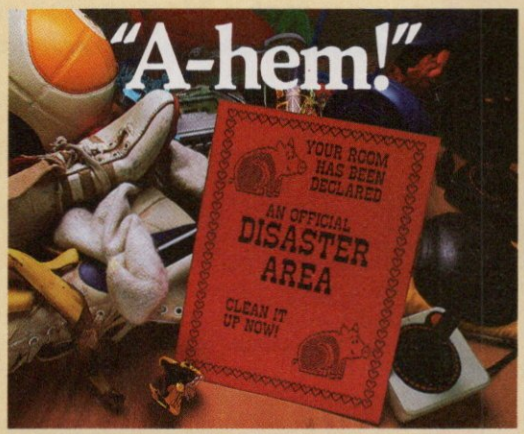
Express Yourself!

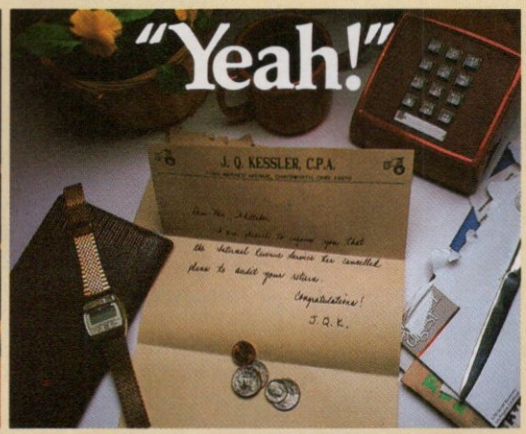
A few minutes and a few keystrokes. That's all it takes to turn your personal computer into a personal print shop.

Everything you need is in the program: typefaces, border designs, background patterns, pictures, symbols and a starter kit of colored paper and matching envelopes. The Print Shop will also guide you along, step by step, even if you've never touched a computer before.

So think what you'd like to say, then put it in your own words with The Print Shop.

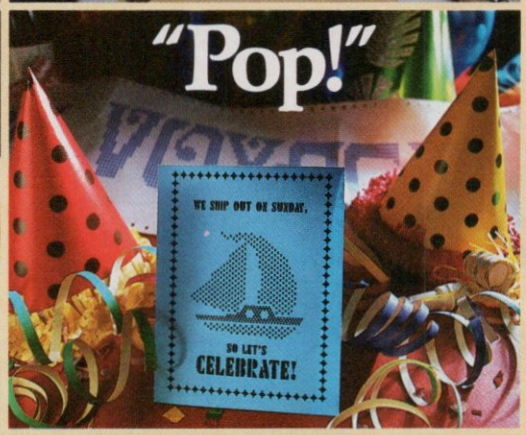
Make quite an impression with just five easy keystrokes.





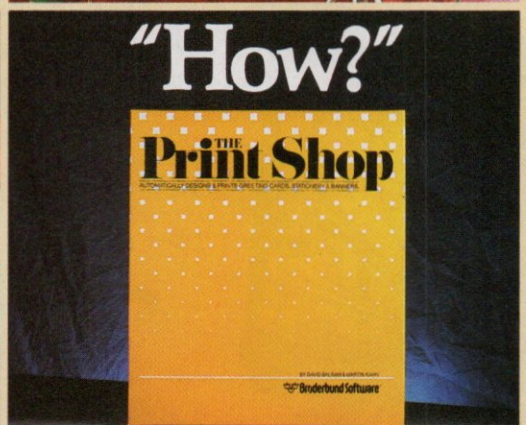
Everybody's creative with The Print Shop. You just can't help it!

Your originality shines through, so good news becomes even better.



Dozens of pictures and symbols to suit every purpose and occasion.

Letterheads, logos, banners and signs. If you can imagine it, you can make it!



Keep your creativity flowing... put it in your own words with The Print Shop.

The Print Shop is available for the Apple. Coming soon for the Commodore 64, Atari Home Computers, Macintosh and IBM-PC/PCjr. Apple and Macintosh are trademarks of Apple Computer, Inc. Commodore 64 is a trademark of Commodore Electronics, Ltd. Atari is a trademark of Atari Corp. IBM-PC and PCjr are trademarks of International Business Machines, Inc. For more information about Brøderbund and our products, write to us at: 17 Paul Drive, San Rafael, California 94903 or call (415) 479-1170.

Brøderbund™

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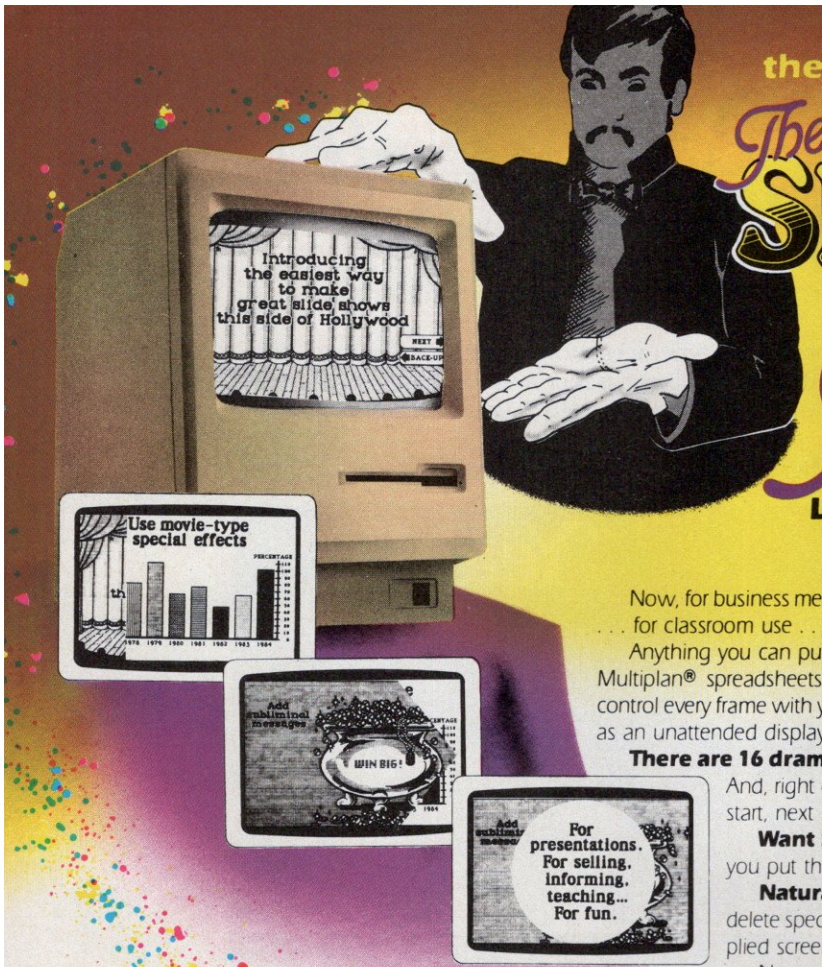
CIRCLE 390 ON READER SERVICE CARD

Presenting . . .
the complete presentation maker . . .

The Slide Show Magician™



Lets you make Macintosh* slide shows with movie-type special effects!

Now, for business meetings . . . sales presentations . . . in-store and store window demonstrations . . . for classroom use . . . for home fun!

Anything you can put on a Mac screen can be used with the Slide Show Magician . . . from Multiplan® spreadsheets and MacWrite** copy to pictures, graphs, words and charts. You can control every frame with your Mouse or let the entire show run automatically, even run continuously as an unattended display!

There are 16 dramatic, movie-type special effects you can use to create extra attention. And, right on the screen you can place the specific control buttons you want to click: start, next frame, back-up, jump (to a specific frame), pause/resume, quit.

Want Subliminal Messages in your show? The Slide Show Magician lets you put them in, as well as superimpose blocks of text over key pictures.

Naturally, you can edit your show — shift a frame, eliminate a frame, add or delete special effects, select the time before a frame change. And you can use the supplied screen-borders (like a stage curtain which opens) or quickly prepare your own.

Now you can create the most interesting slide shows **this side of Hollywood!** And thanks to the Mac's portability you can take it with you right to a customer's desk, the boss's office, to school, to meetings. Or, set it on a counter or in your store window and let the show run and run and run.

Get the Slide Show Magician today, it's good business. Need art help to make an impressive slide show? See the McPic! information that follows.

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For details, see below

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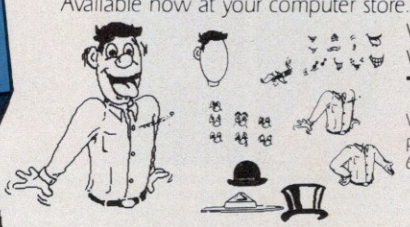

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licorice?) disks are always welcome, no doubt, but your loved ones may appreciate a change of pace—multicolored disks. They're all the rage now; there's no truth to the rumor that Boy George has started to braid them into his hair, but they still look good, and the performance is the same. Go for a rainbow of colors (at about $33 for a box of ten) or buy two tasteful boxes of red and green in honor of the season.

A carrying case. For the portable members of the Apple family. Cases for the II family run about $40; cases for the Macintosh will cost around $99.

Disk-filing boxes. You can find something in every price range here. Diskette files begin with workhorse plastic and end with the polished finery of oak and mahogany. Plastic file boxes cost $15–$19; wooden boxes are $25–$30.

Printer ribbons and printer paper. As with disks, you can spring for the colored versions, but a healthy supply of standard-issue ribbons and paper will still be appreciated.

HARDWARE

Go ahead, be adventurous. You can help your friends make their own kind of music, play their own kind of games, use a new operating system, or just—you should pardon the expression—reach out and touch someone. The following interesting peripherals and cards can open up new, uncharted regions for computer users. One caution: If you're going to get hardware that you think may have the *ghost* of a chance of being incompatible, ask somehow. Hint around. Just be casual, but find out whether the stuff plugs in, or you're courting disappointment.

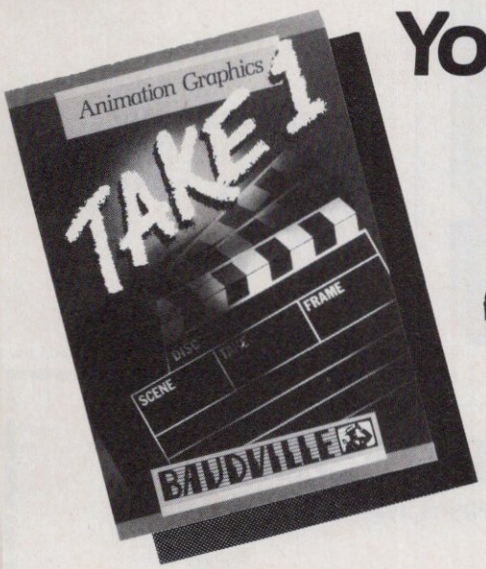
A RAM expansion card. If the gift recipient has an Apple II or II Plus with only 48K RAM, you can get a 16K RAM card for about $50 to bring the system up to 64K. An Apple IIe can be upgraded to 128K with a 64K Extended 80-column card from Apple that lists for $295, but you can locate them less expensively at discount stores or mail-order houses. Or you might want to look for a CP/M card, which would make even more software available for your Apple. Check the magazine ads.

An inexpensive modem. This peripheral will put confirmed computer addicts in contact with hundreds of other computer addicts. Guaranteed hours of pleasure for them. Two modems under $200 are The Networker from Zoom Telephonics, at $129, 300 baud, software included; the Volksmodem from Anchor Automation, at $79.95 ($12.95 for cables), 300 baud; and The Operator from Timecor, at $159, 300 baud, software included. You'll discover other models and various pros and cons, but the idea's well worth exploring.

The Mockingboard Sound Effect Generator, from Sweet Micro Systems, listed at $99.95 without speech effects and

The Mockingboard Sound Effect Generator

$199.95 with speech. Enhances other software with stereo music, sound effects, and speech-synthesizing capabilities. Good for the entire II series, including the IIc.



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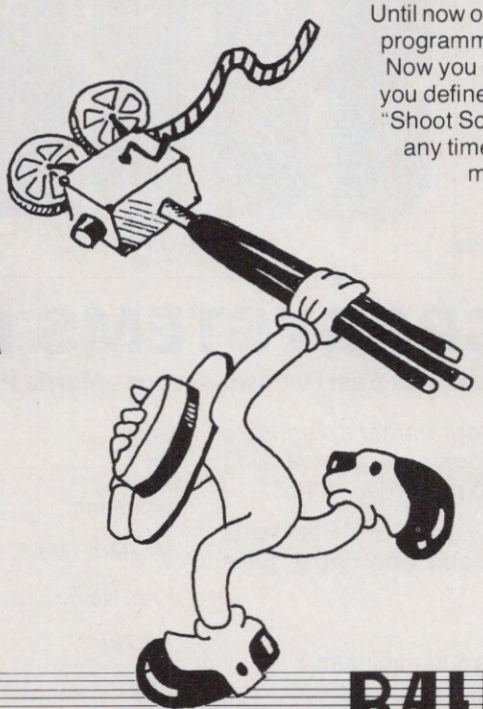

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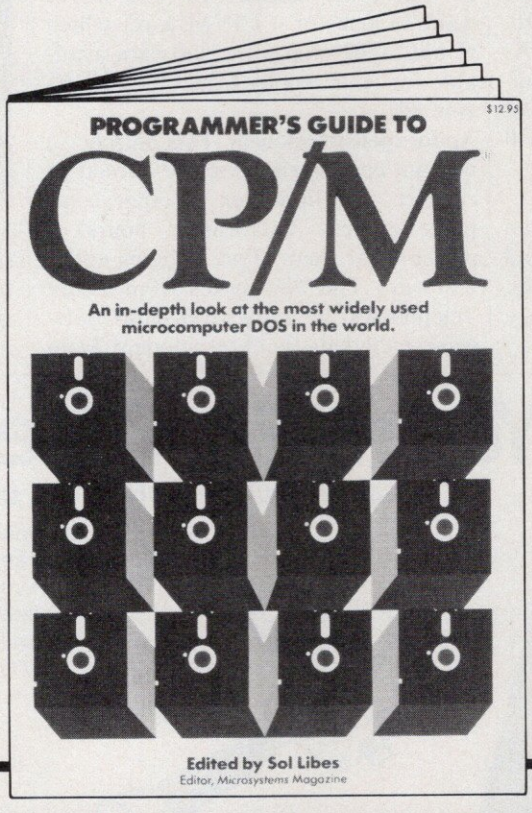
Edited by Sol Libes

Here's an important collection of CP/M insights that you'll never find in any CP/M manual. CP/M is the most popular microcomputer DOS in use today, and this widespread use has generated many innovative techniques and enhancements of CP/M. *Programmer's Guide to CP/M* tells you what these enhancements are and how to put them to use, how to get around apparent limitations of a CP/M system and why CP/M is far more versatile than you might have imagined. Every article in *Programmer's Guide to CP/M* originally appeared in MICROSYSTEMS between January 1980 and February 1982. Except for this collection, these articles are now unavailable! *Programmer's Guide to CP/M* gives you an in-depth look at CP/M from the viewpoint of the programmer—the individual who creates the software that interfaces directly with CP/M, or who is installing CP/M on systems for which configurations do not already exist.

Contents include "An Introduction to CP/M," "The CP/M Connection," "CP/M Software Reviews," "CP/M Utilities & Enhancement," "CP/M 86" and "CP/M Software Directories." $12.95.



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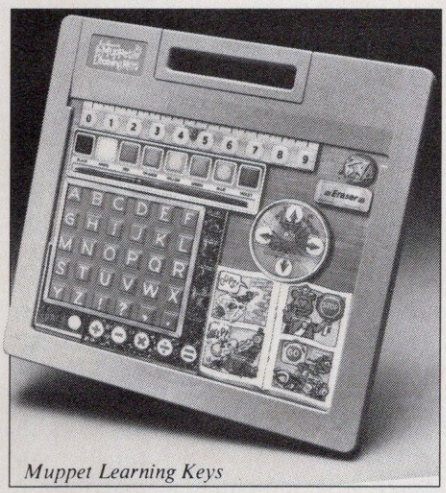
Joysticks. For the inveterate game player who wears out a joystick in a few months of rough-and-tumble play, a new joystick may come in handy. Joysticks vary in price from $30 to $50. Most computer stores, and even some department stores, carry them.

A surge protector. This device is better insurance than most policies you can take out on your computer. A surge protector shields a computer from voltage spikes or power outages that can destroy circuitry or data. List prices work down from about $70, but again, cherchez les discounts.



Muppet Learning Keys

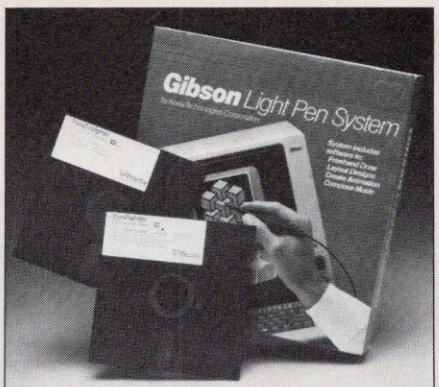
Muppet Learning Keys. This computer keyboard for kids ages three and up simulates the contents of a schoolroom desk with a ruler, watercolor set, penmanship slate, compass, eraser, and arithmetic exercise book. Miss Piggy and Kermit teach commands. The keyboard lists at $79.95 from Koala Technologies.

The Gibson Light Pen, also from Koala Technologies, helps users create freehand drawings, diagrams, computerized animation, or music. You can even use the light pen with your own software. Lists at $249.95.

COMPUTER CARE

Necessity is the mother of maintenance. Your computer needs to be cleaned and dusted more than those knickknacks sitting over in the corner. A clean computer is a happy computer; by extension, a clean computer means a happy computer owner. Here are a few cleaning tips.

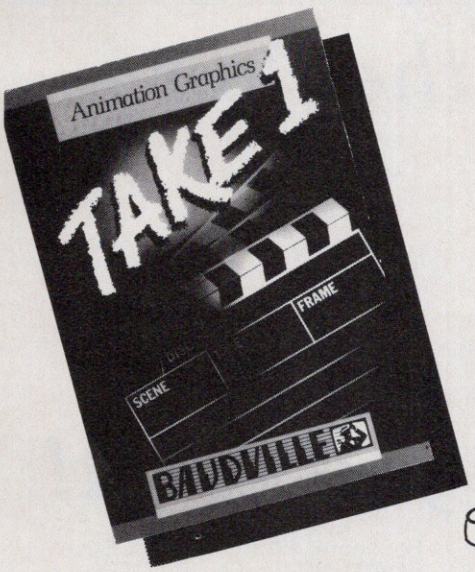
A PC-board-cleaning tool kit. $9.95 from the Jensen Tool Catalog (7815 South 46th Street, Phoenix, AZ 85040; (602) 968-6231); or check your electronics-supply store. Helps you keep dust, rust, grease, paint, glues, stains, and corrosion out of your computer's innards.



The Gibson Light Pen

A mini vacuum cleaner with a dusting-brush attachment. Dust is the ghost that haunts your computer and keyboard. Sometimes it even scares your machine out of operating correctly. The best ghostbuster your computer ever saw is a delicate once-over with a hand-held vacuum cleaner. You might spring for a $60 machine, or you might find a $29.95 mail-order bargain.

A cleaning kit for floppy-disk heads. The read/write heads on an Apple's internal disk drives ride directly on the medium of the disk. Garbage in, garbage on, to coin a phrase. If your disks are dirty, the heads get dirty too, with oil, dirt, or dust particles. Perfect Data



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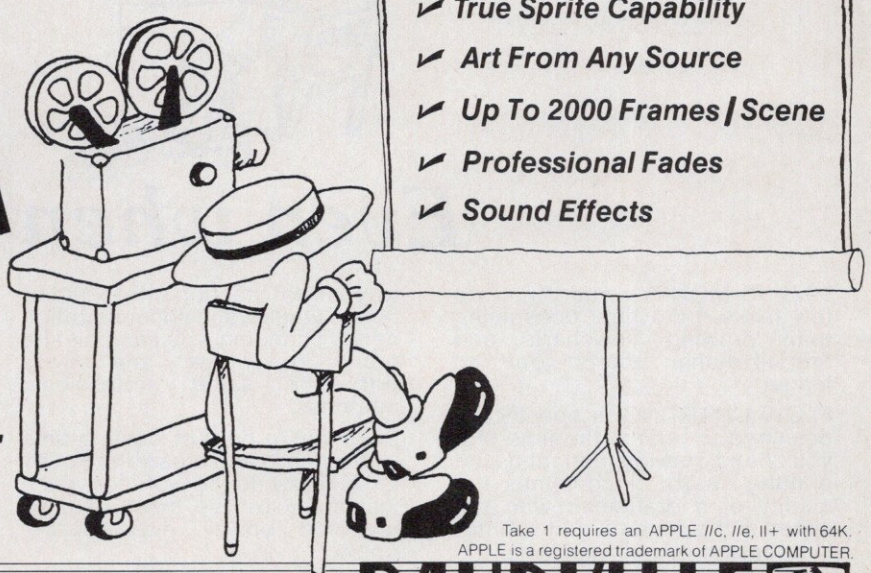

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Corporation offers the Case for Computer Care, which contains a disk-head cleaner, printer cleaners, antistatic spray, and other computer-care accessories packaged neatly in a plastic carrying case. It lists at $49.95.

The Case for Computer Care

NOVELTIES AND MISCELLANEOUS

Also known as Other, or Unusual, or Why Not?

First, some items from Apple Computer itself: The company is offering special rebates on more than 20 of the most popular software packages for the IIe or IIc. Coincidentally, you get these rebates if you *buy* a IIe or IIc between November 1, 1984, and January 15, 1985. Your purchase will include an envelope with rebate certificates. Renée Rodrigue of Apple notes that this year's Christmas promotion includes fewer packages but more substantial rebates. The rebates range from 10 to 15% of the product's value. Check with your dealer for a list of the participating software manufacturers.

Apple also sponsors The Apple Collection, a catalog of goods displaying the Apple logo in various colors, shapes, and sizes. The main catalog includes mugs, visors, sportswear, oven mitts, pens, sailboards(!), chairs, and more. The company also has two specialized catalogs, The Apple Winter Collection—sweaters, ski hats, long johns, Christmas stockings—and The Apple Tiffany Collection, with an Apple-imprinted sterling-silver business-card case, a Tiffany crystal vase or decanter, a swivel-top clock, and much more. Order right now if you want to get your gift in time for Christmas (and it'll be touchy going at that).

Nonproprietary gifts can include

A subscription to one of the on-line information services, such as CompuServe, Dow Jones, or The Source. Starter kits for these on-line services cost $39.95, $49.95, and $59.95 respectively.

Dustcovers for the computer and its peripherals. These are cheap and can be easy on the eye. Some are plain gray plastic, others sport the Apple rainbow, and still others can rightly be considered "designer dustcovers." From $6 to $22.

The Apple Tiffany Collection includes an Apple-imprinted sterling-silver business-card case, and a Tiffany crystal vase.

An insurance policy for the computer. You already know that the first insurance you should buy is a surge protector, but after that, look into the other kind. The Chubb Group sponsors the standard form of Apple computer coverage, and you can find that form at

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most Apple dealers. Shop around, though; other companies offer similar coverage for less cost. The general rule is $1 of premium for every $100 of computer value per year, but you may find better deals.

Computer magazine subscriptions. We would feel lax if we didn't mention here that an excellent magazine, a requirement for Apple owners, is the publication you're holding in your hands at this moment. Definitely a best buy, if you haven't subscribed already.

GIFTS WE'D LIKE TO SEE

Some of the gifts we'd really snap up haven't been made yet. Here are a few of the products on our wish list. Make up your own. Start your own company and manufacture them for us: We'll be first in line.

Apple jockey shorts and underwear. Keep the Apple logo close to you always. Show your loved ones that you really care about what they care about.

A digital computer swivel chair. Counts the number of times you've spun around, lets you know how long you've sat in the chair, counts the number of miles you'd have logged if you'd been up and walking instead of hunched over the computer. An optional speech synthesizer calls out the names of loved ones, as a reminder that they exist.

A word processor/text editor that automatically removes from your text any reference to "user-friendly," "windows," or "integrated package," along with other computer jargon. Options available for bureaucratese and Valley Girl.

Well, we're off to do our own shopping now. Here's hoping your computer's Christmas is a merry one! Merry Christmas, and to all a good reboot. ✚

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Gibson Light Pen
Koala Technologies Corporation
3100 Patrick Henry Drive
Santa Clara, CA 95052-8100
(408) 986-8866
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CIRCLE 671 ON READER SERVICE CARD

The Mockingboard
Sweet Micro Systems
50 Freeway Drive
Cranston, RI 02920
(401) 461-0530
List Price: $99.95 (without speech) or $199.95 (with speech)
CIRCLE 672 ON READER SERVICE CARD

Muppet Learning Keys
See Koala Technologies Corporation
List Price: $79.95
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Electronic Arts
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Sargon III
Hayden Software
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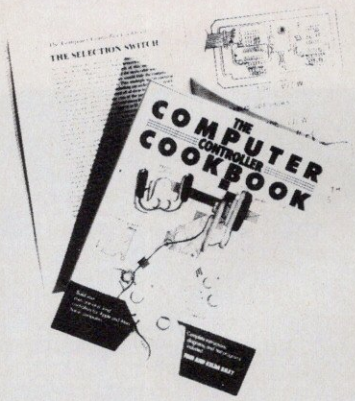

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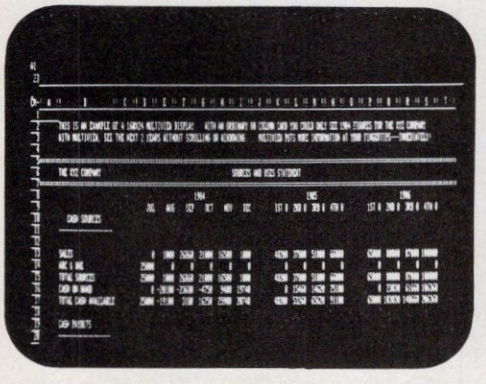

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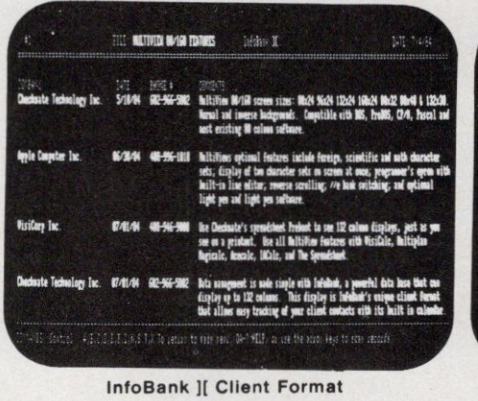

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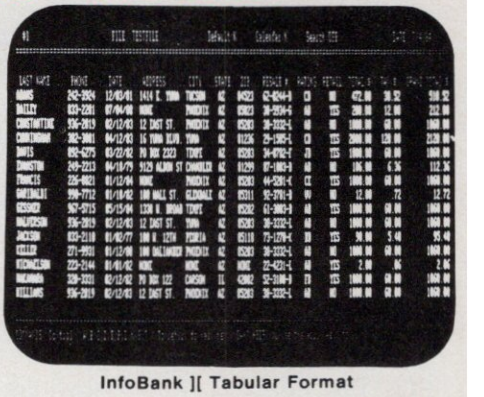

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BY LINDSAY MCGRATH

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YOUR DENTIST CAN USE AN APPLE TO HYPNOTIZE YOU, TO PLAN YOUR ORTHONDONTIA, OR TO CURE YOUR FEAR OF FILLINGS.

Apples are good for your teeth. Dentists throughout the country are using Apple computers to manage offices, plan orthodontic treatment, help hypnotize patients, and give anxious clients a chance to overcome their dental phobia.

Currently, few of the 126,000 dentists in America use computers in their practice. The American Dental Association estimates that fewer than 10% of its 104,000 practicing members have computers in-house. Another 20% contract with outside bureaus for computer services.

Those numbers are growing as more and more dentists discover how computers such as the Apple can help them run their offices and clinics. More and more of these practitioners are using Apples in ways that make them and their patients feel like smiling.

Hypnotism vs. Hypodermics

Are you afraid of pain? Do you require novocaine for even the slightest dental treatment? If you went to see Dr. Skip Neiburger, he would sympathize but probably try to talk you out of wanting the anesthetic, not because he wants to hurt you, but because he believes he can offer you a better pain deterrent—hypnosis.

The Waukegan, Illinois, dentist has used hypnosis in his practice for 15 years—often with the aid of an Apple II Plus computer and his program Hypnosis—to keep patients from feeling any pain. The technique works for most patients, he says, whether they're getting a cavity filled or undergoing the rigors of oral surgery.

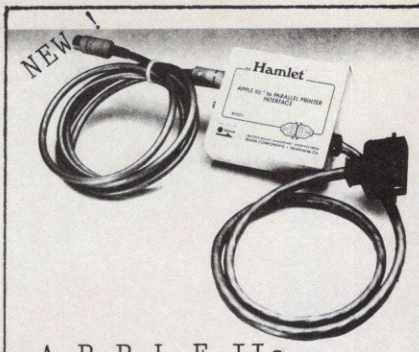
Neiburger, head of the International Apple Core's Dental Special Interest Group (SIG), reports hypnosis has reduced or eliminated the need for novocaine or other anesthesia in 90% of his patients. The dentist also reports success with posthypnotic suggestion to promote healing and reduce bleeding after surgery and help people overcome such nasty habits as clenching their teeth. ["The computer and Hypnosis provide] a way of verbally treating people," says Neiburger, adding that the computer appeals more than a needle to patients. "Drugs have side effects, and people are more fearful of a shot than this procedure. Young children react very well. They just look for the joystick."

Most of Neiburger's patients can be quickly hypnotized without the aid of the computer, but occasionally people have trouble reaching a suggestible state. If the patients are willing, Neiburger introduces them to the Apple II Plus and Hypnosis.

Hypnosis displays a variety of colored shapes at varying speeds on the Apple and makes soft clicking noises that help patients reach a suggestible state. Then Neiburger hypnotizes them. "It might take 30 or 40 minutes using classical hypnotic techniques to put a patient into a state in which you can operate on him," says Neiburger. "By using the Apple and a program such as Hypnosis or any electronic hypnotic therapy, you can shorten this time. We've got it down to about two to five minutes. Then once we've got the patient's readings—what frequency they respond best to, what color and shape image on the screen—we can reproduce this for the next visit and induce the patient in 90 seconds or less."

Using an Apple as an hypnotic aid, says Neiburger, frees time, allowing him to see more patients. The Hypnosis program is available for $20 through Andent, a software company Neiburger established in 1978.

"The way I use this in bread-and-butter dentistry works very effectively.



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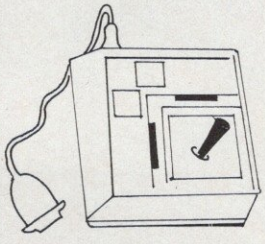

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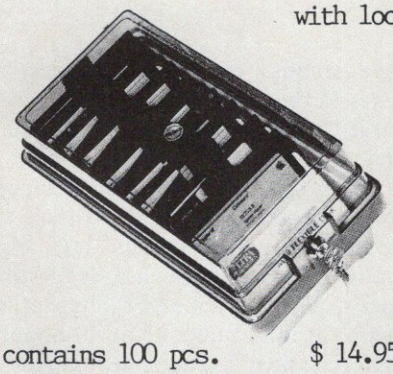

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It is not the only technique that can be used for rapid hypnotic analgesia, but it certainly is one method and helps very much," he says.

Neiburger, who edits the *Dental Computer Newsletter*, a six-year-old publication for dentists, physicians, and others interested in technology, is impressed by the Apple's versatility. Preparing patients for hypnosis is not the Apple's only function. Neiburger uses the two Apple II Plus computers in his office to maintain a patient recall system; do word processing; schedule appointments; prepare insurance and billing statements; and perform statistical analysis, inventory, and payroll. He is happy that he doesn't have to dedicate an Apple exclusively to hypnosis. "That's the beauty of the machine. You stick in the disk and it's dedicated [to a particular function] until you take the disk out. Then you can put in another disk and do payroll."

'The computer acts as a catalyst. It also very nicely computes any data we want for research.'

Fear of Fillings

Apple computers function as well in large dental clinics as they do in small private practices. At Mt. Sinai Hospital in New York City, practitioners are using an Apple II Plus to help people both to overcome their fear of dentists and to stop the injurious habit of grinding their teeth.

The 1300-bed hospital houses two dental clinics that treat patients with a unique combination of relaxation exercises and biofeedback training. Mt. Sinai's Dental Phobia Clinic helps anxious patients overcome their fear of dentists and a Temporo Mandibular Joint Disorder (TMJ) Clinic aids people with special jaw problems. An average of five clients a week use the Apple II Plus the clinics share.

"People who are afraid of the dentist and don't go, yet function happily in every other area of life, have usually been hurt repeatedly by dentists as children or young adults," says Dr. Ted Goldstein, director of the Dental Phobia Clinic. "Often those have been situations in which they could not stop the dentist or discuss the problem."

Dental phobia affects many Americans. Goldstein estimates that 12% of us are so scared that we never go to the dentist, and 50% go only in case of emergency.

According to the doctor, poor dental health can do a lot more than ruin your chances of starring in a toothpaste commercial. It can lead to serious illness. Bacteria in the mouth spawn infections that can spread to other parts of the body. Chronic mouth and dental infections have been linked to heart disease, and undetected mouth cancer can lead to death. Techniques the Dental Phobia Clinic employs help anxious patients learn to relax enough to undergo dental treatment that can either cure or prevent such problems.

With a staff of four dentists, a psychologist, and an oral surgeon, the clinic uses an Apple II Plus with specialized Cyborg BioLab System biofeedback software, two disk drives, a color monitor, and a bar- and line-graph printer.

Staff members at the phobia clinic teach patients to calm themselves, using simple relaxation techniques, and the Apple and biofeedback software let them chart their progress. Most clients learn how to relax without biofeedback, but about 25% of the clinic's patients need the extra encouragement the training offers.

The patient rests comfortably in a dental chair in an office void of other dental equipment. There he learns to relax with the help of a psychologist and the biofeedback system. The therapist puts three surface electrodes—sensors that detect muscle activity—on the patient's body. Often they are placed on a patient's forehead to record the activity of the frontalis muscle, located between the skin and skull. "If we can get you to relax that muscle, it generally relaxes the whole body," says Dr. Andrew Kaplan, a phobia clinic staff member and coordinator of Mt. Sinai dental services.

Then the psychologist teaches the patient a simple relaxation exercise, how to tense and then relax each part of his body from head to toe. While accomplishing this task, the patient can watch his level of muscle activity on the monitor. During the session, a tape recorder also captures the therapist's instructions.

"When you finish a session, you see it on the screen. We give you a cassette-tape recording, and you take it home with you and practice," says Kaplan. "The computer acts as a catalyst. The biofeedback system teaches the patient how to relax more quickly, and it also very nicely computes any data we want

for research purposes," he says.

Patients can see their progress reflected on the Apple's screen in subsequent appointments. It takes two to ten sessions for patients to learn to relax using the biofeedback system. Once they have mastered relaxation, patients spend a session getting acquainted with equipment in the room where they'll have the work performed. After that, they're ready to move into regular dental treatment.

The Apple and biofeedback software are also used in Mt. Sinai's TMJ Clinic. This clinic, under the direction of Kaplan, deals with disorders of the jaw. TMJ, or temporo mandibular joint disorder, is a catchall designation for several different problems related to the jaw joint and the muscles that control the jaw.

One kind of TMJ patient clinicians see often, says Kaplan, is a person who complains of sore jaw muscles or "myofacial pain syndrome." TMJ victims often bring this pain on themselves by clenching and grinding their teeth. The disorder can cause head, neck, and shoulder pain, as well as pain around the face. The Apple and biofeedback training offer many of these patients a way to learn to relax and break their gnashing habit.

"People who clench their teeth can experience pain in the sides of their face and can end up with temporo mandibular joint disorder," says Kaplan. "What we can do with those patients is put the electrodes on the particular muscle they're causing to go into spasm and teach them to relax the muscle. Then we do a little talking to them to find out what in the environment makes them grind their teeth. Some people grind their teeth whenever their boss walks by them." Treatment at the Mt. Sinai TMJ Clinic helps many people whose jaw problems have gone unrecognized for a long time, says Kaplan. "We have patients who have seen psychiatrists for years, and the psychiatrist is teaching them how to live with their pain because nobody diagnosed the problem."

The Apple II Plus is used for more than biofeedback work at the clinic. Dentists at Mt. Sinai use their computer to maintain a large mailing list of dentists all over the country interested in treating phobic patients. The staff of the Dental Phobia Clinic give courses in their treatment technique.

The doctors making use of computers at the clinic are also doing exciting things with them outside of the hospital. Goldstein has a limited partnership with Enterprise Technology Corporation, a New York company that will publish his CP/M-based dental-management system this year. He also uses an Apple in his private practice for various office procedures. It is programmed to print messages on bills urging patients to keep their mouths clean.

"I've found in my practice certain kinds of messages or slogans are useful. Some of the most recent ones I used were 'A family that flosses together stays together' and 'Love your mouth and all its little teeth.' It personalizes the statement, and, more than that, it really personalizes the dentist. It's slightly invasive, which is appropriate sometimes," Goldstein explains.

Apples in Orthodontia

Apple computers are also making their presence felt in the offices of dental specialists. Orthodontists, for example, are using them to help devise treatment plans for patients. Orthodontia is an exacting science. Depending on the age and the particular problem, each patient's case is unique and calls for individualized treatment plans.

Dr. Homer Phillips, Dr. Carolyn Flanary, and Dr. Alan Avery share an office in San Antonio, Texas. Their office's treatment area includes three dental chairs flanked by various equipment, including an Apple II Plus computer. "It runs all the time. We use it throughout the day," says Phillips. What the Apple II Plus runs is an integrated package of 43 orthodontic diagnostic programs called the Phillips Cephalometric System, by Dr. Phillips and his friend, engineer Ned Snead. The software package features programs that compute measurements and create vital orthodontic analyses quickly and a specialized interactive program that lets a doctor actually simulate a treatment plan on the computer's screen. It is marketed by Databill, of Van Nuys, California. "It allows you to simulate different treatment modalities," says Phillips. "It will show you what it looks like both graphically and in numbers, and if you don't like it,

Apple and biofeedback training offer many of these patients a way to learn to relax.

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Along with the Apple II Plus and two disk drives, Phillips' office also has a Houston Instruments Hipad Digitizer, a specially designed caliper, and an Epson MX-80 dot-matrix printer. The orthodontist can input data into the computer manually or by using the caliper and digitizer. The digitizer is used to capture information from x-rays that will then be stored inside the computer. The caliper, which plugs into the Apple's game port, is used to measure the length and width of teeth and various dental arches. The measurements are stored in the computer automatically for later evaluation.

'We generate probably ten times the amount of information that you would manually.'

Once a variety of information has been collected, a trained person can use an interactive program in the software package to simulate an actual treatment plan on the computer's screen. Experimenting with different treatment schemes on the computer helps the orthodontist find the best one for the patient.

It's a way of working that Phillips enjoys, and, he says, his patients enjoy having an Apple II Plus as a part of their diagnostic team.

At pretreatment conferences, Phillips shows clients "hard copy I have generated from the computer, or, depending on the interest level or understanding of the family or patient, I sit them down at the computer, and they see their child's information or their own on the screen."

Initially, Phillips, who has practiced orthodontia for more than 20 years, worried whether patients would react favorably to the involvement of an Apple in their treatment. "It's like a candle you make by hand vs. one that's poured by a machine. I had the feeling they would think I was taking shortcuts, when in effect I was actually doing far more in terms of planning. But that wasn't the reaction at all. It was a very favorable one," he says.

"In a physical sense, we know much more about our patient than we would without the computer. We generate probably ten times the amount of information that you would manually simply because you don't have time manually. So by using a computer, whatever time we allocate for study of a treatment plan can be devoted to studying information rather than generating it."

Phillips sells his Cephalometric System for $3500. It is currently in use in practices throughout the United States, Canada, Mexico, and Brazil. The University of Texas Health Science Center in San Antonio bought a system to use in its dental school's oral-surgery department, where Carolyn Flanary works as an associate professor.

"There are a relatively small number of orthodontists so far who are interested in this. But the number seems to be growing," says Phillips, adding that doctors who have run excellent practices for years without computers need time to get used to the idea of using one.

"This is an educational thing. People have to learn first of all that it exists. Secondly, they have to believe that it will help them, and that isn't always immediately apparent."

Dentists Can't Wait

Because few dentists are using computers right now, dentists interested in computerizing their offices don't always find appropriate software. Thus, many dentists are writing their own programs.

When Dr. Ken Goldenberg of Bethlehem, Pennsylvania, shopped for an office-management system, he couldn't find an affordable program to do what he wanted.

"I wanted to computerize my office, and I looked at five or six different vendors. Most of them were in the range of anywhere between $15,000 and $30,000. I just couldn't justify it, says the dentist of 11 years. "I couldn't see how I was going to be able to make $30,000 more to pay for this system, or put up with the aggravation of learning how to use it. So I gave up." But not for long. Goldenberg defined the kind of office system he wanted—one that would generate various insurance forms, maintain a patient recall system, expedite paperwork, and more—and tried to hire programmers to write it for him. None of them worked out. So he bought an Apple II Plus to play with. He started playing games and then began copying game programs out of magazines to try to learn programming.

Future applications will be limited only by the imaginations of the doctors who use them.

"I said, 'Hey, this isn't so hard.' And, if you can believe it, I remembered that my senior paper in college was on computer analysis of analytical-chemistry problems. So I really did have a background in computers, but I'd just forgotten about it!" says Goldenberg, who was a senior at the University of Pittsburgh in 1969 and went on to attend the University of Pennsylvania Dental School.

Goldenberg took a programming course in BASIC and went on to write the program he wanted himself. The software offers dentists a range of functions but does not track accounts receivable. According to the dentist, "The Apple is not really big enough to handle it without a hard-disk drive, and with a hard-disk drive, you step the price up."

Goldenberg gave away copies of the program to several dentist friends. After they gave him good feedback, he decided to offer the program for sale. The system, called the Apple IIe Dental System, is available by mail (c/o Dr. Ken Goldenberg, 307 East Fourth Street, Bethlehem, PA 18015), costs $500, and runs on the entire series of Apple II computers. About 30 systems are in use. The program was favorably reviewed in a recent issue of *Focus on Dental Computers*.

The Future

The role of computers, including Apples, will grow in dental offices and clinics throughout the country. More and more dentists are discovering ways in which computers can help them organize their offices, do research work, and make their patients more comfortable. Future applications will be limited only by the imaginations of the doctors who use them.

Mt. Sinai's Goldstein has an idea that could keep dental offices packed with teenagers. He hopes in the future to use the Apple in his private practice as a "video-game distraction mechanism." That is, he would like his patients to be able to play video games while he works on them.

"The games Apple has are wonderful, and it's a very nice distraction mechanism to give video games to patients while they're having dentistry performed," says the dentist. The trick, he says, is to build hand controls into the arms of the dental chair. +

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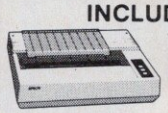

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Softerm 2 provides complete emulation of these terminals: ADDS Regent 20, 25, 40, 60; ADDS Viewpoint; Data General D200; Datapoint 3601; DEC VT102, VT52; Hazeltine 1400, 1410, 1500, 1520; Hewlett-Packard 2622A; Honeywell VIP7205; VIP7801, VIP7803; IBM 3101 Model 10 and 20; Lear Siegler ADM-3A, ADM-5 and TeleVideo 910, 925, 950. And the list is growing all the time. We'll send you a User's Guide, handy reference card, and a telephone number to call if you need more assistance.

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It's the inexpensive way to turn your Apple into a much more valuable tool for your home or office. Softerm 1 is only $135; Softerm 2 is $195. Both are available now from your local dealer or from Softronics, Inc. For more information or to order, call (901) 683-6850.

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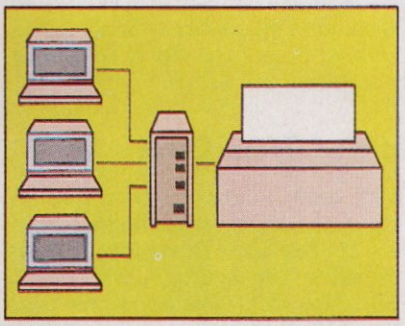

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The Pause Switch stops printout temporarily. Especially convenient for paper changing.

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And, with additional Multi-Buffer units, almost any number of computers can be networked with a single parallel printer.

So if you need one printer to work like more than one, ask your computer dealer about Multi-Buffer. Or call or write Scooter today.

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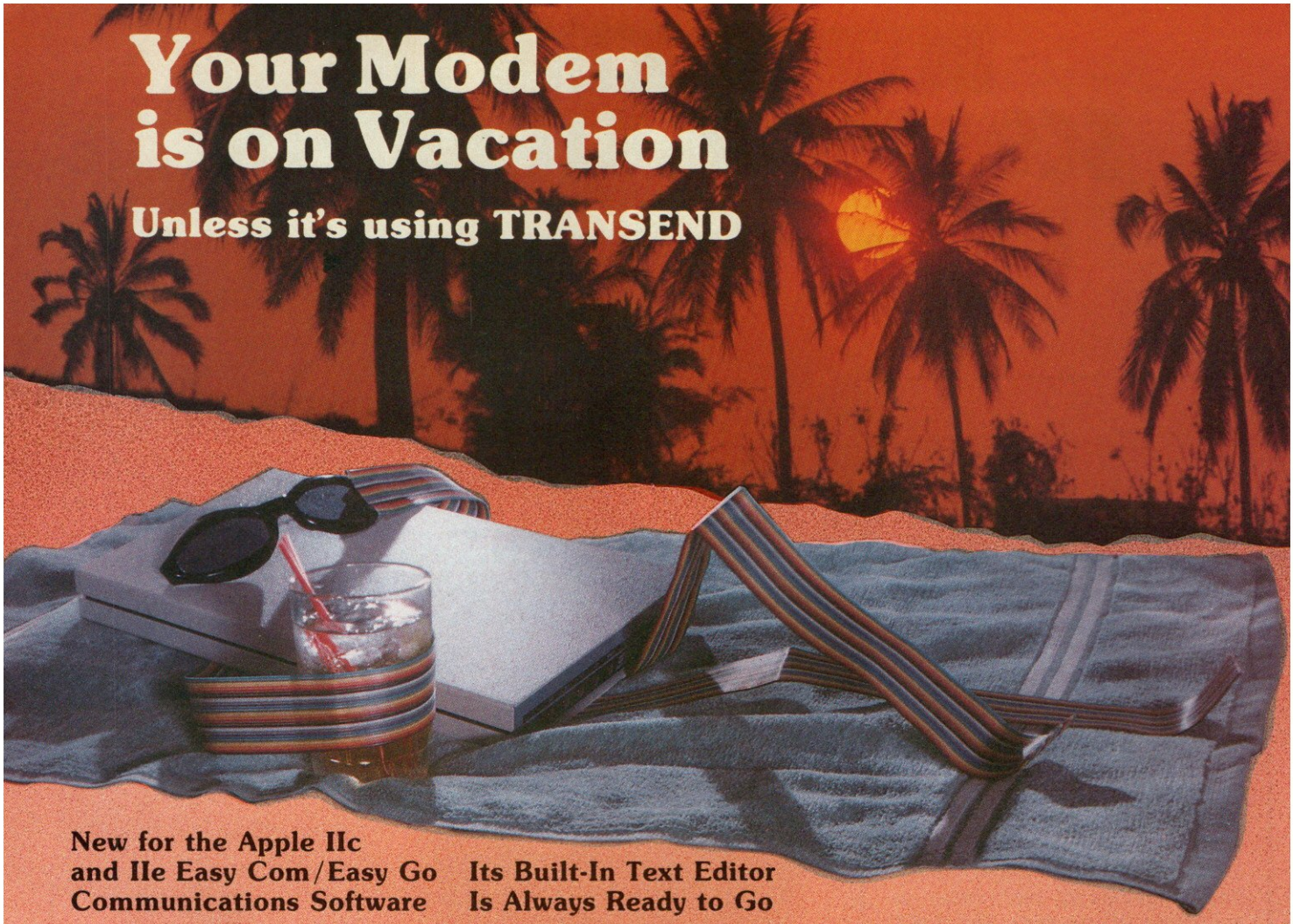

New for the Apple IIc and IIe Easy Com/Easy Go Communications Software

Introducing the telecommunications software that will put your modem back to work. If you want to send a letter, chat on the Source℠, check your financial situation on Dow Jones℠, get flight information on OAG, check the news and sports out on Newsnet, obtain some legal or medical files with the Knowledge index, send an overnight letter through MCI mail or Western Union's Easy Link, or even line yourself up with a date in a city you'll be traveling to, then get your modem back to work with Easy Com/Easy Go, new from TRANSEND.

If you want to swap files, programs, or games, Easy Com/Easy Go will do it in either CP/M, DOS 3.3, PASCAL, or PRODOS — and we'll even verify your transfer to make sure you've got it all and in good order.

Its Built-In Text Editor Is Always Ready to Go

Now with Easy Com/Easy Go you can write or receive information, replace a word or sentence, move a paragraph, or modify the margins. All this is a simple job for Easy Com/Easy Go. Then with just one keystroke you have sent it—and at a speed of over 670,000,000 MPH. Print it, or save it on disk just as easily.

It's Simple But Not Stupid

It knows the basics such as telephone number retention, Auto-Logon, on line printing, has a big Capture Buffer and auto disk save. But that's not all. Easy Com/Easy Go also handles advanced operations including keyboard macros, redefinition of the keyboard, XON/XOFF, verification protocol, and multiple flow control options. It works as well with most modems as it does with Transend's own modem, and at speeds up to 1200 Baud. Compatible with all Apple II's, Easy Com/Easy Go is so simple even a mouse can use it.

Limited Time Offer

With each purchase, receive offers worth over $400 from leading information services like Dow Jones News Retrieval℠, The Source℠, MCI Mail, OAG, Newsnet, Dialog Knowledge Index, and Western Union Easy Link.

Money Back Guarantee

If Easy Com/Easy Go doesn't put your modem back to work within 30 days, we'll give you your money back.

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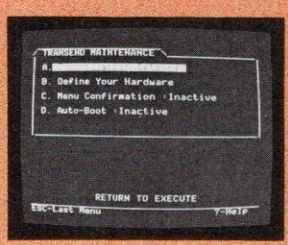
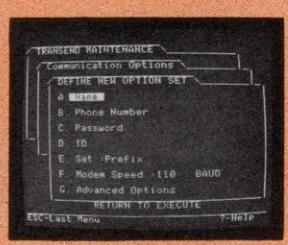
The first screen gets you in touch with a service — **preprogrammed.**



All you do is select, and Easy Com/Easy Go does the rest.



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CIRCLE 123 ON READER SERVICE CARD

programming contest

Send in for Your Listing

Here are the two ways that you can obtain the program listings of the *A+* Program of the Month Contest winners.

1. Write to us, and we'll send you a printout of the listing you want. Be sure to state the name of the program and the month that it won, and include a self-addressed, stamped envelope with 37 cents postage for each program you desire.

2. As a special holiday offer, *A+* will provide you with a 5¼-inch diskette containing all of the winning programs (July–December) ready to run. The price for this special diskette is only $10. If you would like to receive the *A+* Contest Winners Diskette, send your name and address, along with a check or money order for $10, to *A+* Magazine, Contest Winners Diskette Offer, 11 Davis Drive, Belmont, CA 94002.

▸ CONTEST WINNER

Congratulations to John Romero, winner of December's Program of the Month contest, the last month of this contest. John will receive $500, and we'll enter him in our special grand-prize contest. The winner of the special $1000 grand prize will be announced next month.

Cavern Crusader

Cavern Crusader is a video game that consists of a BASIC program and two assembly-language subroutines. In Cavern Crusader your mission is to patrol a continuous cavern while shooting down enemy spacecraft. The program uses hi-res graphics and sound effects to create an arcade-style game. One of the nice features of the game is the ability to turn the sound effects off, which is helpful if you want to play without distracting others.

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The Creative Apple, edited by Mark Pelczarski and Joe Tate. 8½" x 11", softcover, illustrated. $16.95.

THE CREATIVE ATARI

Whether you're an Atari beginner or seasoned expert, you really shouldn't be without this extraordinarily useful guide to practical Atari "how to" and lore. You get tutorials on Atari graphics, a discussion of Atari memory concepts, programming tips, programs and much more that will help you make better use of your Atari. It's written so the average, non-expert user who knows a little about BASIC and simple programming can easily develop into a skilled Atari user. The contents have appeared as articles, columns and tutorials in *Creative Computing,* but have been thoroughly revised and updated to insure maximum learning ease.

The Creative Atari, edited by David Small, Sandy Small and George Blank. 8½" x 11", softcover, illustrated. $15.95.

THE CREATIVE TRS-80

Here's a complete guide to everything you can do with your TRS-80 and how to do it better, faster and more expertly: games, graphics, educational applications, business applications, programming aids, music and a review of handy hardware and peripherals. Whether you're interested in expense management or educational techniques, symphonies or color composition, this valuable volume will enable you to use your TRS-80 for more exciting and satisfying computing almost immediately.

The Creative TRS-80, edited by Ken Mazur. 8½" x 11, softcover, illustrated. $15.95.

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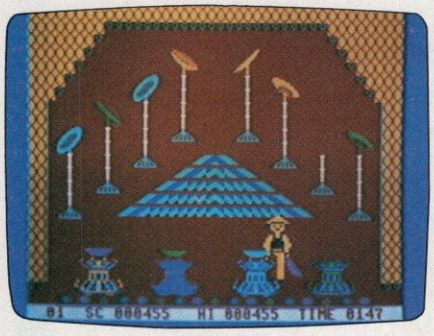

Chinese Juggler

That depends on you. You are the Juggler and your act is the delicate art of plate spinning. Yours will be a tough act to follow if you succeed in matching colors and spinning plates on all 8 poles at the same time.

As your skill increases, so does the pace and the challenge of the game. You must act with speed and precision or the curtain will come down and your act will be all washed up!

Chinese Juggler is a refreshing departure from the usual shoot-em-ups and strategy games. It's fun, fast-paced and will delight players of any age. For Commodore 64. New from Creative Software.

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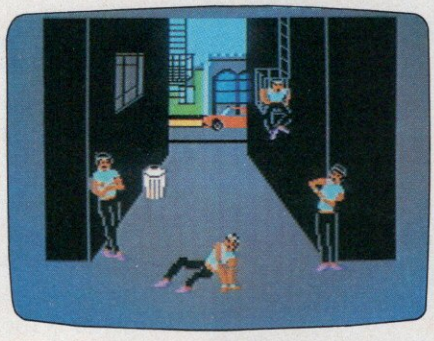
How do you moonwalk, snake and tut?



Break Street

You'll soon become a break dancing expert with our latest bestseller, Break Street. Now that combination of gymnastics, mime, funk, and just plain show-off, leaves the sidewalks and comes home to your Commodore 64.

Individual play guides you through the footwork of moonwalk, backspin, windmill, tut, and the rest of those sidewalk moves. Slow motion and lively musical accompaniment help you perform each move step by step. String together a whole series of moves and record them for future replay.

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The answers are at your finger tips.

CIRCLE 151 ON READER SERVICE CARD

What's the capital of Alaska?

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Do you know? Get ready to outwit your family and friends with Roll Call USA's fun facts on states,capitals and major industries.

Roll Call USA combines history and geography facts into a colorful question and answer game that challenges your knowledge of the 50 states, their capitals, major industries and statehood dates.

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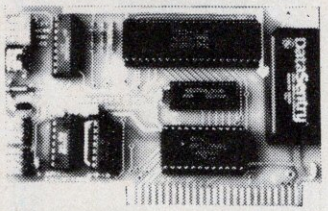

- Absolutely, positively, totally PRO-DOS and DOS 3.3 compatible.
- Time in hours, minutes, seconds and milliseconds (the ONLY PRO-DOS compatible card with millisecond capability).
- 24 hour military format or 12 hour with AM/PM format.
- Date with year, month, day of week and leap year.
- The easiest programming in BASIC.
- Eight software controlled interrupts so you can run two programs at the same time (many examples are included).
- Compatible with ALL of Apple's languages. Many sample programs for machine code, Applesoft, CP/M and Pascal on 2 disks.
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.
- Rechargeable nickel-cadmium battery will last over 20 years.
- Two BSR/serial ports for future expansion.

Full emulation of all other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the H.O. to emulate other clocks, we just drop off features. That's why the H.O. can emulate others, but none of the others emulate us.

The Timemaster II H.O. will automatically emulate the correct clock card for the software you're using. You can also give the H.O. a simple command to tell it which clock to emulate. This is great for writing programs for those poor unfortunates that bought some other clock card.

Of course, most programs will use the Timemaster II H.O. in its native mode, but its comforting to know that you can use programs written for other products without any modification.

REMOTE CONTROL

Our BSR X-10 interface option for the H.O. allows you to remotely control up to 16 lights and electrical appliances through your BSR X-10 home control system in your home or office. You're already wired because a BSR system sends its signals over regular 120 volt wiring. That means you can control any electrical device in your home or office without any additional wiring.

PRICE $129.00 BSR Option $49.00

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- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.
- The 64K MemoryMaster IIe will automatically expand Apple Works to 55K storage. The 128K MemoryMaster IIe will expand Apple Works to 101K storage.
- High Speed disk emulation for BASIC, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

MemoryMaster IIe with 128K $249
Upgradeable MemoryMaster IIe with 64K $169
A. E. Extended 80 Column Card with 64K $139

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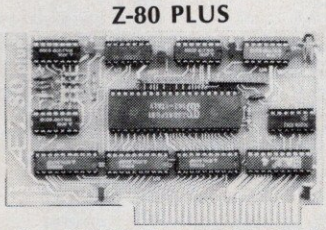

- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, TURBO PASCAL, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
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- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

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- On-board 40/80 soft video switch with manual 40 column override.
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

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VIEWMASTER	**159**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUPERTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	YES	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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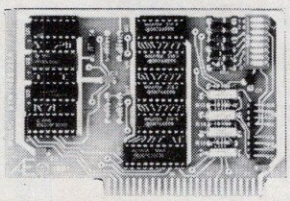

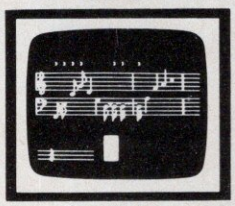

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HOW TO dBASE II

PART XIV

In a tutorial series on dBASE II, a popular program for database management

Welcome to the last in our series of 14 dBASE II tutorials.

Picking up where we left off last time, you may remember that we wrote a program that quickly scanned our stereo-store inventory file and then calculated and reported a series of totals. In case you don't have a copy of the file structure, data, or program, see figure 1.

Recall that the data is your stereo-store inventory list, which an employee keeps up to date on a daily basis. Once a week you want to know just how many items you have in each category, what your total investment is, and how much retail value is wrapped up in your inventory.

Looking at the program we used to get this information last time, remember that the ? tells dBASE to print whatever appears in quotation marks or print the value stored in a memory variable (as in ? tt) in the absence of quotation marks. By adding extra spaces after the quotation marks but before the first letters of text, you can "push" a prompt or message further into the middle of the screen or page, improving the appearance of the printout. For example:

```
? "          This message is in the middle"
```

Using this technique, you can rewrite your program to prevent your prompts from appearing at the left margin. Another, more versatile, way of doing the same thing is using the @ X,Y SAY . . . command, which lets you specify the exact position of a message or variable:

```
@ 3,20 say "Hello"
```

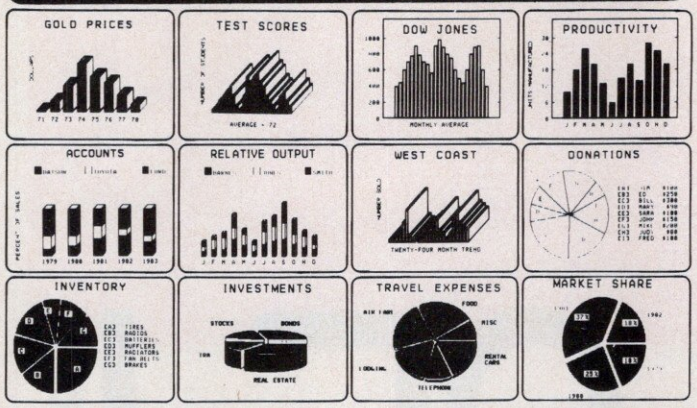
tells dBASE "at line 3, column 20, print *Hello*." Try it from the dot prompt; the *Hello* should appear near the top of your screen. (Incidentally, lines are counted 0–23 from top to bottom and columns 0–79 from left to right.)

Now, let's give our whole program a more attractive screen display by using some variations of the @ SAY technique. Use either the dBASE II editor (the Modify command) or your word processor (in the Nondocument mode) to create the following program:

```
* REPORT.CMD--This is the name of the pro-
* gram. Notice that you can put comments
* in your programs. These will not appear
* when you run the program, but to avoid
* getting the SYNTAX ERROR message, you must
* put an asterisk in the first column of
* each comment line.

* This first part opens the database and
* erases the screen.
```

MasterChart!



Don't pay more for less! The pictures shown above are examples of charts created with MasterChart!, perhaps the most powerful and friendly Apple II chart program on the market. Within seconds, keyboard-entered data can be converted into picture-perfect pie or bar charts, in 26 user-selectable styles, automatically scaled and labelled, and in color or black and white. And if you want to customize your charts by adding extra artwork or text, or display them in a slide show, MasterChart! comes with these valuable extras.....

A **slide projector,** or orchestrating automated, stand-alone screen presentations of a series of charts, timed and sequenced by the user. This program alone is worth the cost of the disk. It can be used with any graphics files created with any program.

A **graphics editor,** for alteration and embellishment of charts. Besides standard point-by-point sketching, built-in structures permit push-button creation of cirlces, rectangles, lines, shape-table shapes, and exotic woven plaid patterns. If you wish to add clarifying text to the charts, you may type on the screen in several different letter font styles. For the artist, the graphics editor can also be used to sketch any imaginable scene from, scratch.

A **shape table editor,** for creating special shapes for your charts. These shapes can also be used for animation in your programs! A sample animation program shows how to do it.

MasterChart! includes a screen-dump program for printing your charts on paper. MasterChart- is more! Just read what these people have to say about it...

"I noticed the advertisements for Spectral Graphics' Master Chart! program and figured that, with a money-back guarantee, I would try it. Boy, am I glad I did! This is a fantastic program. You can master its many varied capabilities in less time that it would take to describe them. I would recommend it to everyone, even if you have absolutely no need for a graphing program. It's just fun to play with." **S.A. Smith, San Bernadino, Calif... letter to SOFTALK, June, 1984, page 14.**

"The software does much more than the advertisement suggests. Without question, this is among the best buys in software that I have ever come across, and certainly among the best written. It is extra-ordinarily easy to use, very well thought out, and priced to kill your competition (which I wish you every success in doing)." **Anthony J. Scriffignano, North Caldwell, New Jersey.**

"I have long been distressed by the lack of software available in the scientificlacademic community. At last there is a simple yet robust graphics program applicable for our purposes: MasterChart!, by Spectral Graphics Software. Business folks and scientists alike will really appreciate how user-friendly it is; I was able to produce my first three-dimensional, multi-colored, labeled bar graph within five minutes of booting the disk--without reading my documentation. I would have had to pay a scientific illustrator much more than the whole program costs just to produce that one graph....you can't do without this gem." **John B. Iverson, Richmond, Indiana...letter to SOFTALK, April, 1984, page 23.**

ONLY $29.95 Apple II+/IIe/IIc. Satisfaction guarantee or your money back (really!). Send a check or purchase order to **SPECTRAL GRAPHICS SOFTWARE,** 6333 Pacific Avenue, Suite 256, Stockton, California 95207. Or call (209) 474-1212 for COD orders and dealer inquires. MasterChart! is not yet sold in most stores. All orders are shipped immediately and are in your hands within three days.

CIRCLE 407 ON READER SERVICE CARD


```
use inv-1
erase
set talk off

* The next part does the calculations
* and stores the answers in memory
* variables.

count for category = "RECEIVER" to r
count for category = "SPEAKERS" to s
count for category = "TAPE DECK" to td
count for category = "TURNTABLE" to tt
sum cost to c
sum price to p

* Now the program displays the information
* on the screen in an attractive format.

@  4,27 SAY "Equipment Inventory Report"
@  5,23 SAY "- - - - - - - - - - - - - - - - - - -"
@  7,27 SAY "Number of Receivers      :"
@  7,48 SAY r
@  9,27 SAY "Number of Speakers       :"
@  9,48 SAY s
@ 11,27 SAY "Number of Tape Decks     :"
@ 11,48 SAY td
@ 13,27 SAY "Number of Turntables     :"
@ 13,48 SAY tt
@ 16,27 SAY "Total cost of items      :$"
@ 16,48 SAY c
@ 18,27 SAY "Total retail value       :$"
@ 18,48 SAY p
@ 20,23 SAY "  - - - - - - - - - - - - - - - - - -"
```

Upon running the program by typing DO REPORT, you should see this:

```
                Equipment Inventory Report
- - - - - - - - - - - - - - - - - - - - - - - - -
Number of Receivers  :                         4
Number of Speakers   :                         2
Number of Tape Decks :                         2
Number of Turntables :                         2
Total cost of items  :$                  1594.59
Total retail value   :$                  3449.80
- - - - - - - - - - - - - - - - - - - - - - - - -
```

The @ Say command can format information that goes to your printer. You use the Set Format to Print command, but you must make certain your x,y coordinates progress in ascending numerical order only. For example,

```
@ 20,30 say "there"
@ 10,30 say "Hello"
```

will work fine on the screen, but it will confuse your printer, since it would have to do ten reverse line-feeds to get back up to line 10 after printing *there* on line 20.

OK, now let's expand the sample program a bit more to illustrate another point. Complex programs, unlike our simple example, are often designed to let users choose between several different tasks, rather than have the computer perform all of them at once. Say you need only to know how many items you have, not their value. You can rewrite your program to determine only the number of items. With a large database, eliminating unnecessary calculations can save time.

Breaking a program into separate sections that perform

different tasks involves two changes. First, the program prompts the user to choose a task, usually by typing a letter or a number. Next, the program uses that choice to determine which specific portion of the program it needs to execute. Fortunately, dBASE includes easy-to-use programming commands to make this determination. dBASE creates an empty memory variable for storing the user's choice and then waits for the user to press a key. When you press the key, the letter or number is stored in the variable. You can use any of three commands to request input from the user: WAIT TO <variable name>, ACCEPT "any message" to <variable name>, and GET

```
STRUCTURE FOR FILE:  A:INV-1.DBF
NUMBER OF RECORDS:   00010
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD          NAME        TYPE    WIDTH    DEC
001     PART:NUMB          N       005
002     CATEGORY           C       010
003     BRAND              C       010
004     MODEL              C       006
005     QUANTITY           N       002
006     COST               N       006     002
007     PRICE              N       006     002
** TOTAL **                          00046
 . list
00001          1 RECEIVER   NIZO          T-33          5          225.49          350.49
00002          2 RECEIVER   NIZO          T-35          4          312.00          425.25
00003          3 RECEIVER   ACME          R25-MT       13           19.99           49.99
00004          4 RECEIVER   NADIR         2-CHP        50           12.95           29.99
00005          5 SPEAKERS   RAZCO         L-55         30          199.00            0.00
00006          6 SPEAKERS   TALBEST       BG-20         6          250.00          350.88
00007          7 TAPE DECK  ROLLEM        CAS-3        10          125.65          212.99
00008          8 TAPE DECK  FLOWUTTER     WBL-5         5          149.33          250.77
00009          9 TURNTABLE  XIRTAM        25-L          5           99.99          149.99
00010         10 TURNTABLE  RALURIC       RND-1         3          595.00          850.00

*REPORT.CMD
erase
set talk off
use inv-1
count for category="RECEIVER" to r
count for category="SPEAKERS" to s
count for category="TAPE DECK" to td
count for category="TURNTABLE" to tt
? "WEEKLY INVENTORY LISTING FOR WEEK OF  / / "
? " - - - - - - - - - - - - - - - - - - - - -"
? r
?
? "Number of Speakers:"
? s
?
? "Number of Tape Decks:"
? td
?
? "Number of Turntables:"
? tt
?
sum cost to c
sum price to p
? "Total cost of items:"
? c
?
? "Total retail value:"
? p
?
clear
cancel
```

Figure 1: Stereo-store inventory file structure, data, and totaling program

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Thousands of users have discovered how RAMDISK 320 can boost both disk access speeds and memory of their Apples. The RAMDISK 320 is more than 10 times faster than standard floppy disk drives. With the RAMDISK you can zoom through a wide variety of tasks that are disk intensive — wordprocessing, accounting, data base management, software development, or any similar application where speeding up disk access time is important.

RAMDISK 320 is a solid state memory add on system fully compatible with Apple DOS 3.3. PRODOS, SOS, CP/M, Apple Pascal 1.1 and Pascal 4.0
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ADDITIONAL FEATURES:
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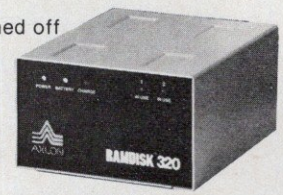
- Retains data when computer is turned off
- Three hour battery back-up system
- Built in power supply draws no power from computer
- Technical support available



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RAMDISK comes with a plug in, slot-independent interface card, a specially designed operating system, and software for diagnostics and fast load copy routines.

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- The monitor acts as a "window" so operator can view any area of the larger drawing board
- Drawing boards can be chained together to offer unlimited picture resolution
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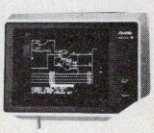

System Requirements
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- Epson MX100 or FX100 printer with Graftrax ROM Set
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CIRCLE 178 ON READER SERVICE CARD

<variable> . . . READ.

Each of these commands has its advantages. Wait, which is the simplest command for single-keystroke responses, creates the memory variable automatically, and you don't have to press Return to terminate your response. The Accept command allows a message of your choice (rather than the WAITING message that appears if you choose the Wait command) and allows multiple letter/number responses. The Get/Read command lets you place the cursor wherever you want it, but you have to create your variables before issuing the command. Try typing these examples after the dot prompt to get the hang of each command.

```
erase
. wait to x
WAITING 4
. accept "Please answer Yes or No" to choice
Please answer Yes or No:yes
. store 0 to r (Note: This line creates the variable r)
0
. @ 20,20 get r
. read (Note: Type the number 3)
. display memory
 X         (C) 4
CHOICE     (C) yes
R          (N) 3
** TOTAL **  03 VARIABLES USED  0013 BYTES USED
```

Once it has stored a choice in a variable, your program must evaluate the variable and figure out what action to take. dBASE also uses the logical operand IF. If the IF statement is true, then dBASE executes any commands between it and the next IF. In the example below, if x does equal 1, then only *Hello* will be stored to Y.

```
if x=1
   store "Hello" to Y
if x=2
   store "Good-bye" to Y
endif
endif
```

Also, notice that every IF statement needs a corresponding ENDIF—just one of the rules of dBASE programming that keeps the computer from getting confused.

Now that we have covered the basics of getting choices and "branching" to their appropriate responses, let's expand our program. Even though it is relatively simple, we can break our program down into two sections, one for each type of calculation:

```
* REPORT.CMD--This is the name of the pro-
* gram. Notice that you can put comments
* in your programs. These will not appear
* when you run the program, but to avoid
* getting the SYNTAX ERROR message, you
* must put an asterisk in the first column
* of each comment line.

* This first part opens the database and
* erases the screen.

use inv-1
erase
set talk off
```

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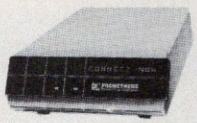

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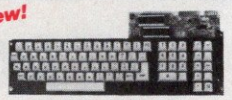

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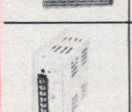

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EPROM Programmer w/JE665 Option
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CIRCLE 279 ON READER SERVICE CARD

```
* The next section of the program reserves
* a blank space for the choice variable (a
* character variable) and asks the user
* what to do.

store " " to choice
@ 5,26 SAY "Inventory - - - - - - Main Menu"
@ 6,26 SAY "- - - - - - - - - - - - - - - -"
@ 8,31 SAY "Please choose one:"
@ 11,30 SAY "1 = Number of items"
@ 13,30 SAY "2 = Value of items"
@ 16,30 GET choice
READ
* The Read command puts the cursor in the
* right spot and accepts the user's
* response.

* If you want calculations, this section
* does it, storing the answers in memory
* variables.

IF choice = "1"
     count for category = "RECEIVER " to r
     count for category = "SPEAKERS " to s
     count for category = "TAPE DECK " to td
     count for category = "TURNTABLE " to tt

     * Now the program displays the infor-
     * mation on the screen in an attrac-
     * tive format.

     erase
     @ 4,27 SAY "Inventory Report - Part I"
     @ 5,23 SAY " - - - - - - - - - - - - - -"
     @ 7,27 SAY "Number of Receivers   :"
     @ 7,48 SAY r
     @ 9,27 SAY "Number of Speakers    :"
     @ 9,48 SAY s
     @ 11,27 SAY "Number of Tape Decks  :"
     @ 11,48 SAY td
     @ 13,27 SAY "Number of Turntables  :"
     @ 13,48 SAY tt

ENDIF choice = 1
* Notice that the ENDIF can be placed
* immediately after the series of
* commands executed by the IF that it
* goes with, rather than at the end
* of the entire program as in the
* previous example. Also,
* the choice=1 after the ENDIF is
* not necessary, but it helps you
* keep track of which ENDIF you
* are looking at.

IF choice = "2"
  * If you want to do only calculations
  * of value, the next section does
  * them.

  sum cost to c
  sum price to p
  erase
  @ 4,27 SAY "Inventory Report - Part 2"
  @ 5,23 SAY " - - - - - - - - - - - - - - -"
  @ 7,27 SAY "Total cost of items   :$"
  @ 7,48 SAY c
  @ 9,27 SAY "Total retail value    :$"
  @ 9,48 SAY p
  @ 11,23 SAY "- - - - - - - - - - - -"
ENDIF choice =2
RETURN
```

So there you have it—a fairly complicated program, actually. There are ways of returning to the main menu without having to type DO REPORT each time. The easiest way is to use the Do While command. Unfortunately, I've used up my allotted space for this article, so you will have to experiment on your own.

Why not see if after each of the two sections of the program, you can get back to the menu automatically? (Hint: Use a Loop command just before each ENDIF and a Do While statement just before the main menu. Also, add an Exit Program option in the main menu with an IF and ENDIF that enclose a Cancel statement. This way you won't get caught in an endless loop.

If you've come this far from our first tutorial over a year ago, you're really on the road to programming in dBASE. There's always more to learn, more quirks to drive you crazy occasionally, and tough problems to program around. But don't give up. Just consult the manual, keep thinking creatively, and talk to other dBASE programmers when you get stuck.

Please address any thoughts, tips, or comments to me, Robert Cowart, c/o *A+* Magazine, 11 Davis Drive, Belmont, CA 94002. ✚

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ALS Z Engine $145.00
Microsoft Softcard $225.00

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ALS Dispatcher Serial Card $89.00
MA Systems Omnigraph (Same as Grappler) . . . $79.00
MPC Parallel Printer Card/Cable $55.00
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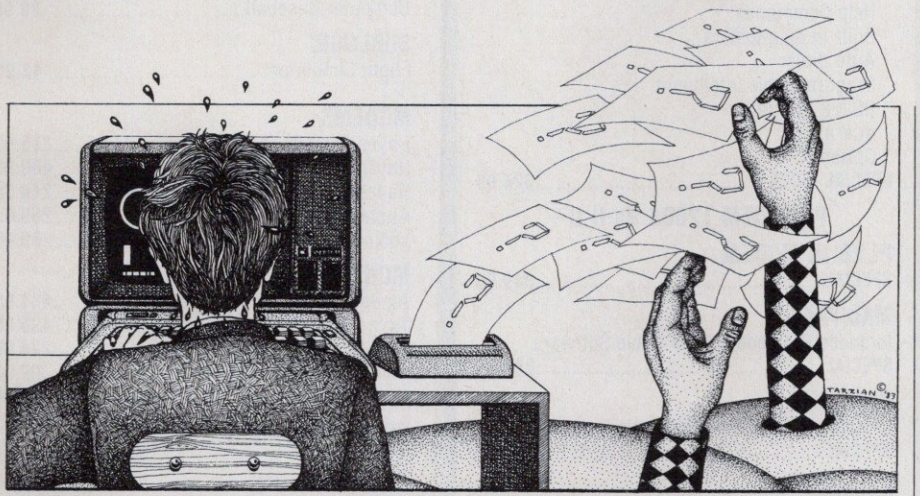
RESCUE SQUAD
BY FREDERIC E. DAVIS
Questions from our readers



▸ HARD-DISK DRIVES AND THE IIc

Q. *I want to use a hard-disk drive with my Apple IIc. My dealer says that the Apple ProFile and other hard disks he has for sale all require a special interface board that plugs into one of the slots in the Apple II Plus or IIe. Since the IIc doesn't have expansion slots, he says that the ProFile and other hard-disk drives will not work with the IIc.*

On the back of the IIc are a bunch of connectors that Apple claims will let you expand the capabilities of your system. Is there some way to hook a hard disk up to the IIc using these connectors?

A. Yes, it is possible to hook up a hard disk to your Apple IIc using the connectors on the back of the computer. You can connect a hard disk to one of the serial-port connectors or to the floppy-disk connector. Any hard disk that supports the RS-232 serial interface (either directly or via a networking device) will hook up to a serial port on the IIc. The serial port provides a relatively slow communication path compared to the typical hard-disk drive, however. The slowness of an RS-232 connection is a major drawback of this type of hookup. Also, to ensure that you have the proper cables and software, you should get a hard disk that is specifically designed for use with the Apple IIc.

The floppy-disk connector on the IIc provides a faster communication path for a hard disk and therefore offers a better means for using a hard-disk drive with the IIc. Using the floppy-disk connector requires a special interface that the manufacturer must build into the hard-disk unit. One example of this type of hard disk is the 10-megabyte drive from Quark, Inc., 2525 West Evans, Suite 220, Denver, CO 80219. Plugging in the Quark hard disk uses up the only floppy-disk expansion connector, but on the back of the Quark drive is another connector for a floppy-disk drive, so you can still add a second floppy drive to your system.

Another hard disk for the IIc that attaches to the floppy connector is the Symbfile, which comes in sizes ranging from 10 to 40 megabytes. The Symbfile networks with other IIc's and Macintoshes. For more information, contact Symbiotic Computer Systems, Ltd., Duroma House, 32 Elmwood Road, Croydon, Surrey, CR9 2TX, England, phone 01 683 1137.

▸ POINT-OF-SALE DEVICES

Q. *Is there a way to hook up a cash register or cash drawer to an Apple so it will work with a computerized accounting system?*

A. Yes, you can hook up a cash register or cash drawer to your Apple. Computer-compatible cash registers, cash drawers, and the more recent bar-code readers all fall into the technical category of "point of sale devices," i.e., devices that, at the point of a sale, provide information about the transaction. Most of these devices use a standard RS-232 serial hookup to communicate with the Apple. Since all Apple computers can use the RS-232 serial hookup, theoretically any of them can work with any of the many point-of-sale devices now offering an RS-232 hookup.

Just hooking up a point-of-sale device, such as a cash drawer or cash register, is only half the solution, though. The other half involves having software that can use the device to its fullest potential. You may be able to write some simple programs that will make use of the point-of-sale device; but in order to integrate it with a computerized accounting system, you should select software meant for a particular brand of cash drawer or cash register. Also, check the specifications of the software to make sure that it will accomplish your accounting tasks.

One hardware/software combination for the Apple II series, the Stock Seller and Stock File, integrates with the BPI Systems Accounting Package (see "Battling Billing," page 52, in the September 1984 issue of *A+*) and is available from Solidus International Corporation, 1060 Roosevelt Crescent, North Vancouver, British Columbia, V7P IM3, Canada; (604) 984-0477. A more limited system for the Apple II is Storekeeper II from Lake Computing, 1211 East Kentucky Drive, Tucson, AZ 85714; (602) 294-4088. ✚

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

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PRODUCT NEWS

HARDWARE

Amdek Color 300 Video Monitor

A new, high-quality, NTSC-composite video monitor, the Amdek Color 300 provides an inexpensive alternative to a television set for home-computer displays. The new Color 300 features 260(H) dots by 300(V) lines resolution and a dark-bulb CRT to provide vivid, high-contrast displays for games and graphics. The unit is capable of displaying up to 40 columns by 25 lines of text.

A built-in speaker and audio amplifier allow the monitor's use with computers having audio output but no sound capabilities. The Color 300 also has a headphone jack for educational settings or private audio operation.

The Color 300 is protected by Amdek's exclusive two-year warranty, including parts and labor on electronics, and has three-year protection on the CRT. The monitor is FCC- and UL-approved for safe use in the home, classroom, or office. *(List Price: $350)*

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

Amdek Corporation
2201 Lively Blvd.
Elk Grove Village, IL 60007
(312) 595-6890

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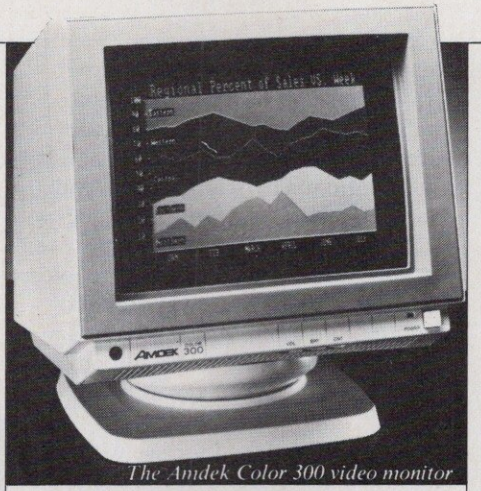
QC10 Hard Disk

Quark's new QC10 hard disk is a ten-megabyte mass-storage system that plugs into the floppy port on the Apple IIc, the Apple IIe with Duodisk Drive, and the Macintosh. Special accessory cables are available for the Apple IIe without Duodisk and the Apple III. You can divide the hard disk into dozens of different volumes of any size and protect them with passwords. The QC10 is compatible with Quark's Catalyst program selector, which allows you to install on the hard disk ProDOS programs on the Apple IIe and IIc or SOS programs on the Apple III. *(List Price: $1995)*

Requires: Apple IIc, IIe, III, or Macintosh

Quark, Inc.
2525 West Evans, Suite 220
Denver, CO 80219
(303) 934-2211

CIRCLE 901 ON READER SERVICE CARD



The Amdek Color 300 video monitor

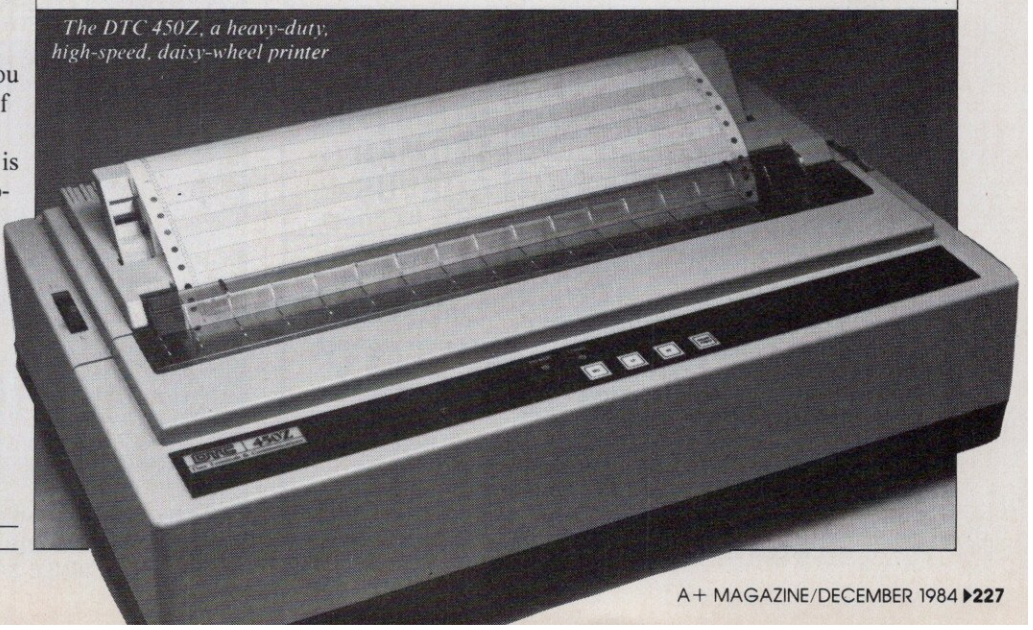
DTC 450Z Daisy-Wheel Printer

Data Terminals & Communications' DTC 450Z is a fast, quiet, heavy-duty, daisy-wheel printer. Its features include a 100-character print wheel containing 30 word-processing and 28 data-processing type styles, serial RS-232 and Centronics parallel interfaces, out-of-paper and out-of-ribbon signals, bidirectional printing, serial communications speeds from 50 to 19,200 bps, and a 16,000-character buffer expandable to 64,000 characters. The printer uses Diablo 630 software command codes to make it compatible with most word-processing software packages. *(List Price: $1595)*

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

Data Terminals & Communications
590 Division Street
Campbell, CA 95008
(408) 378-1112

CIRCLE 902 ON READER SERVICE CARD



The DTC 450Z, a heavy-duty, high-speed, daisy-wheel printer

Star Micronics Printer Interfaces

The Grafstar II, a parallel-interface system that is ready to run with the Apple II, II Plus, and IIc, is compatible with Star Micronics' standard line of printers. Grafstar II also offers fully programmable high- and low-resolution graphics in various modes and comes with a demo and graphics diskette.

Star Micronics has also introduced a new Apple IIc cable that connects with the standard PowerType, Delta, and Radix series and also with the Gemini series when you use an optional serial-interface card. *(List Price: Grafstar II, $79; Apple IIc cable, $12.95)*

Requires: Apple II, II Plus, IIc, or Macintosh

Star Micronics, Inc.
200 Park Avenue
New York, NY 10166
(212) 986-6770

CIRCLE 903 ON READER SERVICE CARD

Ethernet Interface

With this interface card, users can network as many as 1024 Apple IIs with a minicomputer or mainframe host. This arrangement allows the transfer of information between Apples and other devices on IEEE 802.3-specification local-area networks, such as Ethernet. *(List Price: $1250)*

Requires: Apple II, II Plus, or IIe

En-Link, Inc.
4706 Bond
Shawnee, KS 66203
(913) 268-6066

CIRCLE 904 ON READER SERVICE CARD

PRODUCT NEWS

HARDWARE/SOFTWARE

Calmpute
A biofeedback package for Apple computers, Calmpute uses a GSR (Galvanic Skin Response) monitor to measure users' stress levels and suggests suitable exercises to reduce tension. Each package includes a GSR monitor, the software program, and a guidebook that features a stress-management program and general information about stress and biofeedback. The GSR monitor plugs into the joystick port of any Apple II-series computer. *(List Price: $89.95)*
Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive
Human Engineered Software
150 North Hill Drive
Brisbane, CA 94005
(415) 468-4111
CIRCLE 909 ON READER SERVICE CARD

Echo+, Cricket, and AlphaBits
Street Electronics Corporation has released three new products—Echo+, Cricket, and AlphaBits—for Apple computers. Echo+ and Cricket are speech synthesizers that feature natural and robotic voices, stereo music, and sound effects. The software provides a fixed vocabulary of 700 commonly used English words, spoken in a female voice; a phoneme-based text-to-speech program that gives unlimited vocabulary spoken in a robotlike voice; and built-in sound effects that you can add to programs.

Echo+ is designed for use with the Apple II Plus or IIe. Cricket, designed for the Apple IIc, also features an onboard clock for automatic dating of ProDOS files and alarm capabilities.

AlphaBits is a serial interface that emulates the IIc's serial ports so that owners of Apple II, II Plus, or IIe computers can use peripherals designed for the IIc. The package includes a IIc-compatible connector and GraphicBits software that lets you draw and print a variety of high-resolution graphics and text. The software includes fill-pattern and character-set editors, screen-dump commands, and windowing and magnification features. *(List Price: Echo+, $149.95; Cricket, $179.95; AlphaBits, $119.95)*
Street Electronics Corporation
114 Mark Avenue
Carpinteria, CA 93013
(805) 684-4593
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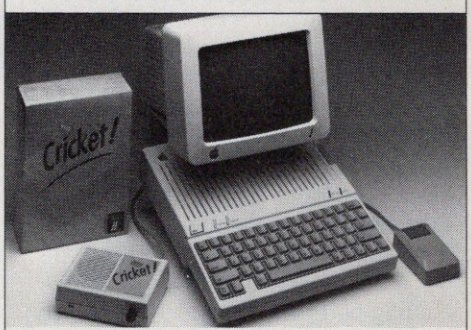

The Cricket features natural and robotic voice, sound effects, and music generation.

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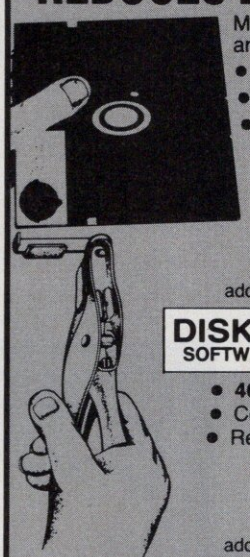

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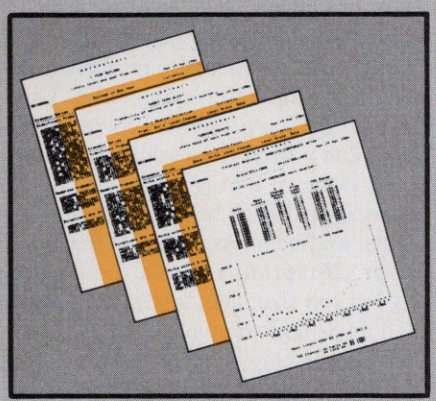

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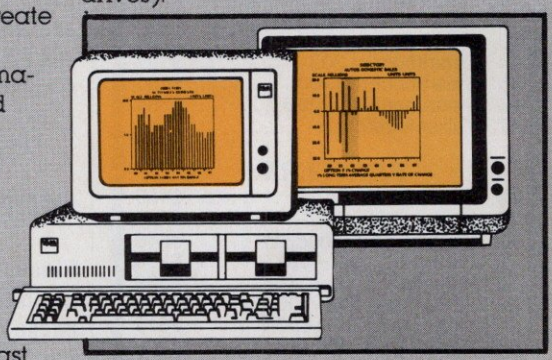

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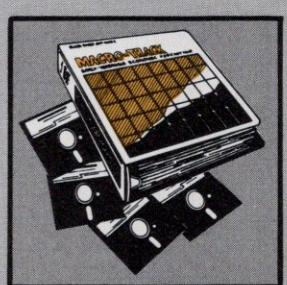

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PRODUCT NEWS

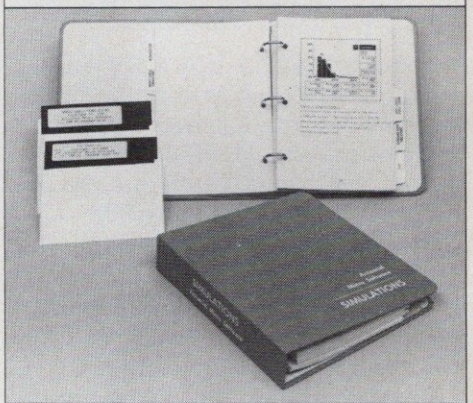
The Designer's Toolkit—Professional Version
A color-computer graphics-processing system for designers, illustrators, and visual-presentation artists, The Designer's Toolkit includes an Apple IIe, Duodisk Drives, 256K RAM, a graphics processor, a graphics-tablet digitizing pad and stylus, a monochrome monitor, an RGB color monitor, and a CP/M coprocessor. Built-in artistic tools include an airbrush, calligraphy nibs, paintbrushes, patterns, and numerous type fonts; and the package also has editors that allow you to create custom type fonts, paintbrushes, and patterns. *(List Price: $9875)*
MicroGraphic Images Corporation
19612 Kingsbury Street
Chatsworth, CA 91311
(818) 368-3482
CIRCLE 911 ON READER SERVICE CARD

SOFTWARE

Simulations
Simulations is a statistical-software package that enables you to analyze past experiences and explore future possibilities. The package includes two programs, GASS (General Application Simulation System) and Monte Carlo Simulations, which are also available separately.

GASS simulates up to ten variables and combines them into one user-defined algorithm. Each variable can be either random, Boolean, functional, or compound, and random variables can be any of 13 different probability distributions. The program enables you to construct easily almost any statistical model and quantify its risks.

Monte Carlo Simulations incorporates statistical analysis as well as simulation abilities. It uses the chi-square goodness-of-fit test to match a set of raw data to a standard distribution; seven other probability distributions are also available. Other features of the package include DIF-file compatibility; source code; and graphics, color, and audio enhancements. This program works with GASS to analyze past experience and enhances GASS results with additional graphics and reports. *(List Price: Simulations, $395; GASS, $325; Monte Carlo Simulations, $125; demo package, $50)*
Requires: Apple II, II Plus, IIe, or III in Emulation mode; 48K RAM; DOS 3.3; one disk drive
Actuarial Micro Software
3915 A Valley Court
Winston-Salem, NC 27106
(919) 765-5588
CIRCLE 912 ON READER SERVICE CARD



Simulations, a statistical-software package

The Encephalon and Histogram Plot
Two new programs from Andent are The Encephalon and Histogram Plot. The Encephalon uses high-resolution graphics, sound, and color to produce simulations of neurologic patients. The program allows a choice of patients, presents the patients' history, and allows medical students to perform an examination and offer a diagnosis. The simulator then presents a correct diagnosis and a brief discussion of the case.

Histogram Plot is a fast, easy-to-use statistics package for researchers, students, and businesspeople. It features input, edit, print, and save data; variable graph size; demonstration files; and an 8-page manual. The program can also display or print raw and computed data, mean, median, standard deviation, expected cell frequencies, and actual cell limits and frequencies. *(List Price: $39 each)*
Requires: Apple II, II Plus, or IIe; 48K RAM; DOS 3.3; Integer BASIC (The Encephalon); one disk drive; 80-column printer (Histogram Plot); game paddles or joystick (The Encephalon)
Andent, Inc.
1000 North Avenue
Waukegan, IL 60084
(312) 223-5077
CIRCLE 913 ON READER SERVICE CARD

PRODUCT NEWS

Robot Odyssey I
This new software program fulfills the desire for more sophisticated entertainment by combining action, adventure, and education. Robot Odyssey I creates a sophisticated level of video challenge and calls on the player's mind as well as motor skills to maneuver through a series of intricate mazes on the road to freedom.

Step-by-step guidelines are within easy reach, at the push of a button for players who get stumped. These tutorials teach the essential logic concepts necessary to play and win the adventure game. Throughout Robot Odyssey I, players become familiar with the basics of digital electronics, including the design of the circuitry that controls and commands robots. The learning concepts include circuit design, digital logic, microchip design, and modular design. *(List Price: $49.95)*
Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive
The Learning Company
545 Middlefield Road, Suite 170
Menlo Park, CA 94025
CIRCLE 919 ON READER SERVICE CARD

Softsync Software
Softsync's Trio integrates a word processor, spreadsheet, and database into one program. The program is designed for home and small-business use and has on-screen tutorials that make it easy to learn to use.

Intended for new users, a second new package from Softsync is Sensei. This package comprises a series of instructional programs ranging from how to run and maintain your computer to lessons on writing BASIC programs. The package also has diagnostic and troubleshooting abilities.

Softsync has also enhanced its Model Diet program for Apple IIe and IIc computers. Model Diet creates personalized nutritional profiles, and the enhanced version includes a routine that enables users to create their own food files, update food values, and add specific foods to existing categories on the program's master disk. *(List Price: Trio, $99.95; Sensei, $39.95; Model Diet, $34.95)*
Requires: Apple IIe or IIc
Softsync, Inc.
14 East 34th Street
New York, NY 10016
(212) 685-2080
CIRCLE 920 ON READER SERVICE CARD

Beacon
Beacon is a collection of software tools for personal financial management and tax planning, including an investment manager, cash-accounts manager, asset manager, and a tax-record-keeping module. The system produces net-worth statements for individuals, a family trust, or your IRA.

Beacon also produces a tax-summary report by automatically gathering tax information from the various Beacon modules and presenting it in a convenient form for tax-return preparation. The system also uses this same tax information to print a summary tax return for tax-planning purposes. *(List Price: $90)*
Requires: Apple II, II Plus, IIe, IIc, or III; 48K RAM; one disk drive; printer
Cumberland Company
4765 North Cumberland Blvd.
Milwaukee, WI 53211
(414) 964-7877
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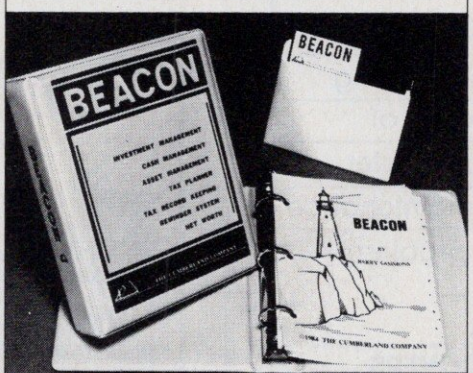

Software tools from Beacon

DOS 4.0
Compared with previous Apple DOS programs, DOS 4.0 increases available disk storage space and enhances the performance but does not alter existing application programs. Compared to DOS 3.3, for example, DOS 4.0 processes programs up to 25% faster, provides 35% more disk storage, increases available RAM for language-card users, improves file-handling abilities, increases performance of housekeeping routines, and adds eight new instructions and 27 new program codes. The

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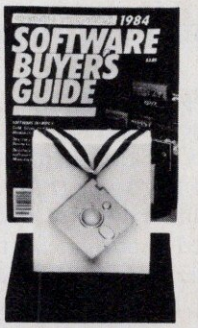

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package comprises a CMOS 6502 processor, DOS 4.0 software, a step-by-step installation and users' manual, and a technical manual. *(List Price: $95)*
Requires: Apple II, II Plus, or IIe
Rune Enterprises
80 Eureka Square, Suite 214
Pacifica, CA 94044
(415) 355-4851
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VisiCalc Upgrade Kit
This enhanced upgrade provides users with a VisiCalc that is fully compatible with any of the Apple II family of computers, including the IIc, and offers the most desired improvements to the original VisiCalc program—variable column widths and full-word prompts. The disk includes six models for home-management and finance use. Since this upgrade reads all existing VisiCalc models, users of previous versions will not lose valuable time or data moving files to this new program.

The VisiCalc Upgrade Kit includes a program disk, reference, guide, customer support card, and complete license and warranty. *(List Price: $50)*
Requires: Apple II, II Plus, or IIe with 48K RAM and one disk drive; Apple IIc
Software Arts
27 Mica Lane
Wellesley, MA 02181
(617) 237-4000
CIRCLE 918 ON READER SERVICE CARD

Stitch Grapher
Stitch Grapher provides computer-aided-design and chart-generating software to generate charts for needlework. This program allows you to create and perfect, on-screen, a cross-stitch design of up to 240 × 400 stitches and print the result. Built-in features enable you to set or delete single stitches or entire design areas, move design elements, copy repeated elements, change color symbols, build color charts, reverse the design's orientation, create borders or trims, or produce mirror images of designs. *(List Price: $89.95)*
Requires: Apple II, II Plus, IIe, or IIc
Compucrafts
RFD 2, Box 216
Lincoln, MA
(617) 259-0409
CIRCLE 923 ON READER SERVICE CARD

Executive Secretary
Featuring faster printing, expanded tutorial and Help service, a power-typing mode (100 WPM), and expanded edit options, this new release also includes an integrated mailing list, a mail-merge function that works with any common database, and electronic mail. It retains the easy-to-learn characteristics of the original Executive Secretary word-processing system. *(List Price: $189.95)*
Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive
SOF/SYS
4306 Upton Avenue South
Minneapolis, MN 55410
(612) 929-7104
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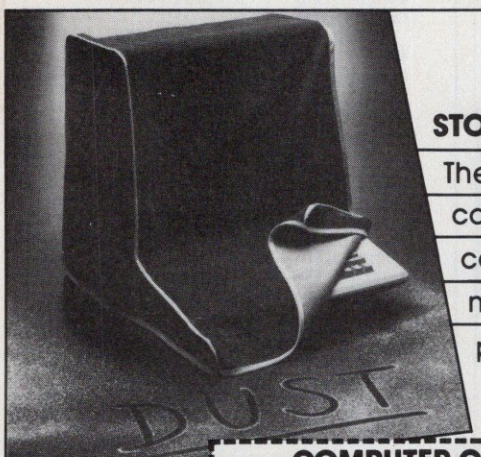

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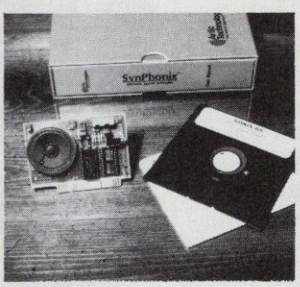

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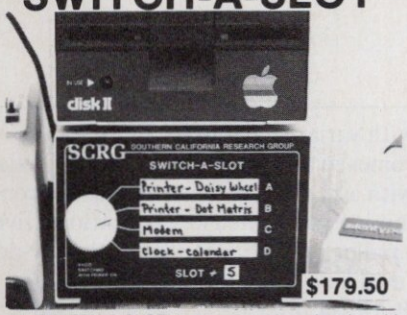
SCRG PRODUCTS FOR THE APPLE COMPUTER

SWITCH-A-SLOT



$179.50

The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

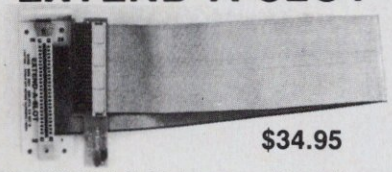
This product is especially useful where the software requires the printer to be in a particular slot, and the user wishes to choose between two or more printers.

- Allows up to four peripheral cards to be plugged into one peripheral slot.
- User selects desired card by front panel rotary switch.
- Only selected card draws power.
- Plugs into any peripheral slot.
- Saves wear and tear on delicate connectors.
- 18" cable connects Switch-a-slot to computer.

New—resistive terminations for better response

SWITCH-A-SLOT and EXTEND-A-SLOT work well with all slow to medium speed cards, such as Modems, Printers, Clock, 80 Column, Music, etc. They are not recommended for high speed data transfer devices such as disk drive controllers, alternate processor, and memory cards. These products may be incompatible with some alternate processor cards.

EXTEND-A-SLOT



$34.95

The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. The 18" flex cable is long enough to allow placement of the card in a convenient location. The high quality connectors are gold plated for reliability.

The perfect accessory for:

Owners of large numbers of I/O expansion cards—keep your frequently used cards installed. Use the EXTEND-A-SLOT for the others.

Technicians—easy access to test points on accessory cards under actual operating conditions.

Experimenters—make easy changes to cards while card is installed.

EASY TO USE—just plug it in as you would any expansion card, then plug your card in. When you want to change cards, do it easily outside the computer, without the wear and tear on the computer expansion slot.

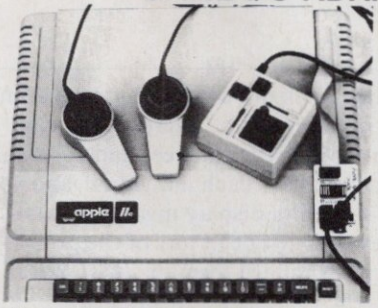
OTHER PRODUCTS

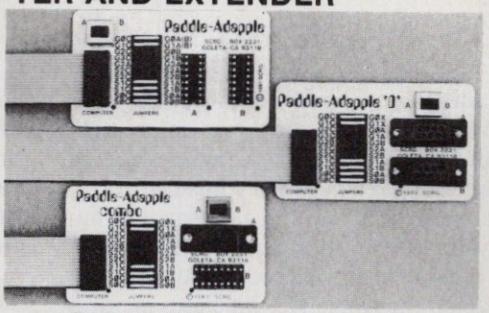
D Manual controller. Gives complete control over the $C000 through $C0FF range in hardware. Can be switched while program is running. $89.50.

MAGIC KEYBOARD (for][or][+ only). Re-encodes the keyboard to give alternate keyboards, such as DVORAK, ASK, 10-KEY, HEXIDECIMAL KEYPAD, etc. $49.50.

Paddle-Adapple

GAME I/O ADAPTER AND EXTENDER





- Works with all Apple compatible joysticks, paddles and other I/O devices.
- Select one of two devices or . . .
- Use 4 paddles simultaneously.
- Unique "Jumpers" socket allows you to configure to meet your needs.
- BPI™ users can have BPI™ device and paddles plugged in simultaneously. (**Paddle-Adapple** and **Paddle-Adapple Combo** only).
- Gives you four push-button inputs.
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- Exchange X & Y joystick axis.
- Small and compact — adheres to computer with supplied foam tape.
- All Strobes, annunciators and power available on all 16 pin connectors.
- Supplied with 18" cable.

$29.95

The **Paddle-Adapple** has two 16 pin sockets

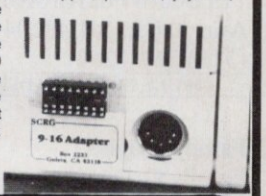
The **Paddle-Adapple "D"** works with the subminiature D connectors.

The **Paddle-Adapple Combo** has one 16 pin socket and one subminiature D connector.

NEW 9-16 Adapter

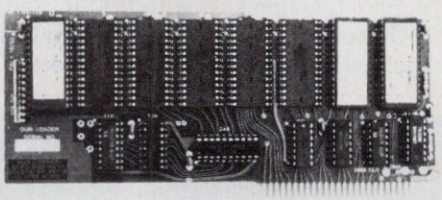
For Apple / /e and / /c

This product permits the use of most 16-pin I/O devices with the APPLE //c or //e. By plugging this adapter into the sub-miniature 'D' connector, you can plug in a 16-pin device, such as the Paddle-Adapple, paddles, joystick, KOALA PAD™, etc. The only limitations are those devices that use the annunciators or the C040 strobe, such as the POWER PAD™. Please note that the //c does not support four joystick inputs.



$14.95

quikLoader™



FAST AND CONVENIENT

The quikLoader is the *fastest* way to load programs. **BAR NONE!** Programs can be loaded in fractions of a second. More importantly, DOS is instantly loaded every time the computer is turned on. Integer is even loaded in the language card. This process takes less than a second, saving valuable time. Frequently used programs are available *instantly* when you need them, without having to look for the disk, or hoping that the lengthy disk loading procedure goes smoothly.

To run a program from the quikLoader, bring up the quikLoader catalog (Q-reset), and the names of the programs will be displayed, along with an index letter. Pressing the index letter will instantly load and run the program.

Up to 23 programs on the quikLoader can be displayed on the screen at one time. If you have more programs, you may scroll through the catalog in either direction.

The quikLoader is **ideal** for applications requiring a dedicated computer. Your program can be automatically loaded and run at "power-up"

PROGRAMMING EPROMS

Putting your own programs on the quikLoader is easily done, using a separate EPROM programmer such as the **PROmGRAMER.** For APPLESOFT, INTEGER, or single machine language files, no programming knowledge is necessary. You **will** need experience if you want to save copy-protected or complex programs. The amount of experience necessary depends on the complexity of the program.

COMMERCIAL PROGRAMS

If you have a program that is valuable, it will become **more** valuable when it is instantly available to you. We are actively seeking licenses from software publishers to allow their popular programs to be made available for the quikLoader. Independent authors are encouraged to write programs suitable for the quikLoader. If the author wishes, we will market the program (with appropiate royalties), or the author can take care of all marketing. In either case, we will make known to our customers the availability of these programs.

We start your library of programs with the most popular utilities on the card, FID and COPYA. Now, if you have to copy a disk, you don't have to search for the master disk. You can start copying within 3 seconds after turning on the computer.

We are currently licensed to sell several very popular programs on EPROM. **DOUBLE—TAKE** by BEAGLE BROS., and **COPY][PLUS** by CENTRAL POINT SOFTWARE. The introductory price for DOUBLE—TAKE is $45.00. This includes the program exactly the same as you would buy it at your dealer for $34.95 (including disk and documentation), and a programmed 27128 EPROM (worth about $25.00). COPY][PLUS cost $65.00. This includes the original program (worth $39.95) and **two** programmed 27128's.

Other programs available directly from us or the publishers are, **BARKOVITCH I/O TRACER AND SINGLE STEP TRACE, MICRO/TYPOGRAPHER** from **TIDBIT SOFTWARE, ECHO** speech synthesizer software from **STREET ELECTRONICS,** and **MERLIN** assembler, from **ROGER WAGNER PUBLISHING.** More commercial programs are now in the works.

MEMORY CAPACITY

The quikLoader has eight sockets for EPROMs. These sockets can accommodate standard EPROMs from 2716 to 27512. These types can be freely intermixed. The memory capacity of the quikLoader depends on the EPROMS used. For example, the 2716 can hold 2K of programs, and the 27512 can hold 64K. (Frankly, the current costs of the 27512 is prohibitive,but should come down drastically in the next year.) At this writing, the least cost-per-bit is provided by the 2764, which can hold an 8K program. Using these "chips", the quikLoader becomes a 64K ROM. Using larger capacity EPROMs allows it to become a 128K, 256K, or even a 512K card. If more memory capacity is needed, the quikLoader operating system supports multiple quikLoaders.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 5% additional space for programs and data on your disks.

ABOUT THE DESIGNER

The quikLoader was designed by Jim Sather, author of UNDERSTANDING THE APPLE][(forward by Steve Wozniak), published by QUALITY SOFTWARE (21601 Marilla Street, Chatsworth, CA 91311 (818) 709-1721).

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE][+ or //e. If used in a][+, a slightly modified 16K memory card is required in slot 0. A disk drive is required to save data.

DOS, INTEGER BASIC, FID, and COPYA are copyrighted programs of APPLE COMPUTER, INC. licensed to Southern California Research Group to distribute for use only in combination with quikLoader.

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PRODUCT NEWS

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Jane is an easy-to-use, integrated-software package that combines a word processor, Janewrite; a spreadsheet calculator, Janecalc; and a personal filing system, Janelist. The package is now available in an updated version that can run on the Apple IIc. Jane uses pictures to represent system commands and functions, and four on-screen windows allow you to display all three applications simultaneously. *(List Price: $179)*
Requires: Apple II, II Plus, IIc, or IIe; 64K RAM; AppleMouse II, KoalaPad, or joystick
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113 South Fourth Avenue
Ann Arbor, MI 48104
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Requires: Apple IIc or IIe, ProDOS, 80-column card, one disk drive
Analytical Solutions
8411 Greenbush
Houston, TX 77025
(713) 664-7675
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20 Fingers X
20 Fingers X is a software package that enhances the Apple computer's keyboard by allowing you to define the top row of keys and their respective Shift keys with any keystroke sequence of up to 255 characters. The system also predefines function keys with BASIC and DOS commands, and its software gives positive audio feedback of keystrokes with variable loudness. The package comes in a ProDOS or DOS 3.3 version with a plastic-laminated template containing predefined key definitions, five smaller templates for use with user-defined keys, and documentation. *(List Price: $45)*
Requires: Apple II, II Plus, or IIe; DOS 3.3 or ProDOS; 80-column card
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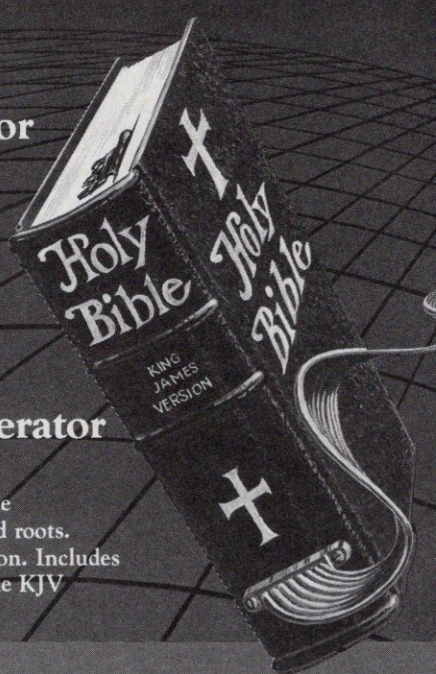

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Requires: Apple II, 64K RAM, one disk drive, game paddle or joystick, Alpha-Syntauri Computer Music System
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Requires: Apple II Plus, IIe, IIc, or III; one disk drive
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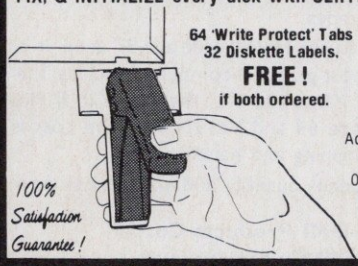

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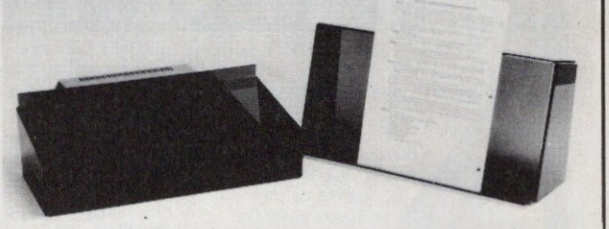

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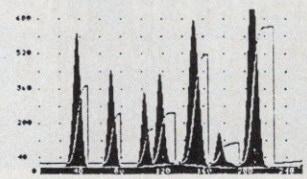

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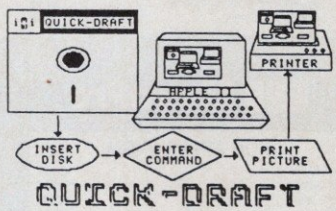

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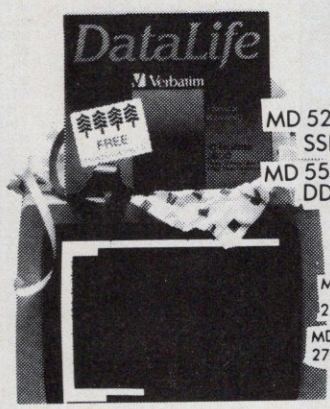

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The Bank Street College of Education has joined forces with Holt, Rinehart and Winston to produce a comprehensive educational program that integrates microcomputer software, a PBS television series, and printed classroom materials. The product is designed to give children in grades 4 through 8 a better understanding of science, mathematics, technology, and what scientists do.

The Voyage of the *Mimi*'s focal element is the PBS television series. Each 30-minute show comprises a dramatic episode and a documentary expedition that involves a seaborne scientific research mission aboard the ketch *Mimi* to study whales in the Gulf of Mexico.

The scientific concepts and technical skills that are presented in the show are expanded upon in the accompanying learning modules, which consist of books and software. The modules are entitled Maps and Navigation, Introduction to Computing, Whales and Their Environment, and Ecosystems.

Software in the first modules features three preparatory games in which students apply navigational skills. Introduction to Computing uses turtle-graphics commands and teaches the history of computing. Whales and Their Environment includes a hardware and software package that converts the computer into a general-purpose laboratory instrument for collecting and displaying data to measure sound, heat, and light, in both air and water.

Complete system packages are suitable for use by 25 students and one teacher, although materials are also available individually. *(List Price: System Package #1, $1276.50; System Package #2 [no video], $856.50)*
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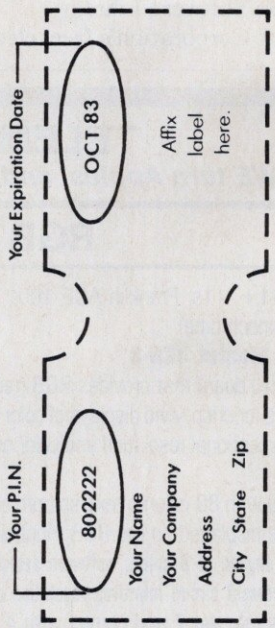

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3D Modelling Toolkit enables Pascal programmers to model and view objects in a 3D world-coordinate space. Using a set of character fonts defined in a stroke format, you can subject text to a complete set of geometric and viewing transformations. To use this program, you also need the Raster Graphics Toolkit. *(List Price: Toolkit, $500; Raster Graphics Toolkit, 3D Modeling Toolkit, $300 each)*
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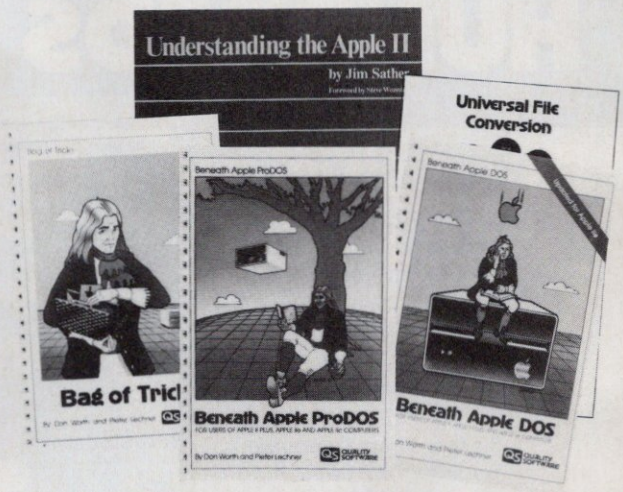

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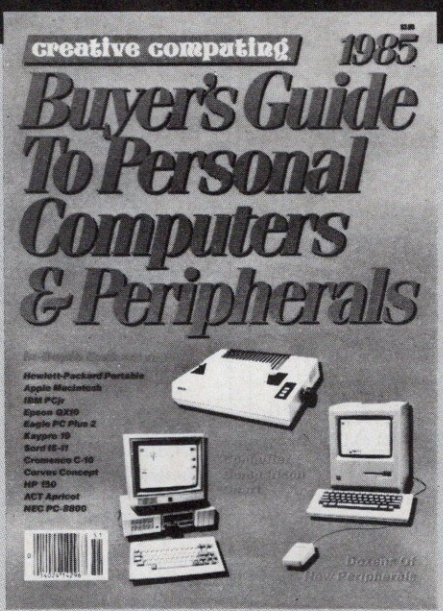

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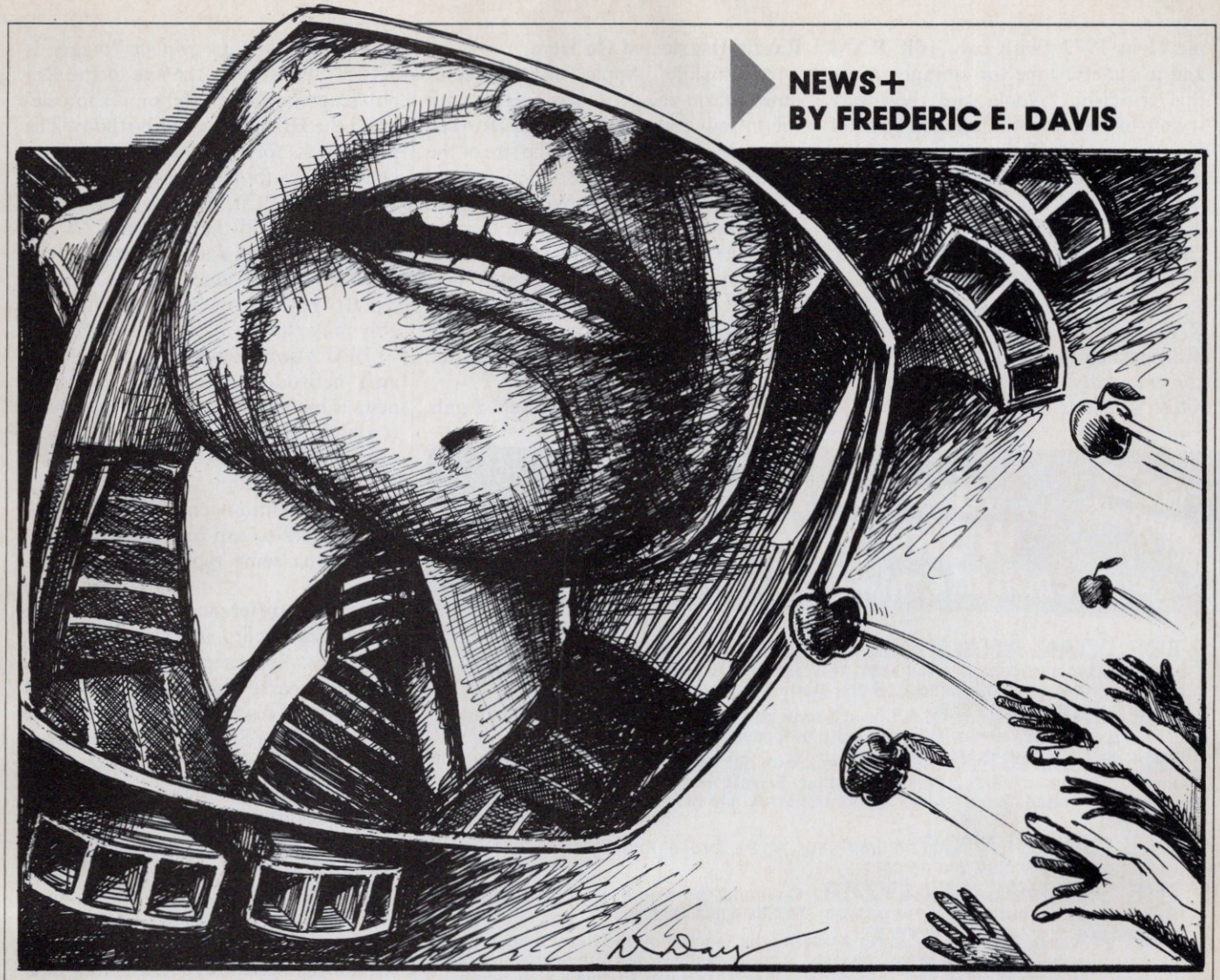

1984: THE YEAR IN REVIEW

1984 is almost over, and it seems that Big Brother wasn't watching us very closely after all. But Big Blue has been watching Apple very closely. When Future Computing held a forum about the Macintosh, more people attended from IBM than from any other company. Although Apple is only 1/40 the size of IBM, Apple grabbed the spotlight away from IBM several times during 1984.

Norman Rockwell vs. Big Brother

Last January's Super Bowl game saw the kickoff for the 1984 Apple/IBM rivalry, when both companies bought some of TV's most expensive advertising time to showcase their new computers. IBM's commercial—as wholesome as a Norman Rockwell painting—featured the bumbling Charlie Chaplin wheeling out the PCjr in a baby carriage. IBM hoped that the PCjr would appeal to the serious home-computer user and compete with the Apple II. Apple's TV commercial was an Orwellian, surrealistic shocker that portrayed IBM as Big Brother and introduced the Macintosh as the hero of the oppressed masses. Apple hoped that Macintosh would appeal to the business-computer user and compete with the IBM PC.

Both the PCjr (code-named Peanut) and the Macintosh (code-named Macintosh) had been the subjects of intense speculation by both the press and the computer industry for more than a year prior to the time they were introduced. After the introductions, software and hardware manufacturers rushed to market new products for the new computers. Interest was so intense that four magazines were started for the PCjr and two for the Macintosh.

Cheers for the Macintosh

Perceived quite differently, the Macintosh elicited cheers, but the PCjr got jeers. Brøderbund Software got ahold of its first PCjr and first Macintosh at about the same time. According to Brøderbund President Doug Carlston, the company's programmers were falling all over each other to get at the Mac, but relegated the PCjr to a closet. Software and hardware companies started accelerating development on Macintosh products and canceling PCjr products. Even the mighty Microsoft, producer of PC-DOS and MS-DOS, announced that the development of Macintosh software would be its top priority. After less than a year, all four of the PCjr magazines ceased publication, and only the stronger of the two Macintosh magazines remained.

People started complaining about the PCjr right away, so IBM scurried to come up with an upgrade that included extra memory and a new keyboard. After a while, people also started complaining about the Macintosh. An early Mac owner who had purchased an Ap-

DON DAY

ple II in 1977 (with only 16K RAM and a cassette tape for storage) made this criticism: "Apple said they were trying to recreate the phenomenon of the Apple II. Well, in my opinion they've done it again—the Macintosh was also introduced with inadequate disk storage and insufficient RAM." Other voices echoed similar sentiments. Not surprisingly, Apple went scurrying to upgrade the Macintosh to 512K RAM and then signed over all its hard-disk technology to Sony, which, not so coincidentally, manufactures the Macintosh's disk drive.

Razzle-Dazzle and Ho Hum

Meanwhile, Apple brought computer razzle-dazzle to new heights with the introduction of the Apple IIc. The gala extravaganza held at the site of the 1984 Democratic convention featured off-color jokes by Steve Wozniak, a full day of computer hype, and an evening of somewhat bizarre music by Herbie Hancock. Although Apple set a new computer-industry sales record by taking orders for 50,000 Apple IIc's in a single day, nobody started a magazine about the IIc.

Not to be outdone, IBM held a gala extravaganza of its own in "bigger is better" Texas (near the site of the Republican convention, hmm. . .) to celebrate the IBM PC's third birthday. The party was for IBM dealers, and it helped them forget how they had been stung on the PCjr. About a month later, IBM introduced the IBM PC AT advanced computer, and it was back to the usual ho-hum product introduction for a pretty ho-hum product that will probably make lots of money for IBM.

IBM also introduced its new local-area network for the PC. The good news is high performance; the bad news is a high price tag—$1000 per connection. Apple claims that its inexpensive $50-per-connection Apple Bus network for the Macintosh enables a group of Apple users to tap into the IBM network using some type of gateway device.

Another difference between the two companies occurs in their marketing strategies. Apple seems to be encouraging third-party developers, and IBM seems to be discouraging them. Apple President John Sculley says he wants to keep Apple's product line quite short, which leaves plenty of room for other companies to produce products for use with the various Apple computers. IBM, in contrast, has been steadily adding to its product line, with more than 50 new microcomputer products introduced this year, including Topview windowing software, a Lotus-like integrated-software package, Displaywrite professional word-processing software, and the IBM Assistant Series.

The most notable addition is the IBM Assistant Series, a group of simple-to-use software packages for most of the major business-software areas. The series includes the Writing Assistant, Filing Assistant, Reporting Assistant, and Graphing Assistant. These programs are actually Software Publishing's popular PFS:Write, PFS:File, PFS:Report, and PFS:Graph products, which have been licensed to IBM. Ads for the IBM Assistant Series are prevalent not only in computer magazines but also in airline magazines, business magazines, and others. This may be good news for Software Publishing, but it's bad news for a lot of other third-party software companies with competitive products.

During 1984, Apple expanded its dealer network by adding some important dealerships such as ComputerLand, BusinessLand, and the Sears Business Centers. The ComputerLand deal alone added more than 700 dealers

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in 25 countries to Apple's dealer network. Apple is also attempting to strengthen ties with dealers and increase dealer profit margins by cutting out the manufacturers'-rep firms that were acting as middlemen in Apple's retail sales. IBM, however, appears to be undermining its dealer network to get more of the action for itself. At the beginning of 1984, approximately 30% of all IBM PCs were sold directly by IBM; IBM's authorized retail dealers handled the majority of sales. IBM itself is now selling more than 60% of all IBM PCs, however. Several IBM dealers have told me that they view IBM as their major competitor.

1984 is almost over, and the rivalry is still going strong. A tally of the 1984 sales figures will probably show that Apple has sold more personal computers than IBM and that IBM will have made more money on what it sold than Apple. We'll soon welcome 1985, and both IBM and Apple have a variety of new products they'll be trying to dazzle us with in the months ahead. It should be an interesting year.

THE LITTLE KINGDOM

Anyone interested in Apple Computer, Inc., should enjoy *The Little Kingdom: the Private Story of Apple Computer* by Michael Moritz, published this fall by William Morrow and Company. Moritz, *Time* magazine's San Francisco bureau chief, is a seasoned business writer who knows how to provide insight into a company's inner workings. He uses Apple as a case study in modern American business, which gives the book a broad appeal. This in-depth study of Apple takes a hard look at how the personalities of Apple's founders affected the company in its rise from a garage operation to an international billion-dollar-a-year corporation. As an avid Apple watcher, I found the book fascinating. Highly recommended reading.

HELP FOR MAC DEVELOPERS

Two recently formed groups provide support for Macintosh software developers, but it's hard to tell which of these new start-ups provides the most useful service. The first group is the Macintosh Developers Exchange, sponsored by The Programmer's Shop, 128 Rockland Street, Hanover, MA 02339; (800) 421-8006 or (617) 826-7531. The group offers a computer-bulletin-board service and support services aimed at Macintosh programmers. The Programmers Shop says that the service will be free of charge for the first few months and that some type of charge may be considered in the future.

The second group is the Programmers Network, spearheaded by the infamous John Draper, aka Captain Crunch. Draper is the eccentric yet brilliant programmer who wrote the original EasyWriter program for the Apple II while he was in prison for incurring the wrath of the phone company. Draper's Programmers Network claims to provide to users nationwide Tymnet access to a more sophisticated bulletin-board system for only $3 an hour, but so far I've been unable to verify this claim. Programmers Network asserts that its services will include tips on contract negotiation, job-placement listings, and other resources, as well as programming tips and algorithms. Although the Programmers Network would seem to have the most potential ($3-per-hour Tymnet access sounds like a real plus), it costs $75 to join, which seems steep to me. Draper told me it helps them provide the service while keeping people who aren't serious off the network. Decide for yourself. You can obtain further details from Pro-

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▸ APPLE IIe SALES BOOMING

Apple expected IIc sales to decrease demand for the Apple IIe, but IIe sales are better than ever. Schools have been increasing their orders for IIe's; the state of Tennessee placed a single order for more than 5000 IIe's this fall. The Apple IIe's easily accessible bus makes it more versatile than the IIc, so home and business users have also been continuing to buy IIe's in record quantities. The only bad news for Apple is that it underestimated the demand and has been having a hard time keeping up with IIe orders. There are plenty of IIc's around, though, which is one reason Apple lowered the retail price of the IIc; the original price of $1295 now includes the IIc monitor and stand.

▸ APPLE BUS LOOKING GOOD

The new low-cost Apple Bus network for the Macintosh and Lisa is almost ready, and it's looking really good. The network allows a group of up to 32 computers and/or shared peripherals to be interconnected at a cost of only $50 per connection. The connectors are simple transformers about the size of a matchbox. The network operates at about 250,000 bits per second and is self-configuring, which means that computers and peripherals can be daisy-chained together in any sequence. Although the Apple Bus network is not as powerful as IBM's $1000-per-connection network for the IBM PC, the Apple Bus is easier to install and provides most of the functionality of the IBM network.

▸ CP/M FOR THE MAC

IQ Software has announced the availability of CP/M-68000 for the Macintosh. The company offers CP/M-68000, the C language, and a terminal program in a $395 package. The CP/M-68000 operating system performs two to five times faster than the current version of the Finder. The company also offers a CP/M-80 emulator that lets you run programs such as WordStar and dBASE II. For more information contact IQ Software, 2229 East Loop 820 North, Fort Worth, TX 76118; (817) 589-2000.

▸ THE RUMOR MILL

Beginning this month, The Rumor Mill becomes a regular feature of News+. This space is set aside for the spurious, curious tidbits floating around the industry. If you overhear any hot rumors, write to The Rumor Mill c/o *A+*, 11 Davis Drive, Belmont, CA 94002.

Color Mac

It seems that a color version of the Macintosh, code-named "Rainbow," is now in the works. The local scuttlebutt is that Texas Instruments is preparing a set of custom CRT controller chips that will give color capabilities to the 512K Mac through the addition of a video-output jack on the back of the computer that will allow you to connect an external color monitor. Upgrading the Mac to color won't be cheap—the cost is said to be in the $800 to $1000 price range.

Miniscribe

Apple appears to be developing a new portable version of the Scribe printer. It should help make the IIc a truly portable system when combined with the much-awaited LCD display.

Flat Mac

Sony has just introduced a new flat-panel CRT display for microcomputers that is a spin-off of the Sony Watchman personal television. The Sony flat screen is available in both a monochrome and a color version and ranges in size from 4 inches to 10 inches diagonally. Sony claims that the new flat-screen technology is not planned for use in any Sony product, but is designed for use as an OEM product by other computer manufacturers. Considering the strong ties between Apple and Sony, it wouldn't be too surprising to see the display show up in the much-ballyhooed lap-size Macintosh that Steve Jobs calls Mac-in-a-book, a takeoff on Alan Kay's Dynabook concept.

Higher ProFile

Many of us have packed our five-megabyte ProFiles to their capacity. Apple is busy upgrading its hard-disk products, however. The first to be released will be a ten-megabyte ProFile, and the next will be a Mac hard disk.

Fast Mac

One of the main complaints about the Macintosh is the relatively slow speed of the disk drive. In order to remedy this situation, Apple is readying a RAM disk that should greatly increase the Mac's performance.

IIc Compatibility

Apple is planning to offer a set of chips that will let you upgrade the IIe to be fully compatible with the IIc. The upgrade will involve swapping the 6502 processor with a 65C02 processor and replacing the computer's ROM chips with new ROMs that support MouseText and other IIc features. ✚

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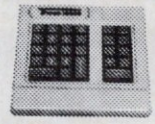

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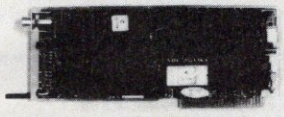

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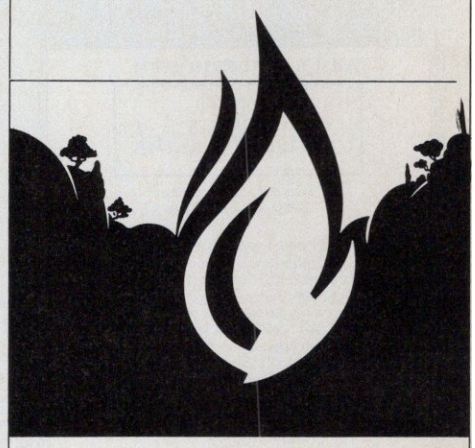

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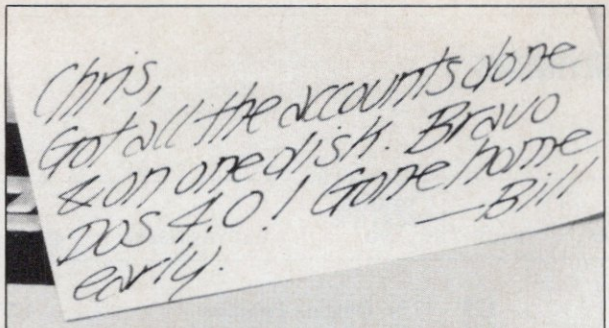

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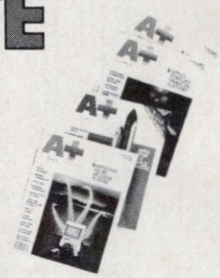

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