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Now Monthly!

Apple Orchard

The Premier Magazine for Apple Computer Users ™

VOLUME 4 NUMBER 6 SEPTEMBER 1983 $3.25 (US)

How a school funded Apples
CP/M to SOS Transfer
Six Hard Disks



THE SECRETS OF PERFECT MEMORY: ONE EARTH DOLLAR

AT LAST: THE WHOLE TRUTH ABOUT FLOPPIES.

Amazing book reveals all!

How to keep from brainwashing your disk so it never loses it's memory.

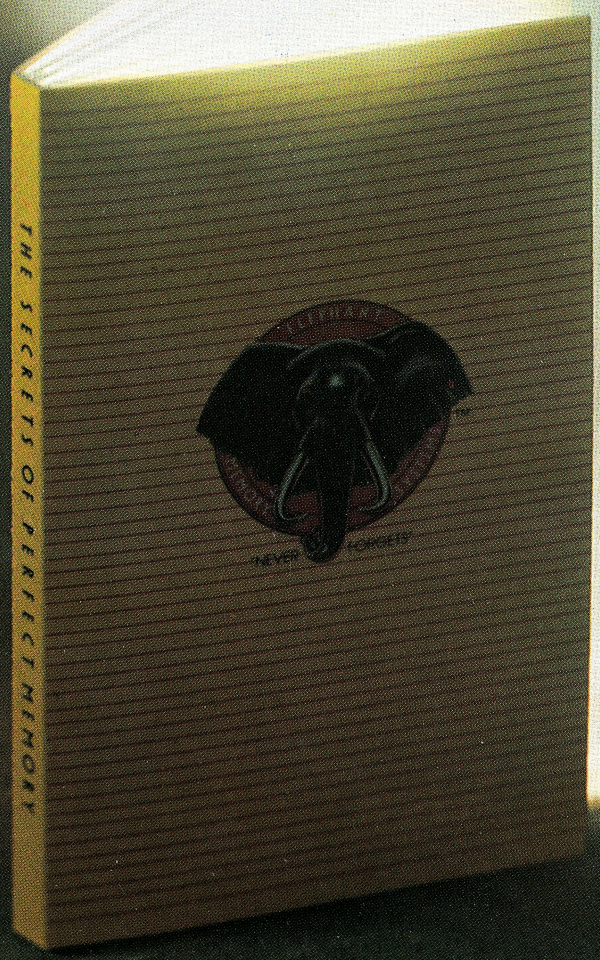
How fingerprints can actually damage disks. Unretouched Kirlian photographs of UFO's (Unidentified Floppy Objects)! The incredible importance of making copies: the Department of Redundancy Department—and what goes on when it goes on! Powerful secret methods that scientists claim can actually prevent computer amnesia! All this, and much more . . .

In short, it's an 80-page plain-English, graphically stunning, pocket-sized definitive guide to the care and feeding of flexible disks.

For The Book, ask your nearest computer store that sells Elephant™ disks, and bring along a buck.

For the name of the store, ask us.

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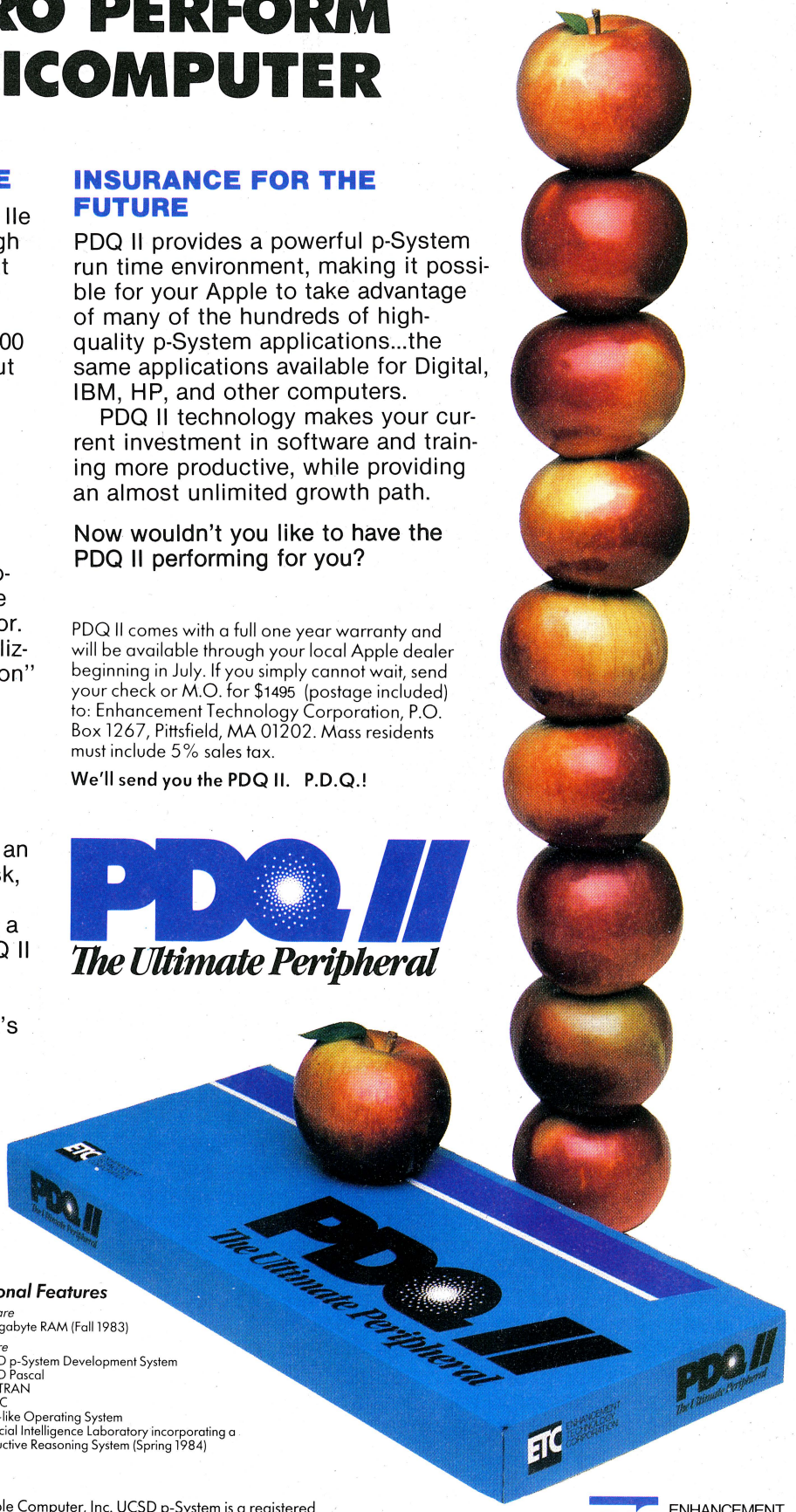
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- Track buffering (p-System)

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- 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
- UCSD p-System (version IV) Interpreter—executes UCSD Pascal, FORTRAN-77 and BASIC P-Code

Optional Features

Hardware
- 1 Megabyte RAM (Fall 1983)

Software
- UCSD p-System Development System
- UCSD Pascal
- FORTRAN
- BASIC
- Unix-like Operating System
- Artificial Intelligence Laboratory incorporating a Deductive Reasoning System (Spring 1984)

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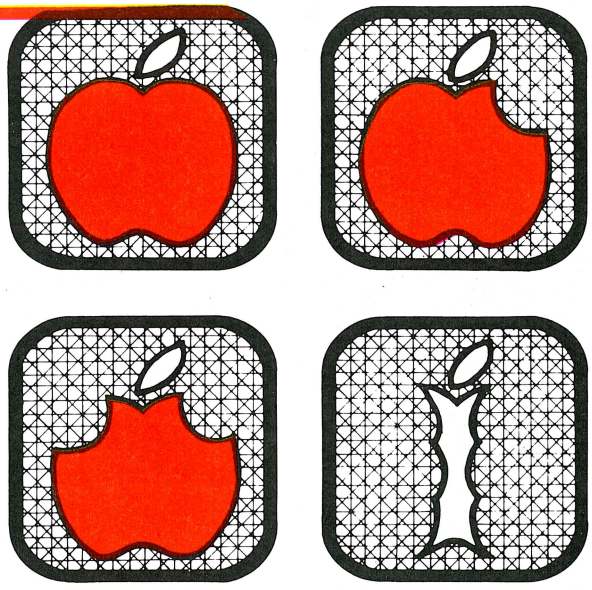
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3M

Take a bite...



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Apple Orchard

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Peter C. Weiglin - Editor and Publisher
Donna Caldwell - Managing Editor
Nicole Lefcourt - Editorial Assistant
Val J. Golding - Editorial Associate

Contributing Editors:
Mark L. Crosby - New Products
"Dr. Wo" - Pascal/Languages Editor
Neil D. Lipson, P. E.
A. S. (Woody) Liswood
Morgan P. Caffrey
Barry D. Bayer
Jim Linhart - Miscellaneous Cartoonery

Dawn Brown - Circulation Manager
Karen Vanikiotis Zinsmeister - IAC Staff

Advertising Representative:
JE Publishers' Representative Company
6855 Santa Monica Blvd.
Los Angeles, CA 90038
(213) 467-2266

Boston - (617) 437-7628
Chicago - (312) 445-2489
Denver - (303) 595-4331
New York - (212) 724-7767
San Francisco - (415) 864-3252

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Apple Orchard
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(408) 727 - 7652

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Textfile

This is our second monthly issue in a row; your **Apple Orchard** staff is surviving quite well, but we could use more material from you, particularly on how an Apple is making life or business more worthwhile. The IAC Board has not objected to an increase in author payment rates, so the incentive for you to contribute is now greater.

We'll remind you again that if you subscribed at our old nine-time rate, we're adding one issue to your subscription if it expires before the end of 1983; two copies are being added if the old expiration date was after the end of 1983. That roughly compensates for the fact that our subscription rate is a bit lower on a per-issue basis. Also, for the first time, we have an incentive for a two-year subscription: it's $24 for one year, and $45 for two years in the U. S. Outside of the U. S., the rates are as shown elsewhere in this issue, and we've added the air mail postage categories for those international subscribers who requested them.

Our cover and cover stories reflect the future; the struggle to provide a computer education program at Willow Glen School in San Jose, CA; and Apple Computer's Kids Can't Wait program. If you can read through these stories without feeling a bit warmer inside afterwards, there's probably no hope for you.

Pat Caffrey has been dissecting six hard disk systems from the consumer standpoint; his analysis of what's needed, desired, and found when a hard disk enters your life begins on Page 10. Other products at which our intrepid independents take a look this month include the Franklin Ace 1200, three 128K RAM cards and their associated software (both by Neil Lipson), and the ABSTAT statistical program package (Woody Liswood). As is usual in this field, about the time you have enough information and experience to get a good handle on a product, there's a new variation coming out. That's particularly true in RAM cards; the word is that at least two 1-megabyte cards (yes, megabyte) could be out by the time you read this.

A new IAC product for the Apple /// makes its debut this month: a CPM to SOS textfile conversion program by Arthur ("Skip") Anderson (no relation to Alan). This disk also is the first non-public domain IAC software product, is copyrighted, etc., and duplication for other than backup purposes is not permitted. We're not printing the source code, because the program is just too long; the disk is available. Also for the Apple ///, we present a (shorter) Text File Case Converter for Business BASIC from Mike Kramer.

Our international focus gets a boost from Paris' Andre Babeanu, who tells us what working with Apples is like in France. We'll be working more with *POM'S* magazine and Andre in the months to come. By the way, what's not here this month is Part 3 of John Uhley's examination of disk drive access. A bit more testing was required at deadline time, and we'll have it when it's ready. Peter Meyer's Disk Map article should hold those addicted to spinning vinyl, however. Two articles on Applesoft and a short look at Pascal round out this issue.

Let's hear from you.



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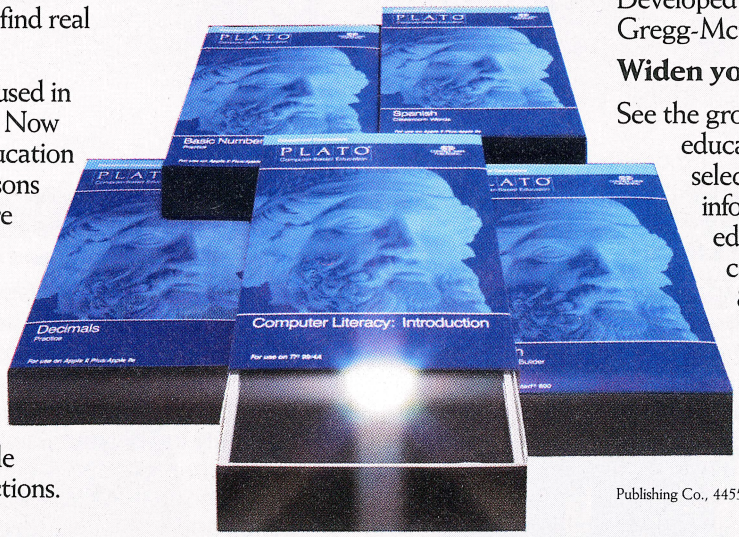
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Our **Computer Literacy** lesson provides a perfect introduction to the computer age for kids and novices.

For Apple II Plus and Apple IIe.

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Widen your child's world.

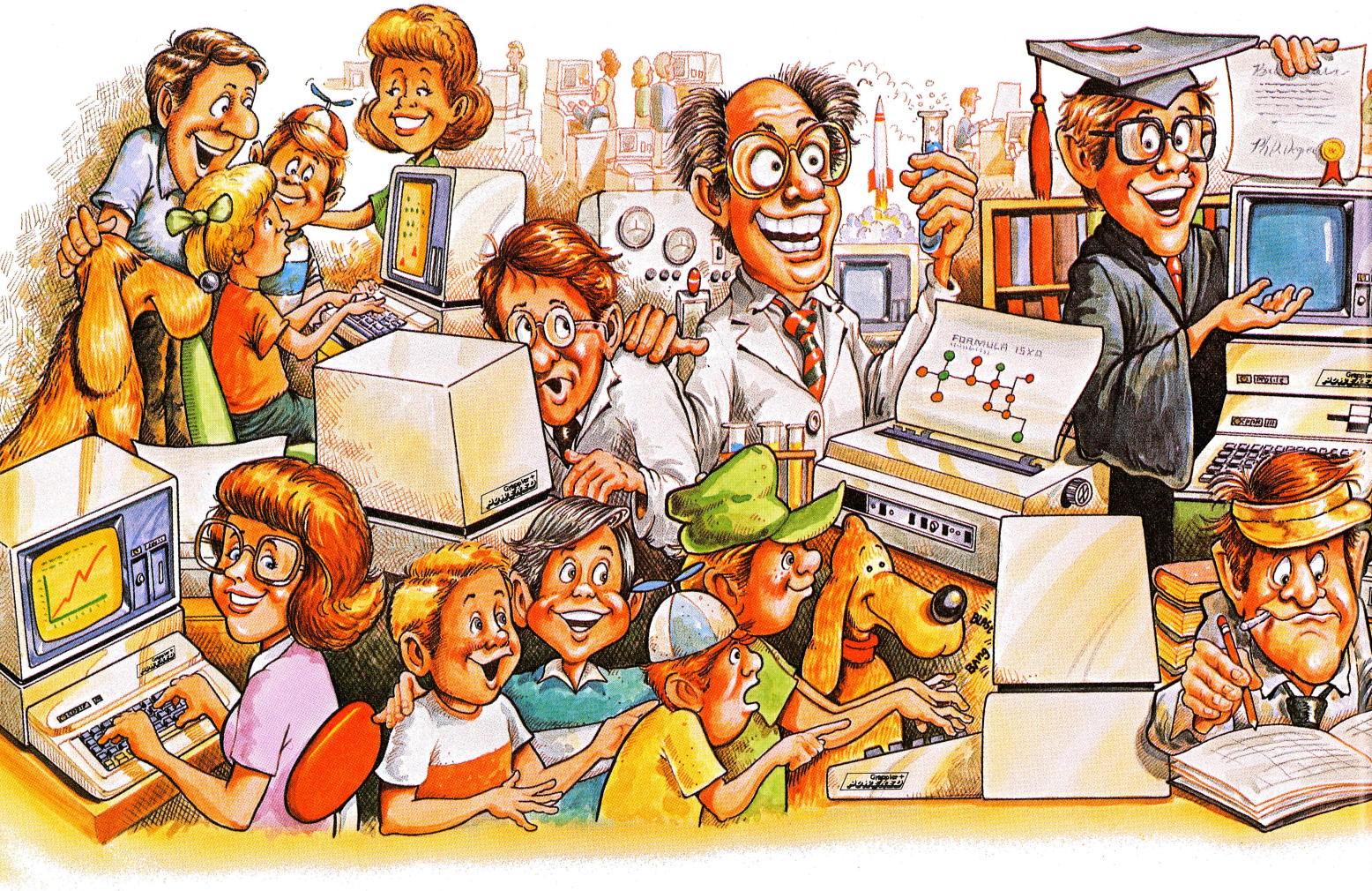
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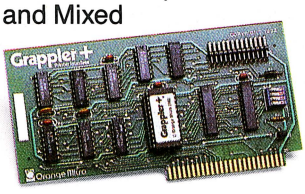
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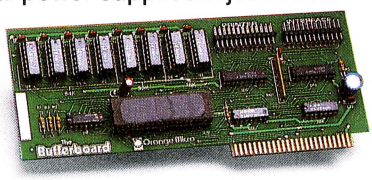
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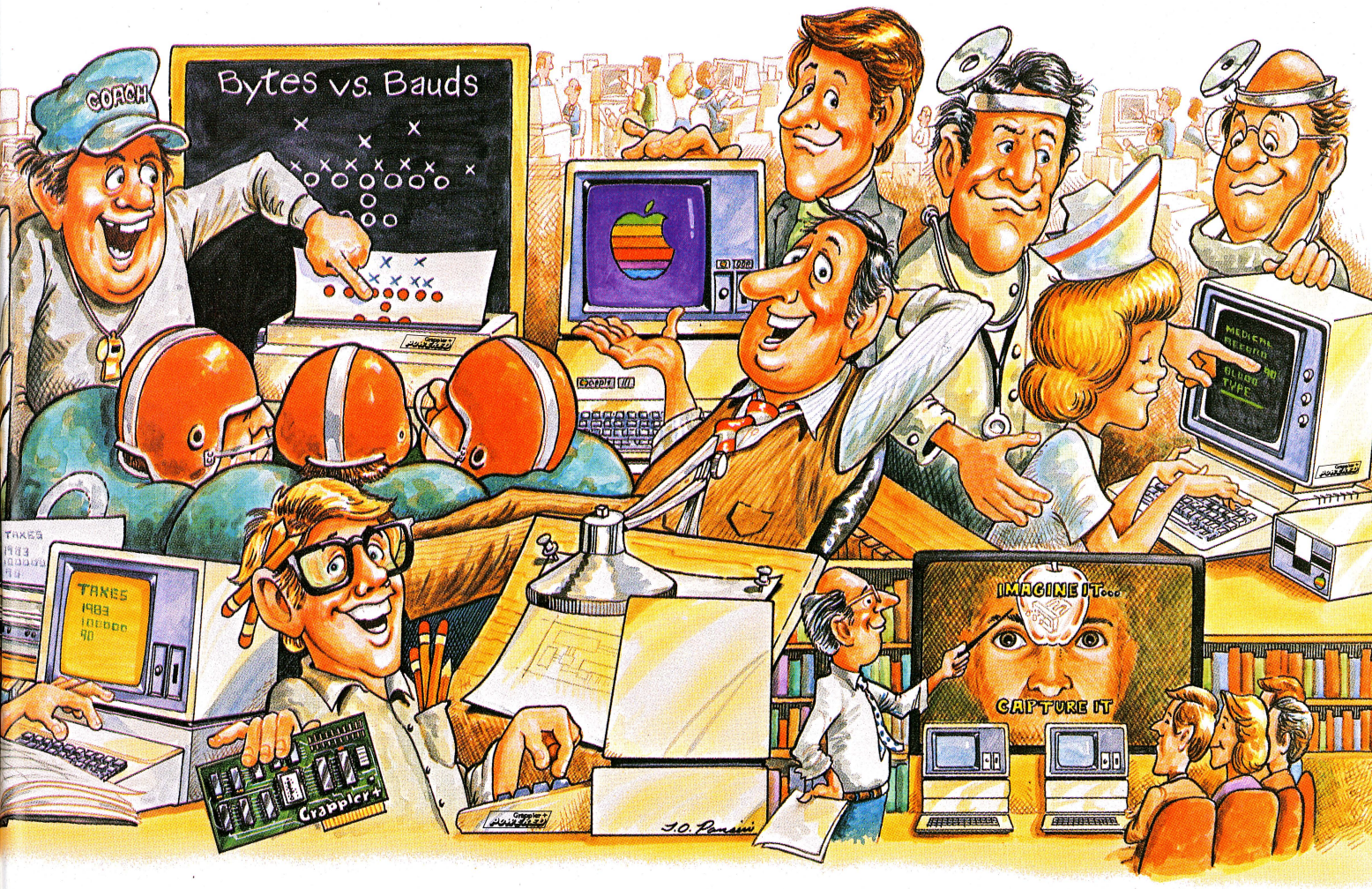
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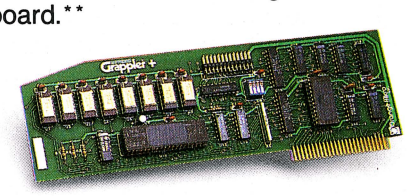
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The Enhancer II™ Proudly Presents

A Whole New Cast of "Key" Characters!

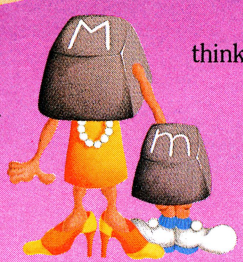


Recognize some of these "key" characters? You've seen them all before on your Apple® II screen, but now the Enhancer II has given them all new identities!

The Enhancer II uniquely gives your Apple II user-definable keys. So you can define any key to become what you want it to be. That means phrases, paragraphs or commands that you use frequently (up to 510 characters!) can be remembered by the Enhancer II and then called up at the touch of a single key.

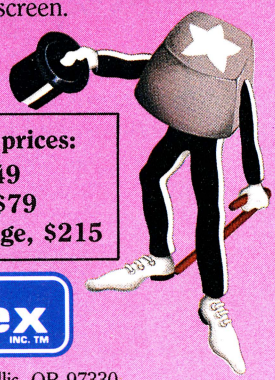


Besides that, the Enhancer II gives your Apple II typewriter mode, with each key assuming the identity of a conventional typewriter key. Not only will you recognize all the characters; you'll positively rejoice at having upper and lowercase letters, auto repeat, shift and shift lock again! The Enhancer II also has a type-ahead buffer of 128 characters, so you can keep sending messages to your Apple II even while it's busy with something else.



And if you want to meet even more new characters, the optional Function Strip™ will introduce you to 16 brand-new keys across the top of your keyboard which are yours alone to define. (These characters will never get mixed up with characters from the keyboard!)

We may be prejudiced, but we think you're going to like these new "key" characters from Enhancer II. In fact, we'll bet that once you've seen them perform, they'll become the stars of your screen.



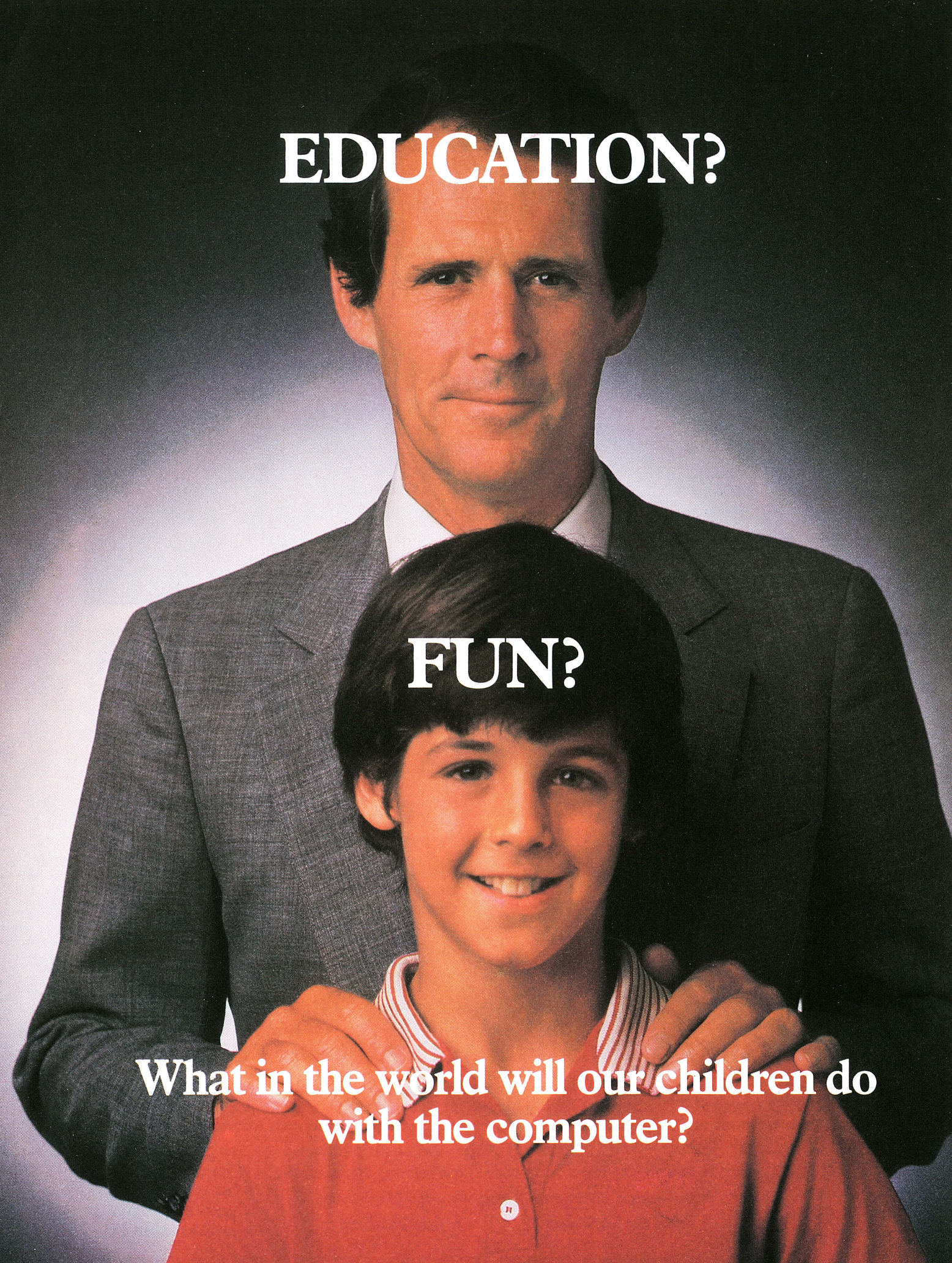
Suggested retail prices:
Enhancer II, $149
Function Strip, $79
Combined Package, $215

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The Enhancer II and Function Strip can be used with any Apple with a keyboard encoder board.

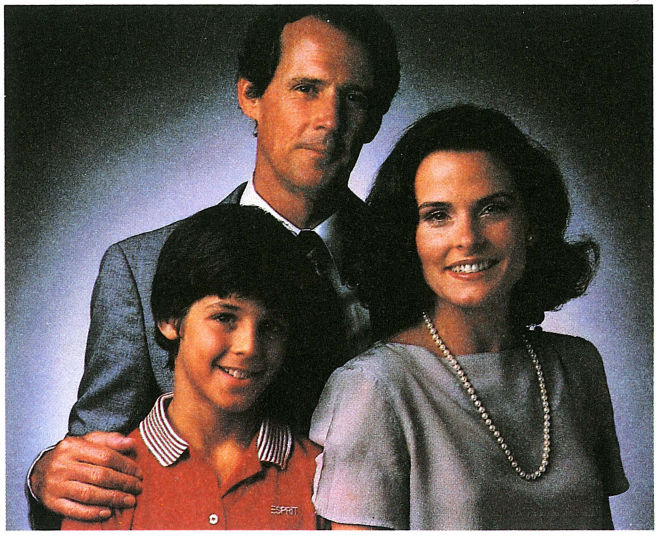
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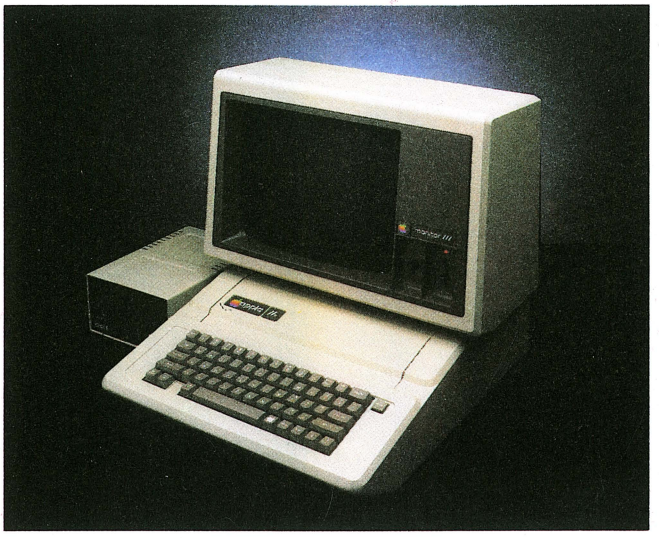

EDUCATION?
FUN?
What in the world will our children do with the computer?

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1. WHAT IN THE WORLD IS A "MICROZINE?"

Microzine is an interactive magazine on a computer disk, and it can open up the world of computer learning to your children *more effectively than any other children's software available today.* Microzine comes to you from Scholastic. We've been trendsetters in children's publishing for over 60 years. Now that traditional teaching methods are being enhanced by computer-taught materials, Scholastic is ready with the innovation that creates an ongoing "dialogue" of fun and learning between your children and your computer. Like a magazine, but unlike other software for children, Microzine is constantly current and topical. Your children receive a new four-program Microzine disk every other month and build their own Microzine Library!

2. WHAT CAN YOUR CHILDREN DO WITH MICROZINE?

Microzine can help your 9-13-year-olds take advantage of one of the most important uses your computer can have: exploring new and more efficient ways of learning and thinking. (If you don't own a computer, your children may be able to use one at school or a friend's home, or borrow one from your local public library.)

Microzine was created with the recognition that today's children take naturally to computers and that tomorrow's adults will need to be computer literate—no matter what their careers.

3. WHAT IS "COMPUTER LITERACY" AND HOW DOES MICROZINE HELP ACCOMPLISH IT?

At Scholastic, we believe that learning how to utilize a computer's wide-ranging capabilities should be an important part of every child's education. This kind of computer literacy is no longer an option, but a necessity, if our children are to take their places in the computer age. To this end, Microzine is designed to spark enthusiasm and teach these essential skills:

- ★ following directions
- ★ vocabulary
- ★ what a computer can do
- ★ learning to use a computer
- ★ the nature of programming
- ★ using the keyboard
- ★ everyday applications
- ★ word processing
- ★ data handling
- ★ graphics
- ★ logic
- ★ parts of a computer
- ★ problem solving

4. WHAT WILL THE FIRST YEAR OF MICROZINE BRING?

An ever-expanding library of fun and learning!
Every eight weeks there are four full-length programs and the variety is incredible:

Who's that trying to solve the *Mystery at Pinecrest Manor,* lost in the *Northwoods Adventure* and challenging the far reaches of space on *Mission to Planet XII*? Could it be someone we know? (With Microzine, *anything* is possible.) All set for takeoff on the *Space Shuttle*— or maybe a hot air balloon race? Wow! (Will Microzine *ever* get down to Earth?)

Back safe on Planet Earth, visit the *Pet Store*. "A flamingo for your bathtub? Or maybe a rare three-humped camel?"



Too wild? *Gift Store* offers practical suggestions for everyone from Great Uncle Oscar to your 16-year-old twin sisters. Or explore your creative options by composing a song, writing and illustrating a book, or inventing your own game.

Microzine is *always* full of questions. If you've ever dreamed of talking to a computer game designer, *Ask Me* gives you the chance. You won't believe all the current big stars waiting to ask you questions, too.

JUST TURN THE PAGE TO FILL OUT YOUR MICROZINE REPLY CARD NOW!

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5. BECOME A CHARTER SUBSCRIBER TODAY AND YOUR FIRST MICROZINE IS JUST $7.95. (A $39.95 VALUE: YOU SAVE $32.00!)

Thereafter, pay only $24.95, plus shipping and handling, for each Microzine you accept.
You save nearly 40% off the retail price by subscribing!

Each bimonthly Microzine Package contains; a Microzine Floppy Disk with Four Complete Programs.

On your first disk, discover:

1. POSTER. What's two spaces wide, slow, green and silent—and changes to three spaces wide, fast, pink and squeaky? It's an imaginary paintbrush that lets you create as many colorful posters as you want!

2. SECRET FILES. If your children want to remember who starred in their favorite horse movie of 1982, they need Microzine's electronic filing system. It works just like the electronic filing systems adults use.

3. ASK ME. Robert Macnaughton of "ET" fame is standing by to accept questions—and ask a few of your children in return!

4. HAUNTED HOUSE. There's never been a haunted house so funny—or one so willing to let you plan your own visit! Like all Twistaplots,® this one ends differently every time you venture inside.

NOTE: The first Microzine Package also contains a bonus: *a separate data disk that can be used to save original posters and other personal creations!* (A $4.95 value.)



The Microzine Handbook

After consulting this monthly step-by-step guide written in plain English for users 9-13, your children will be able to show *you* how Microzine activities work. Easy-to-follow instructions encourage independent work habits, creative thinking and follow-through.

Microzine™

THE SCHOLASTIC CHILDREN'S MAGAZINE ON A MICROCOMPUTER DISK.

FOR APPLE COMPUTERS.

O.K., Scholastic. We're ready to enter a fantastic world of fun and learning. Start our Microzines coming!

☐ Please send us Microzine #1 (featuring Poster, Secret Files, Ask Me and Haunted House) and enter a Charter Subscription to Microzine for the child named below. Bill me the special introductory price of just $7.95 (plus shipping, handling and any applicable sales tax). We will be billed $24.95 (plus delivery) for every Microzine we keep. After purchasing Microzine #1, we are never obligated to buy even one additional Microzine, and we may cancel our subscription at any time. If we are not delighted with the introductory Microzine, we may return it within 10 days and pay nothing.

☐ I've already purchased Microzine #1. Please start our subscription with Microzine #2, for which I will be charged just $7.95 (plus shipping, handling and any applicable sales tax). 61010 06

Child's Name_____ Age_____ Grade_____
(please print)

Address_____ Apt._____

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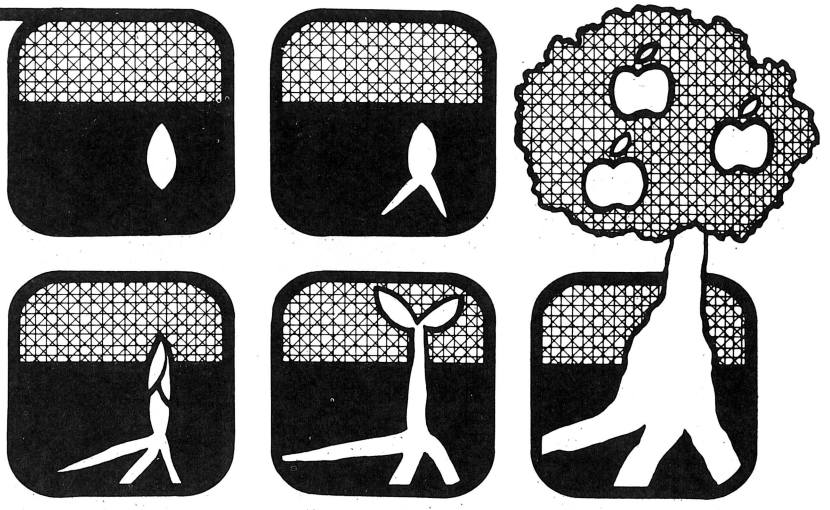
Telephone No. (_____)_____

Parent's Signature_____

SEND NO MONEY; JUST FILL OUT AND MAIL THIS MICROZINE REPLY CARD NOW!

Planting a seed...





The Apple Portable

"Apple is the pioneer", we are solemnly told. And so it was. The Apple II was a watershed device, a plug-in personal computer. No soldering required. That machine started a new era. You've heard that story before. *Awwessomme*, if we may borrow from a recent car commercial.

The Apple /// represented another break with the past: the software machine, the most powerful and flexible middle-weight computer on the market. The undeserved image problems suffered by the /// were people/company failures, not machine failures. Still, the /// is estimated to rank sixth or seventh in terms of Units Out There, after you get above the enlarged calculator models.

Lisa? Another revolution, the integrated software/hardware package. There's about an eighteen month waiting list. Others will claim to be like Lisa, but it will pay to look closely. Some external feature similarities do not constitute equality.

Meanwhile, Apple The Company has elected not to compete in the "low end" market, the $100-$600 area where names like Timex and Coleco are, er, "household" words. Not a bad decision so far, considering the way those guys are beating each other's brains out. And then there's Texas Instruments, which apparently has been trying to compete in any market it can find, with results that made quite the wrong kind of stock market history in June. The profit margin isn't in the low end, at least not yet.

There is, however, one other area in which sales are skyrocketing: the portable personal computer. Specific examples? Osborne, Kaypro, and Compaq, among others. Kaypro, in fact, claims to be third in market share, behind Apple and IBM. Whether that's true or not (sales estimates and reports sometimes contain their own kind of creativity), it certainly indicates a trend toward these suitcase specials, about the size of a sewing machine, with self-contained monitor and disk drives.

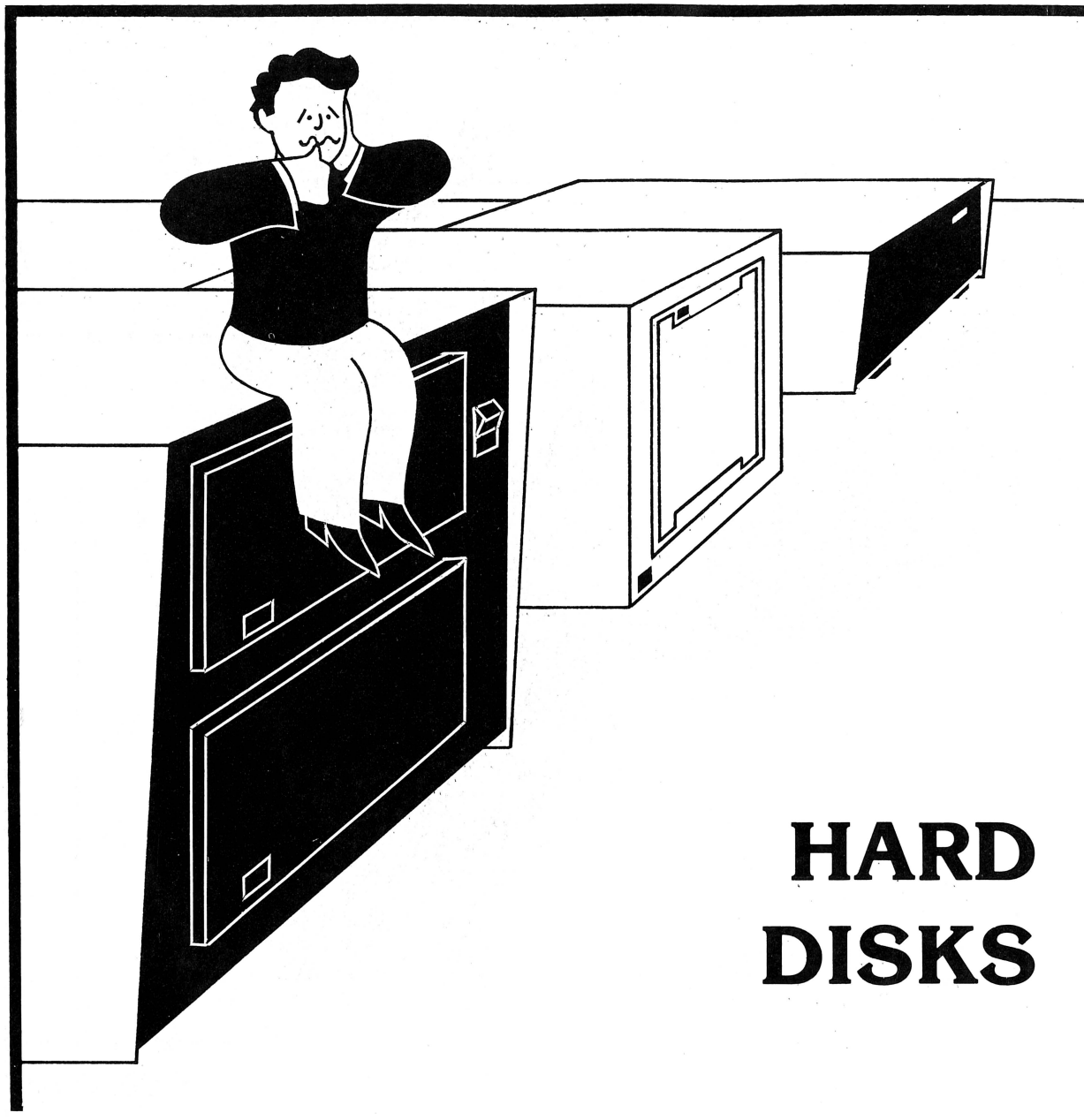
That's the real key: "self-contained". Everything in one container, as opposed to four boxes hooked together with fragile cables. But if Apple is doing anything about the portable computer market, it's a well-kept secret; there's nary a Grade 1 rumor about it. (Note: we dismiss out of hand the normal Happy Hour rumor mill chaff that abounds in Silicon Valley; plenty of other magazines can provide you with that.)

No, Apple The Company is pushing its //e and Lisa models out the door, as fast as they can be made. So Apple seems to have no present incentive to build a //e in a suitcase. What that means is that the portables being sold are IBM-compatible, not Apple-compatible, and there's the long-term danger. The software developers are chasing the other operating system which becomes more desirable over time.

We heard of a firm in Oregon that's about to market a portable Apple, or a box that can contain the Apple components, a monitor, and disk drives. Our review samples are alleged to be on the way, and we'll let you know about it as soon as we can. Frankly, that firm should be congratulated. And it's a shame that Apple didn't think enough of the portable computer market to divert some resources to it before this. Divert from where? Hmm. How about away from high-capacity disk drives?

Come on, Apple: put the disk controller, interfaces and 80 columns on a chip (like the VLSI chips in the //e), put a couple of disk drive sockets, 9-pin paddle/joystick connector, serial and maybe parallel ports on the back of a smaller box, and try one without slots, but with a handle.





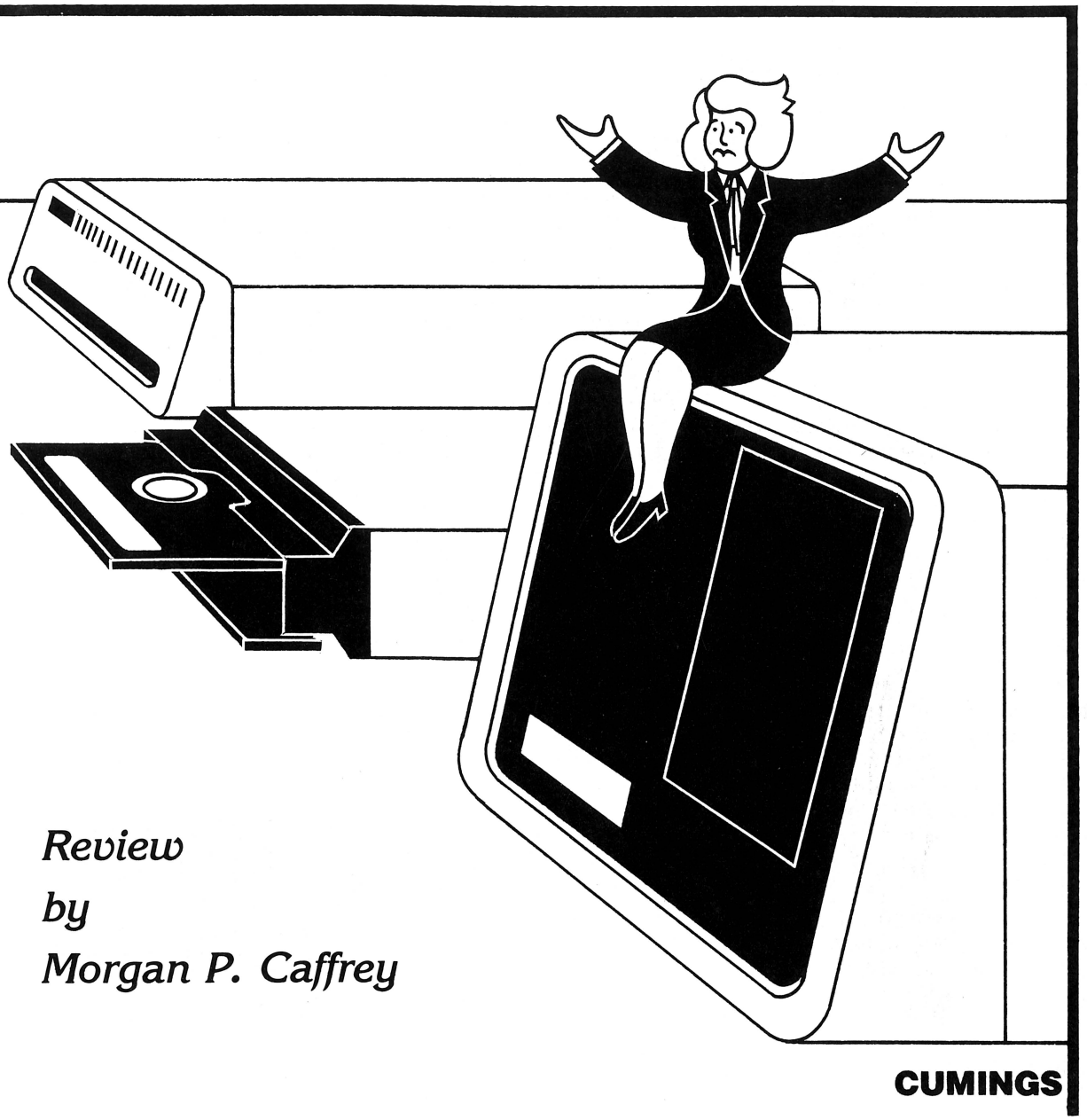
HARD DISKS

HARD DISKS, those fast mass-storage devices which used to be reserved to the big computers at five-digit prices, are now available to users of the Apple and other microcomputers. The price is still usually as high as the computer itself, but the hard disk has the effect of unleashing a strong extra increment of power. While to the hobbyist this may be just fun, to the small business or corporate office it may mean dollars saved.

Most of the power and savings appear in the form of speed. Speed pays in simple ways—more work, more quickly. Extra storage provides speed advantages too. The ability to access any discrete records almost instantly can be a real advantage in systems that need to respond quickly to query situations. In the hobbyist's or mathematician's world, the added storage can be the difference in creating data models large enough to be meaningful.

The Apple II and //e, Franklin, Basis *et. al.* form a unique environment. Most applications have appeared under Apple's DOS 3.3. Many others, often of very high quality, have appeared under CP/M, another operating system which predates Apple's by a number of years, and which requires a Z-80 circuit card in the Apple. Enough people have thought enough of this system that it is rumored that there is a higher installed base of CP/M systems inside the Apple world (including all the johnny-come-latelies) than in the rest of the computer world combined. At any rate, CP/M is a potent force in the Apple world, and vice versa.

Last, and certainly not least in Apple Computer's considera-



Review
by
Morgan P. Caffrey

tion, is Pascal. The UCSD (University of California, San Diego) version of Pascal is both a language and an operating system. I'll state right here that Pascal is the operating system that gets the least attention in this article. Others will need to fill in the gaps pertaining to Pascal.

Each of these three environments organizes the disk storage capacity in a different manner. In early hard disk releases for Apple, only DOS 3.3 was supported. Quickly, public demand for CP/M caused manufacturers and independent software developers to include CP/M capacity. But often the user got an either/or solution; either CP/M or DOS 3.3 but not the two together. Pascal, when it was added, further complicated the issue.

Buyer demand has led the way. Every manufacturer I talked with either has, or soon will have, a release which permits the three major operating environments to co-exist, sharing whatever available storage there is. And the amount of storage is growing. It began with five megabytes (5MB) and is increasing; 6, 10, 15, 20 & 40 megabytes and counting.

While this development has been quite an improvement, the buyer (that's you and me) frequently has been required to read very technical material and then mentally register and properly respond to highly technical questions about amounts of disk space to allocate to which operating system. I haven't found a system in which the questions or the answers reached what I am calling an "intuitively obvious" presentation.

Almost all of the systems require the user to assign amounts of storage space to each operating system before storing a byte

of data or program line. The Santa Clara System 5MB drive I tested required the user to install the operating systems in a rigid order. If Pascal was added later, because of a newly purchased application package or simply the addition of that environment to the buyer's stable of software, the entire disk needed to be reformatted. The order of installation was critical. This may be necessary but it isn't what I want. The problem is that the end user, you and I, wish to remain oblivious to these concerns.

Giving the devils (which they are *not*, really) their due, the problem being solved here is not trivial. The differences between the operating systems are real and restrictive. It takes time to think of a solution which encompases all the necessaries. Time is usually in short supply when trying to get a hardware product profitably to market. Still, the problem must be solved so that a non-programming user can solve problems without becoming almost a programmer.

Concerns

The concerns I developed during this project aren't unusual, but I'll list them anyway. If you buy a hard disk without an answer to each of these questions you are on perilous ground.

- Ease of use and speed. It should be easy to use. It should be very fast.
- Price. I want something (good) below $1000. It hasn't appeared yet.
- Ease of installation. This has grown and grown as a consideration during this writing. Things *do* go wrong and you may have to start over. It shouldn't be hard. It mostly is.
- Availability of operating systems (soon to be a non-issue) and ease of switching between operating systems to use various application programs.
- Facilities for data and program backup.
- Implementation information. This is a programmer's concern but I give high points to any manufacturer who lets me know where important information is stored in memory and how to change it when my application demands it. I know that this can cause trouble for the vendors but if the information is published correctly I don't believe there will be as many problems as anticipated. Certainly the support software will proliferate at a faster rate.

What I Really Want

What I want is a hard disk system that lets me get on about the business of using my computer, faster and better. I want to buy new applications as they become available, and place the appropriate (and all-too-rare non copy-protected) ones on the disk as I want to dedicate the space to them. I *don't* want to have to back up every file in every environment, reformat the disk and re-allocate space to each environment every time a new purchase moves me to the limit I previously assigned to one environment.

It turns out that there is such a system. Mountain Computer turned out the most elegant system I saw. It took me 20 minutes to boot and begin operation and, although I had to assign limits to each system, I could return later as my needs changed and restate the limits. The penalty for this elegance was that it's a slower system. Well, of course. If the limits are fixed, they do not have to be "found" during each operation. But one of the prime reasons I want a hard disk in the first place is speed. Not a happy choice. It turns out that you have to assess the benefits of speed versus the benefits of versatility. I, for one, don't want this to be a *versus* situation. I believe that, some time in the future, all these problems will be dimly remembered irritations. For now they are great limiting boulders on the available landscape.

The Drives Evaluated

In the course of this review no skimping was done. We contacted as many of the hardware manufacturers as we could; some responded and some didn't. The ones who did are: (in meaningless alphabetic order)

Corona Data Systems (Starfire)
Mountain Computer (Dynamic Disk System)
Santa Clara Systems
Vista Corporation (V1200)
Xebec (The kit and the factory-built UPS 9705)
Xiten Gallium

This list doesn't even pretend to be exhaustive. I worked with what was available. The Corvus, Davong and many others which are daily appearing on the scene would have been nice to evaluate as well, and we're looking into follow-ups. But there was plenty to learn and work with and the only real conclusion I have reached is that you can get a lot for your money but it will pinch sometimes.

My father, who first began playing with computers when I was 5 (I am now 36) has just begun to work with a micro and is, in his words, "humbled by how much there is to know once you lose the services of a team of people paid to keep disks, printers, wires and troubles at more than arms length". The hard disks were invented for use by experts, and now secretaries are having to deal with them on a daily basis. Let no one tell

you the world isn't rapidly changing. Hard disks are just another, wonderful, harbinger of the technological revolution.

Some Hard Disk Basics

A hard disk system's metallic, rigid storage surface spins much faster than any floppy disk. For this reason the read-head comes in contact with the information much more frequently. Speed. The (Winchester) environment is sealed at the factory. No dust can get in. Reliability. The heads are positioned with very high speed and accuracy. Speed and Reliability.

A hard disk system requires a special controller circuit in its box to "talk" to the physical mechanism, sending instructions as to where the data is to be stored or what data to read. The only real evidence of this internal controller is a cable leading from the box which must lead *somewhere*. A hard disk system also requires a special controller, which takes up an Apple slot, to "talk" to the controller in the box and "talk" to the Apple data bus and the various operating system environments.

All present disk systems store information in circular tracks, dividing each track into sectors, frequently 16 or 32 sectors per track. Some up-and-coming disk storage schemes are thinking of increasing the density of storage by making the tracks "vertical", of which more when we get a better understanding of the technology. The future is changing even as we try to adapt to the present.

For any of the operating systems, the information that is stored on a disk is blocked into "sectors". Each operating system receives the information from the disk in blocks and is responsible to retrieve what it wants from each block and feed it to the application program. The sector most commonly referred to in the Apple is 256 bytes (characters). Sector length is 128 bytes in CP/M and is 512 bytes in Pascal. Forth (which isn't discussed here much but which can also be implemented) uses 1024-byte blocks. The numbers are not terribly important; they merely point out that to make the various operating systems co-reside on the same hard disk, some software "dispatcher" has to know where everything is and under what scheme it was written.

So, when an operating system wants data from a disk sector, a logical block number or a track/sector pair is sent along with the request to help locate the data. The operating system identifies the track/sector of the logical block and sends that information to the controller software. The controller software has to decipher where the requested sector resides on the *actual* surface of the disk. In a single operating system the information might need no translation. In a multiple system environment the logical track 0, sector 0 of CP/M or Pascal might actually reside on track 306, sector 12 (or anywhere). The application software should remain happily oblivious to all of this. The system implementer, however has a task on his/her hands.

What's important here for most of us is not so much the technical detail of how the little beggar goes about rearranging magnetic flux, but the questions that you need to ask yourself and your dealer before purchasing. In short, how, if at all, can a hard disk help you?

So I will present my conclusions before the evidence.

There wasn't a hard disk that didn't quintuple performance over the floppy disk variety. The actual read/write performance might be critical in a satellite download or very frequent sort system but generally the slowest part of the system is the application software and the disk sits around waiting for its next activity. On balance I will trade ease of use and general flexibility for speed where price does not offset that factor.

Not one manufacturer had a system that I could give to a new or novice user without fear of trouble. Documentation is part of that problem; it must improve. I don't mean more detail; I was awash in detail that, while valuable to a programmer, was irrelevant and confusing to the user. Universally absent were on-line help-screens to clarify the meaning or effect of required entries.

I got lost repeatedly. I had to start over from the beginning after "damaging" configurations by pressing keys out of sequence. It seems to me unacceptable for a confused operator to be able to do so much damage from the keyboard by accident. The configuration software should be more sophisticated, requiring less sophistication on the part of the operator.

Once each system got going I really enjoyed the added speed and storage space. I was able to get my word processor (Pie Writer) working on each system. Word processing is not speed dependent. Unless, as in some word-processors, the file can grow much larger than the computer's memory. Keystroke time and printer speed are the limiting factors. But loading files to edit, storing *lots* of files on one drive instead of multiple floppies, and making frequent saves was speeded up significantly. I have several small databases I use under DOS 3.3. They all worked without a hitch as long as the system implemented drives 1 and 2 and would allow the volume to be specified.

DOS Volumes and Drives

In implementing DOS 3.3, the manufacturers seemed to have some difference of opinion about how to implement

Apple's drive/volume scheme. Corvus pointed the way by leaving the drives as 1 and 2 but simply implementing the volume (0 to 254 allowed per drive) concept. Some other manufacturers implemented a multiple drive scheme and ignored the volumes. This is a minor disaster, since very many software applications do limit-testing to avoid any but drives 1 and 2. On the other side of the coin, some software completely ignores the volume specification and limits the user to two drives. Most limiting of all is "Slot 6, Drive 1 and Slot 6, Drive 2, nowhere else". (*Each manufacturer, of course, is convinced that his answer is the only real solution and should be the standard.—PCW.*) It just points out that application software which is not flexible enough properly to implement the facilities of the operating system will sooner or later cause trouble for the user as new hardware appears.

The Environmental "Footprint"

There are very real environmental concerns about noise. The amount of trouble is a factor of the actual noise of the fan and how close the device must be to the operator due to the short length of cables. I think the cable should allow the hard disk box to sit on the floor beneath the desk. When I could do this the noise level was reduced to very acceptable levels. When I couldn't do this I felt added fatigue and strain after a long session. It was noticeable.

For those of you who use, as I do, a hands-off phone device, the noise in some cases prevented operation because it kept my side of the line constantly transmitting. When I asked several manufacturers about cable length, I got answers that ranged from "that's just the length we picked" to "we're trying to reduce Radio Frequency energy around the device". A long cable *can* act as a transmitter.

Backup seems to be the unsolved riddle. When your application program has created a very large file, larger than will fit on a standard floppy diskette, there must be a way to move that data, in segments, to more than one floppy. The only drive which did this effectively was the Mountain Computer system. Everyone else allows increased size volumes but has left it up to the applications software, or the ingenuity of the operator, to achieve a satisfactory backup. This can be a tooth-grinder.

Evaluation Considerations

Rather than go into the technical drive information of each drive I picked several benchmark tests. Under DOS 3.3 I used the following Applesoft program.

```
10 D$=CHR$(4): REM DOS FLAG
15 A$="ABCDEFGHIUJKLMNOPQRSTUVWXYZ0123456789"
20 PRINT D$"OPEN TEST"
30 PRINT CHR$(7):REM BEEP TO SIGNAL BEGINNING OF TEST
40 PRINT D$"WRITE TEST"
50 FOR I=1 TO 256
60 PRINT A$:REM WRITE ALPHABET AND DIGITS TO DISK
70 NEXT:PRINT D$:PRINT CHR$(7):REM BEEP TO SIGNAL
                                END OF TEST
```

The test simply beeps, and then writes the characters "ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789" to the disk 256 times and then beeps again. I ran each test five times and averaged the times to compensate for my reaction time. Not rigorous in scientific terms but enough to establish performance comparisons. I tested the read operation in a similar fashion:

```
10 D$=CHR$(4): REM DOS FLAG
15 A$=""
20 PRINT D$"OPEN TEST"
30 PRINT CHR$(7):REM BEEP TO SIGNAL BEGINNING OF TEST
40 PRINT D$"READ TEST"
50 FOR I=1 TO 256
60 INPUT A$:REM READ ALPHABET AND DIGITS FROM DISK
70 NEXT:PRINT D$:PRINT CHR$(7):REM BEEP TO SIGNAL
                                END OF TEST
```

To offset the disadvantages of Applesoft, a comparatively slow language, I also ran the following Assembly-language version of the same algorithm.

```
10 D$=CHR$(4): REM DOS FLAG
20 PRINT D$"OPEN TEST"
30 PRINT CHR$(7):REM BEEP TO SIGNAL BEGINNING OF TEST
40 PRINT D$"WRITE TEST"
50 CALL 768+37: REM GO TO ASSEMBLER ROUTINE FOR OUTPUT
70 PRINT D$:PRINT CHR$(7):REM BEEP TO SIGNAL END OF TEST


   ORG $300
TABLE    ASC "ABCDEFGHIJKLMNOPQRSTUVWZYZ0123456789"
         HEX 00
SETUP    LDX #0
LOOP     LDA TABLE,X
         BEQ ICTR
         JSR FDED ;PRINT THE CHARACTER TO DISK
         INX
         BNE LOOP
ICTR     INC COUNTER
         BNE SETUP
         RTS ; PRINT THE CHARACTERS IN TABLE 0-FF TIMES
COUNTER  HEX 00
```

To say all this in English: I write all the letters of the alphabet plus all the digits and one carriage return to the disk 256 times. This becomes the DOS 3.3 benchmark.

CP/M is easier. I used the PIP utility to move MBASIC.COM (the BASIC language supplied with Microsoft's Z-80 card) to a file named TEST. PIP is a fast copy utility and it happens that it showed more interesting results than does the DOS test. CP/M has implemented a faster read/write algorithm for dealing with the disk.

Pascal . . . I might as well 'fess up. I'm not the world's greatest Pascal fan. As you may remember from a previous review, when I do use Pascal I look for implementations under CP/M. So, while I have made sure that everyone who says Apple's Pascal is implemented can get up and running, I confined my benchmark tests to DOS 3.3 and CP/M. If this flaws the review, so be it.

One other thing. I don't hold much store with benchmarks. I did the tests and included the data so that Peter Weiglin would be happy for the "hard-data" enthusiasts. (*Thank you, sir.—PCW.*)

The Systems

Vista V1200 - 6 megabyte Cartridges

This system is a marvel, although not strictly a hard disk. It is not necessarily the best system for general use but it offers fast access to 1.2 million bytes (megabytes) increments of storage and up to 6 megabytes within a few seconds. This drive uses a cartridge of five specially constructed 5 ¼-inch diskettes, each

of which can hold up to 1.2 megabytes of data or program. Remember, the Apple 5 ¼-inch drive can hold 143360 bytes (143K). These Vista diskettes perform the same as double-density double-sided 8-inch drives.

I have to admit that I began testing this machine, an implementation of the Amlyn drive mechanism, with a kind of giddy sense of playing with something that started life as a Rube Goldberg drawing. The idea is to have a mechanism which feeds diskettes to the drive. The mechanism grabs the diskette and changes the attitude of the cartridge for a smooth feed-in and pull-out. That's a lot of physical motion. It's out in the open, available for the wear of dust and the vagaries of diskette material. It wheezes and groans and, finally, works. Disk access time on any one of the five disks appeared to equal that of any of the Winchester drives. It is done, not with mirrors, but with DMA (direct memory access), which turns off the Apple's CPU, jams the data into the destination memory locations and then turns the CPU back on.

The implementations of DOS, Pascal and CP/M are separate. They don't exactly co-reside. You just change cartridges. Cartridges cost about 70 dollars when I started this project.

The problem with the V1200 is that it fails one of the prime goals of adding a mass storage device. It is fast on any one diskette, but achingly slow in copying from one diskette to another. The physical motion of loading and unloading each diskette adds much time to any backup and/or disk-to-disk data manipulation process.

To me this is a delightful solution for writers or small applications which need no more than 1.2 megabytes of storage for any one application. Program developers and consultants might find it very useful to simply dedicate a cartridge to a client and one for backup. It solves many of the backup problems. Just don't think about using it if you need high speed transfers from disk-to-disk. That won't work.

I had trouble with disks jamming at first. They sent a second test version and the problem simply didn't re-occur. I can't predict from this if the problem was circumstantial or design-based.

One useful DOS 3.3 utility is Quickcharge. It speeds up normal floppy disk access by quite a bit. It makes copying one floppy to the V1200 much faster.

Mountain Computer's 5 Megabyte Dynamic Disk System (DDS)

This was the most elegant total package. The hardware is neatly packaged in one of the smallest containers. Its noise level was the least offensive. Its cables fit easily through the openings in the //e's back panel. It has one on-off switch and one busy-lamp. It worked the first time I turned it on, no arguments. It comes with a six month warranty. It is, however, slow.

No other disk manufacturer in this review has done as good a job in organizing the available storage space. Similar in concept to DOS 3.3's dynamic file allocation, hardware disk space is used only as data is actually written, rather than reserved in advance. According to Mountain, this feature "can mean up to 50% more disk space available than on competetive systems." We shall see.

Outstanding Features

1. Volume Maintenance Utility - VUTIL

The DDS programming was done by Pete Rowe and he wrote the most frequently-used utility, 'VUTIL', in each of the three operating systems. The commands and display in each operating system are identical. Your working habits are identical in each environment. You can transfer from any operating system to any other operating system from VUTIL.

2. Storage Allocation

There is one managing program which handles the dynamic allocation of the disk space. In each environment you assign space to named logical blocks, called volumes. You attach or release the volumes as your processing needs require. Space is actually allocated to the named volume as it is used. Thus a re-allocation at a later time allows all unused disk space to be returned to the general pool and assigned to another named volume under any of the operating systems. This is unique among the drives reviewed.

3. Backup

Accessible only from the DOS 3.3 maintenance volume, the backup and restore features allow information from any named volume in any operating system to be copied to floppy diskette. The utility takes care of segmenting all information (files larger than a single floppy) out to the floppy and reconstructing the data should it ever be required. The only negative thing I found about the somewhat lengthy process is that it doesn't tell you how many floppies you need to prepare. If you run out you have to start the whole process all over again.

4. "Attaching" Volumes

A volume from a different operating system may be attached or booted from any operating system. For instance, while operating under CP/M you might attach a Pascal volume because you want to access a file containing a table of data created under Pascal. This is not a process for beginners. The program running under CP/M trying to access the data must know the Pascal directory and how to acquire the data, but at least each operating system can "know" that the other exists and the system provides a potential data path for programmers to explore.

The documentation was (sigh) preliminary. It was word-processed with parts printed with impact printer and parts printed by dot-matrix. It was always legible and readable, which, unfortunately is not always to say comprehensible. In some cases I read sentences over and over, understanding all the words but still not sure what to do next. It did not, however, keep me from making a successful installation the first time.

The installation texts are very good, especially in that they included drawings which accurately reflect the appearance of the interface card and its cable. The drawing shows the cable leaving the Apple II backplate and I was working with the //e. Still, there were no stumbles.

Initialization

Initialization consists of specifying the slot and providing a disk name (which doesn't appear to have a functional purpose). The document accepts too quickly that concepts of volume name, attachment, etc. have been mastered by the reader.

After initializing the disk surface (formatting), you must assign a maximum number of sectors or blocks to each operating system you want to use. This is no different from any other disk system. Once the operating environments are established, you then create named volumes, assigning space to each volume, and attach the volumes you wish to work with. A maximum of eight volumes may be attached at any one time. Volumes may be write-protected.

Speed

Under CP/M I loaded programs approximately 20% faster than from floppy diskettes. This is not a terriffic speed gain. Using PIP I copied MBASIC.COM from drive A: (the CP/M boot drive) to drive C: which is the volume I configured for 2048 kilbytes. It took 26.5 seconds to transfer the 24K program. That is slow. I then transferred C:MBASIC.COM to C:TEST.COM. The results improved to 21.9 seconds; still not good. I then copied the version of PIP over to my floppy (standard Apple drives) and copied MBASIC.COM to TEST.COM on the floppy. The longest time I could get was 13.83 seconds. I don't know why the same utility would take longer on the hard disk than on the floppy disk but it did. Not good.

Another quirk of the Mountain system which seems more than just pesky to me is that you lose the use of floppy drive A: but retain use of floppy drive B:. I called to find out if this is what they meant and they said yes. Since none of the other CP/M systems found this necessary I think it is poor design.

Overall the Mountain Computer system compared very favorably. The flexibility of the system and the utilities which come with make me lean towards it. It is too slow, however when compared to every other system. This is, for now, the apparent cost for that flexibility. If the speed problem was taken care of, it would be the premier system reviewed.

Santa Clara Systems

The Santa Clara System is not my pick. They sent disks for three operating systems but the documentation only covered DOS 3.3. It is not easy to use and the documentation was very limited, difficult for any but the very hardy.

The worst aspect of the Santa Clara implementation is under DOS 3.3. Instead of implementing the standard DOS volume concept, the Santa Clara implements multiple drives, greater than 2. Thus to catalog the 23rd partition you type:

```
CATALOG,D23
```

I believe this is a losing proposition as all the good software I have makes limit checks to see that no drive higher than 2 is accepted. It means that many application programs will need to be rewritten or adapted, *if* there is no copy protection scheme standing between you and making the adaptation. This is an expensive proposition. There were no outstanding features or utilities which offset this disadvantage.

Utilities

INSTALL - Formats the "LUN" (which stands for logical unit) into 34 drives per 5 meg section.

MC - A cataloging utility which was fine for visual scanning but with no published "hooks" for programmers to make use of it.

COPYA - Adapted to allow higher drive numbers. Sets tracks 0-2 busy as though Apple's DOS was needed on every drive (losing 12288 characters of storage per drive, approximately 1/10 of a 5-meg drive)

Speed

Speed under DOS 3.3 was neither unusually bad nor good compared to the other drives. It was a very marked improvement over floppy disk drives.

Xiten's Gallium Disk - 10 Megabyte

This was the worst of the lot. The 19-page documentation was skimpy and poorly written. It had only DOS 3.3 and an implementation quirk which apparently made it impossible to access even-numbered volumes.

The procedures to format the drive and initialize the volumes worked as described. Either normal or triple-sized DOS volumes are allowed. My first attempt to work with multiple volumes failed and after a number of hours I gave up. One of the strictures of working on this review was that everything had to be accomplished from the documentation provided. Thus, the shortness of the review of this drive. Until they make a marked improvement I don't recommend it for beginners or for programmers.

Speed

When running the speed test on this drive the speed was, as with Santa Clara drive, neither exceptionally good, nor bad. It is very likely that these folks have made software improvements by this time, the market being what it is. I really am going to have to reserve final judgment on the system.

Two to Go!

The last two drives I had trouble with and yet liked a lot. In both cases the companies were making the transition to the three-operating system versions, and I had to get a second drive in each case. That's one hardware and one software problem per system.

Both of the manufacturers have produced usable, well-priced systems, and are stressing some utilities and general purpose usefulness. They are similarly priced (The Xebec kit is less expensive but I worked with the assembled UPS 9705 which is the same price as the Corona Starfire).

Xebec UPS-9705 (5 Megabyte - Prebuilt)

I favor a high price-performance ratio more than ease of installation. I am also a programmer and am willing to struggle a bit more than the non-programming user. That inclines me toward the Xebec. It will probably be the kit because I want to keep the cost down. But the speed performance and the availability of information made the most impression on me. This is all arguable, but it is the subjective impression with which I came away from this project, for whatever that's worth.

This system had a cable able to reach the floor, was relatively quiet and well-behaved. It was fast under DOS and CP/M. It was *not* the easiest installation. The documentation was so preliminary that it was made on an office copier. It was not particularly easy to read.

But the documentation provided a "partition worksheet" which enabled me to make decisions, remember why I made those decisions and repeat the actions later, if necessary.

The Xebec S1410 Disk controller (the card inside their box, not the one inside the Apple) can control up to two drives with interfaces compatible with the ST-506 disk drive from Seagate Technology. I have come to learn that this means a large number of 5 ¼-inch Winchester disk drives. It uses the Shugart Associates System Interface (SASI bus) which apparently makes it more "outward compatible" than others. That is, if a better, cheaper drive were to come along and I got hold of it, I would be able, with knowledgeable effort, to adapt the controller.

Some execellent documentations, of no possible interest to business users but of some real interest to intense hobbyists comes with the device. Disk storage information is an open book. Xebec has not decided yet whether to publish implementation software locations because they do not intend to provide

CP/M → SOS TEXTmover

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a software consulting section. As mentioned before, I favor publication of information helpful to software developers as a spur to the development of additional support software.

Utilities

DISK FIGURE - An Applesoft program to determine disk allocation values.

HELLO - A boot menu to select DOS, CP/M or Pascal.

HELLO PASCAL - The program to enter the Pascal environment.

HELLO CP/M - The program to enter the CP/M environment.

FUTIL - A FID look-alike for DOS 3.3 file transfers.

APPLEDIAG - A disk-drive diagnostic.

Xebec hasn't achieved the elegance of Mountain Computer or the Corona but the price-performance, noise-level, speed seem to meet my needs the best.

One last comment. Just a few days ago I got word that Xebec will release within weeks a 10-meg system at "well below $2000". I'm not sure how that is going to affect the price of the UPS9705 but I suspect that the price-performance ratio may get a boost from the release.

Corona Starfire

The Corona Starfire, a nice name, has been around for a while and has been favorably reviewed. They probably won't mind that it wasn't my favorite system, because I'm not representative of the large market. Their documentation, Release B, was head and shoulders above the rest of the field. Word-processed but very nicely word-processed with good illustrations.

I had trouble with the installation. The cable requires special grounding both inside the hard-disk chassis and on the controller card. I don't think novice users should have to open the chassis to make an installation.

The original documentation got me pretty lost, and halfway through the project they requested we wait for the final version. O.K. I waited. It was a marked improvement.

After successfully mounting DOS 3.3 and CP/M I went ahead with the PASCAL and trashed the other two operating systems. Since I didn't hit it with a hammer it must have been something I did from the keyboard. I got no warning messages to tell me I was out of range and havn't yet figured out what happened. That shouldn't be possible.

Utilities

The system utilities seem comprehensive. These folks have been around for a while and have a lot of satisfied customers, so my trouble may not be typical. I just call 'em as I see 'em (or in this case experience them)

DOS 3.3 Plus
HELLO
BACKUP - Copies a file or makes a mirror-image of a source volume. Volumes must be the same size.
COPYC
CONFIGURE
VMS - Volume Management System
FMS - File Management System (FID look-alike)
  CATALOG
  COPY FILES
  VERIFY FILES
  LOCK FILES
  UNLOCK FILES
  DELETE FILES
  UNDELETE FILES (nice to have)
  STATUS REPORT
  INITIALIZE DISK

CP/M

The latest release installs a new BIOS (Basic Input Output System) which may lead to incompatibility with some previous software. The document publishes all the right addresses so the software manufacturers can adapt. What a pain, though.

CP/M Utilities

VMGR - Volume Manager - Adds, removes and lists volumes to and from the Starfire. Also allows mounting and write-protecting of volumes.

CINSTALL - Installs Microsoft's CP/M onto the drive.

CFORMAT - Formats starfire volumes.

FORMAT - Standard CP/M format.

BACKUP - Does a backup of a full volume. If additional diskettes are required you are prompted. If you get a BDOS error on one floppy and need to start over you can enter the floppy to start with and not need to repeat the ones that were already successful. This is an improvement over the Mountain Computer implementation.

RESTORE - Reverses the BACKUP procedure.

FAILSAFE - Allows you to enable/disable from write-verifying immediately following a write.

COPY - Copies from one Starfire volume to another. Will not copy from floppies.

The CP/M backup facility does a great deal to recommend the Corona Starfire system in a business environment. Data grows over time and a stable method to achieve a full volume backup can be money in the bank.

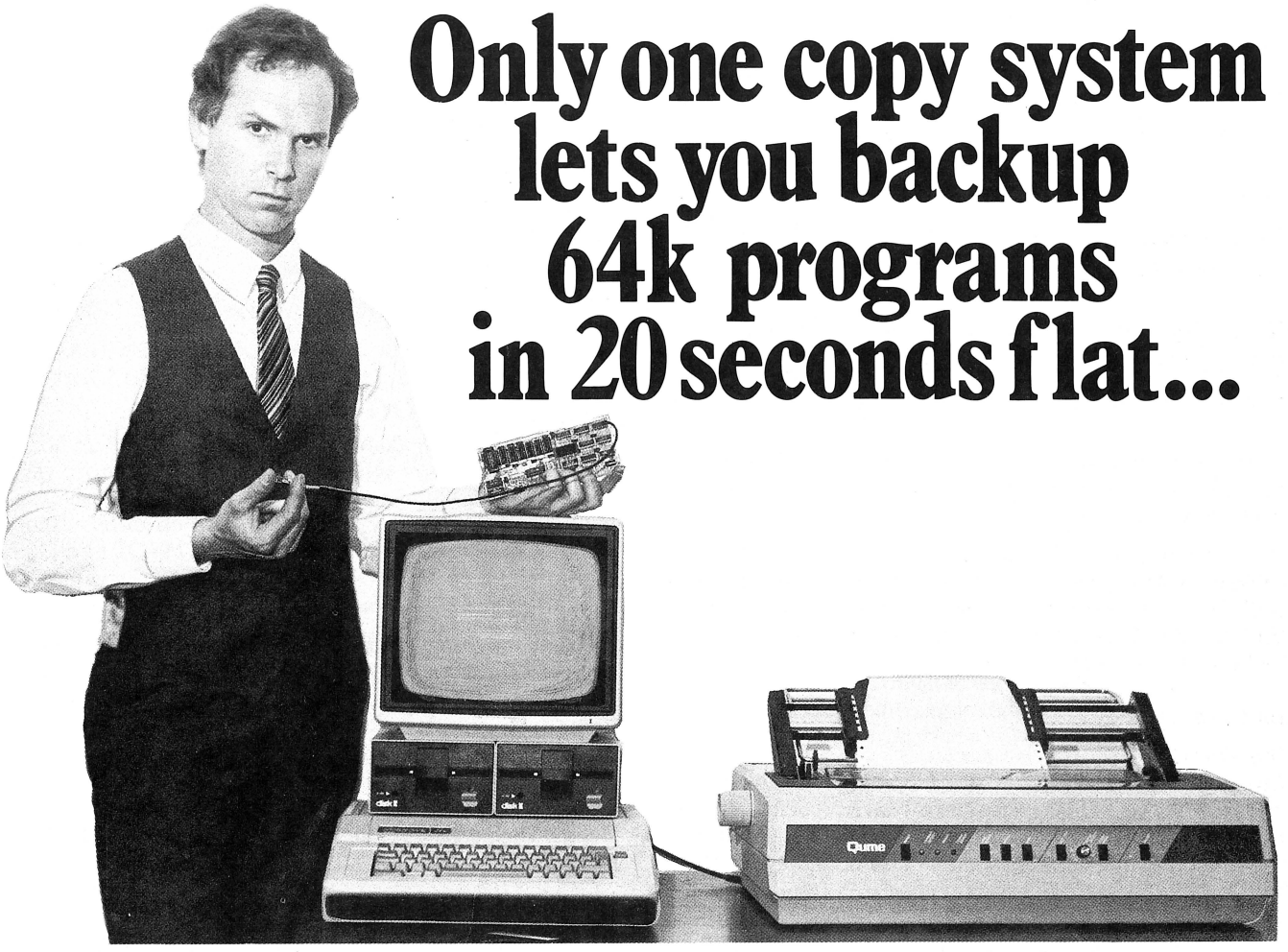
Disk Management Utilities

The Disk management utility makes this drive a rival with Mountain Computer for the most elegant solution. The fact that I had trouble with the Corona (as with others) can't hide the fact that it has weathered some changes and now has a sophisticated system of creating partitions, mounting volumes, altering partition allocations etc. It is shipped from the factory already configured. Since they can't guess right about every user's needs or intentions they make it possible for you to change your/their mind. If you need to you can re-initialize from scratch, or may simply elect to adjust the present allocations.

More?

That's a look at six hard disks, along with some background for the potential hard disk buyer on just what he/she is getting into. We haven't yet covered some other models; six at a time is enough. We would like to hear from you about your problems and successes with Apples and hard disks. What worked for you? What didn't? How did you snatch victory from the drive door of defeat? Let us know.

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ABSTAT

v 2.2

Review by Woody Liswood

Published by:
Anderson - Bell Company
5336 S. Crocker St.
Littleton, CO 80120
(303) 794-7509

System: CP/M

ABSTAT is a statistical program. I haven't yet figured out what the AB stands for although I would place a bet that it comes from the Anderson - Bell company name.

There are many statistical programs available for DOS, but few for CP/M. Although ABSTAT doesn't have all of the features as "Statistics with DAISY" in the Apple DOS world, it does have an impressive amount.

Documentation

ABSTAT comes with a 91 page "perfect bound" manual. It is easy to read, and, in my opinion, rather well laid out. The installation program explanation is mentioned early in the manual, but the pages are in the back of the manual. That's where they should be. Each of the potential ABSTAT commands has a page or more each. That makes for an effective use of white space so the manual does not look cluttered and overwhelming.

Each of the commands is illustrated with a sample set of responses as the program would query you from the screen, which is an effective method of getting the point across. I wish more folks would take the time to show those sample screens in their documentation.

ABSTAT has the ability to process data using a command file (which we'll explain later). There is a demo file on the disk as well as a demo command file. I would think that the first thing you might want to do is run that command file and let ABSTAT take you through a set of commands and screen displays. I will use some of the reports and information created by the demo to illustrate some of the statistical routines later in the review.

Error Trapping

As I spend a good deal of time in DOS as well as CP/M, I can tell you that CP/M has horrible error trapping problems. Most programs, when there is an error, seem to drop you back to the CP/M operating system. ABSTAT doesn't do that. I was not able to cause the program to bomb even doing the dumbest things. Their error trapping is as good as any I have used in the DOS environment.

Installation

The installation of ABSTAT is rather routine. They make few assumptions about your terminals. If you have some extra large storage capacity disk drives then you really do not need to do the installation. The program will assume that all is on the A: drive. If you must, you can have program as well as data files on the B: drive if you are using standard Apple or Osborne disks. The only thing to watch for is that you must always use UPPER CASE when in the ABSTAT program.

Initial Menu

ABSTAT boots to a main menu with five areas mentioned. In addition, the boot process tells you how much available memory you have and how many values you might be able to store. For example, my boot screen looks like this (after the logo):

```
MEMORY AVAILABLE IS 59398. WITH ROOM FOR 4529 VALUES
```

you may type "?" for HELP at any time.

Commands have been broken into groups:

DATA	-	Data manipulation
STAT	-	Statistical analysys
GRAPH	-	Graphic functions
REPORT	-	Report writing
MISC	-	QUIT, HELP, COMM, DIR

Type "? groupname" for a listing and short description of available commands.

Which Command?

I have left the spelling error in on purpose. They may have corrected it by the time you get your version.

Review © 1983

Actually, you do not have to use any of the "groupnames" to use the program. If you know what you want to do, you can just give a direct command at any time you see the WHICH COMMAND prompt.

To use the help function you type ? XXXX to get a screen display about the command. If you type a "?" without a xxxx name, you are returned to the main menu.

MISC

The MISC group is somewhat obvious.

QUIT gets you back to CP/M.
HELP tells you how to use the HELP command

COMM, however, needs an explanation. ABSTAT has the ability to run from a command file. This would be similar to an EXEC file in BASIC. It does not, however, create those files; you would need to do that with your word processor. Then you would type COMM XXXX or whatever name you gave your file, and if they were all valid ABSTAT commands in the proper order your system would run by itself.

As the manual points out, this feature is good for running reports which you would normally create on a periodic basis, with only the data changed. Using a command file, you would bring your data into ABSTAT, then run your command file. It would turn on your printer and perform all of the analysis which you might need, all while you were drinking coffee with your friends.

```
PRINT *
DESC2 *
BARGR 1
AUTO/3
CORR
FREQ 2
REGR
3
1-2
PLOT
1
2
XTAB RC
1
2
ANOV1 *
ANOV2 *
PAIRT
CHIFIT
1
2
CONTIG 1-3
```

That was the command file which came with ABSTAT, called DEMO.CMD on the disk. Each of the lines is a valid ABSTAT command or a valid response to a normal ABSTAT query. That is all there is to it.

DIR is the same as the CP/M directory command.

Data

The data group is as good a place to start as any. Here is the set of DATA commands:

```
CREATE Create a new data file
FETCH  Read in an existing data file
EDIT   Edit an existing data file
SAVE   Save memory data set on disk file
TRAN   Transform current data set
PULL   Add variables from another file
BUILD  Transform a variable from another file
APPEND Append data from another file
PRINT  Print data set
RAND   Random number generator
SORT   Sort data set
READ   Read ASCII data file
WRITE  Write ASCII data file
DBREADRead dBase .dbf file
DWRITE Write dBase .dbf file
```

As you can see, there are many things you can do with your data. The first thing you must do when you get ready to work with any data set is to run the CREATE command. This defines the maximum number of variables which you can use for that file. You do not have to use all of your variables all of the time, but if you say you only will need 10 variables, then later decide that you will need 15, you are stuck.

EDIT does what it says it should do. It's probably the weakest part of the program, although it does work smoothly once you get used to ABSTAT's way of doing things. Within the EDIT function, you can add or change variable names; enter or change the values of variables within a single case; enter or change values within a single variable; or delete entire variables or cases.

Perhaps this is a good time to explain *case* and *variable*. A *variable* is one column of data. For example, I use ABSTAT to check the internal relationships during a job evaluation project. In one project, we used three major elements: Job Knowledge, Problem Solving, and Accountability. Each of those would be considered a variable. Then we analyzed around 399 jobs. Each of the jobs evaluated received a point score for each of the variables. Each job with its corresponding points for each variable would be considered a *case*.

My problem with the EDIT routine is that it adds data in front of things, allows you to go up a case, down a case and other such things. I am so used to the "CALC" programs and their ease of entry that I dislike going back to an old fashioned line-editor type of approach. I will say, however, that ABSTAT does work rather well and that you can transfer your data to it from a multitude of sources, so that my criticism of the editor should not be taken as a problem but rather as a philosophical point about modern techniques as compared to what was acceptable last year.

FETCH is a command you use after you have already created and saved a data file during another work session.

PRINT will list your data set to your printer. It's always a good idea to do this, and to make a quick visual inspection of the data. You would be amazed at how many little typos can find their way into statistical data. Figure 1 is a sample set of ten cases out of the 399 which I actually used to generate the sample statistics for this review.

One of the best features of ABSTAT is its ability to read and write ASCII files as well as dBase files. This means that you do not have to rekey data which you have in other programs when you want to perform statistical analysis on them.

I normally use Selector as my data base of choice in the CP/M world. Selector has the ability to create standard ASCII files. I had Selector create an "ASCII comma delimited" file from the job evaluation project data. Those same 10 items actually looked like Figure 2 before they were transferred into ABSTAT.

Then, I instructed ABSTAT to read only selected columns of that file to create the set of variables which I wanted to analyze. This way I did not need to edit or re-key any of the data.

The entire data entry, manipulation, transformation, and file building sections of ABSTAT work very well. They appear to be well thought out and I could not make them bomb or do the unexpected. That is what you need in a good statistical program.

Stat

There is a number of statistical commands available in ABSTAT. Here is how the help menu shows STAT commands;

ANOV1	One way analysis of variance
ANOVA2	Two way analysis of variance
CHIFIT	Chi Square goodness of fit
CONTIG	Chi Square 2 way Contingency table
CORR	Correlation coefficients (r) matrix
DESC	Means, standard deviation, modes, etc
FREQ	Lists values, frequencies, %, and Z scores
MANN	Mann-Whitney U test
MDIFF	Variable pair mean test
MEANT	Population mean test
PAIRT	t Test for paired observations
PROB	CHI, TTEST, FTEST, POIS, BIN probability commands
REGR	Simple and multiple linear regressions
SRANK	Spearman rank correlation matrix
Xtab	Cross Tabulation
ZSCOR	Lists values, frequencies, %, and Z scores

We will not attempt to explain here what all those mean; that's a couple of three-credit courses. If you're reading the review, I'll assume that you know enough about statistics to understand if those things are worth while for your needs.

One feature of ABSTAT is an ability to print your reports to disk rather than to a printer. That way you could move the reports around and place them in a final report using your word processor. I did not actually key in all of the samples for this review. I ran ABSTAT and created the disk file. Then I wrote the report with WordStar and used the Control-K R command to insert the files as appropriate. (*He did too, and it drove the typesetter crazy!—PCW*)

Rather than just talk about the commands and what they do, I thought that you might like to see samples of the actual output. That way you can tell if the program really will provide you with the data that you need. I know when I'm looking for this type of program, I always want to see sample output before making a purchase decision. See Figure 3.

ABSTAT really worked well on the Rank Order correlation (SRANK). I did this same exact matrix using Statistics with DAISY. DAISY took over 45 minutes to sort each row before it actually processed the data. ABSTAT was done with the entire affair (COMMAND SRANK) in just under 5 minutes.

```
ABSTAT 2.22
FILE: B:TEST      REV# 4                                          PAGE  1

COMMAND: PRINT DATA

    VARIABLES:
CASE          1 K          2 P          3 R          4 PT         5 GD
   1      13.0000      2.00000      4.00000      80.0000      3.00000
   2      13.0000      2.00000      4.00000      80.0000      3.00000
   3      14.0000      2.00000      5.00000      93.0000      4.00000
   4      14.0000      2.00000      5.00000      93.0000      4.00000
   5      14.0000      2.00000      5.00000      93.0000      4.00000
   6      14.0000      2.00000      5.00000      93.0000      4.00000
   7      14.0000      2.00000      5.00000      93.0000      4.00000
   8      14.0000      2.00000      5.00000      93.0000      4.00000
   9      15.0000      2.00000      5.00000      104.000      4.00000
  10      15.0000      2.00000      6.00000      107.000      5.00000
```

Figure 1

```
0,800,0,5902,CLERK JR,AA1M,13,57,A1HB,2,7,B11L,4,16,,0,0,80,3,A
0,452,0,6273,REPRO EQUIPMENT OPR TR,AA1M,13,57,A1HB,2,7,B11M,4,16,,0,0,80,3,B
0,114,0,5002,"CLERK, ACCNT JR",BA1L,14,66,B1LB,2,8,B11M,5,19,,0,0,93,4,B
0,431,0,5106,MAIL CLERK,BA1L,14,66,B1LB,2,8,B11M,5,19,,0,0,93,4,B
0,454,0,5303,LIBRARY ATTENDANT,BA1L,14,66,B1LB,2,8,B11M,5,19,,0,0,93,4,B
0,800,0,5710,RECEPTIONIST,BA1L,14,66,B1LB,2,8,B11M,5,19,,0,0,93,4,B
0,800,0,5809,CLERK TYPIST,BA1L,14,66,B1LB,2,8,B11M,5,19,,0,0,93,4,B
0,330,0,5900,PERSONNEL CLERK JR,BA1L,14,66,B1LB,2,8,B11M,5,19,,0,0,93,4,B
0,431,0,5701,SWITCHBOARD OPERATOR,BA1M,15,76,B1LB,2,9,B11M,5,19,,0,0,104,4,C
0,800,0,5610,STOCK CLERK,BA1M,15,76,A1HB,2,9,B11M,6,22,,0,0,107,5,C
```

Figure 2

(begin Fig. 3)

```
COMMAND: DESC

THERE ARE  5 VARIABLES AND  399 CASES

                                                          STD ERROR    COEFF OF
VARIABLE          MEAN      STD.DEV.      VARIANCE        OF MEAN     VARIATION
 1 K           21.0677       3.38083       11.4300       0.169253       16.0475
 2 P            8.44862      2.55329        6.51927      0.127824       30.2213
 3 R           15.0276       5.14772       26.4990       0.257708       34.2552
 4 PT         375.401       285.989       81789.7       14.3174         76.1823
 5 GD          13.6742       4.00049       16.0039       0.200275       29.2558

VARIABLE          MEDIAN        MODE        MINIMUM        MAXIMUM        RANGE
 1 K           21.0000       19.0000       13.0000       33.0000       20.0000
 2 P            9.00000       9.00000       2.00000      14.0000       12.0000
 3 R           14.0000       14.0000       4.00000      32.0000       28.0000
 4 PT         299.000       299.000       80.0000      2327.00       2247.00
 5 GD          14.0000       14.0000       3.00000      26.0000       23.0000

VARIABLE       SKEWNESS      KURTOSIS
 1 K           0.520504      3.54181
 2 P           -0.511623     2.99600
 3 R           0.601446      3.42952
 4 PT           2.97647      15.8165
 5 GD          -0.163328     3.38760

COMMAND: CORR

                    ### CORRELATION MATRIX ###

VARIABLES:
 1 K           1.000000
 2 P           0.935741      1.00000
 3 R           0.966303      0.921600      1.00000
 4 PT          0.900332      0.763782      0.896688      1.00000
 5 GD          0.975630      0.970223      0.962953      0.837660      1.00000
                     1 K           2 P           3 R           4 PT          5 GD
```

(Fig. 3 cont.)

COMMAND: FREQ

VARIABLE: 2 P

VALUE	FREQ	CUM FREQ	%	CUM %	Z SCORE
2.00000	11	11	2.8	2.8	-2.52562
3.00000	12	23	3.0	5.8	-2.13397
4.00000	9	32	2.3	8.0	-1.74231
5.00000	14	46	3.5	11.5	-1.35066
6.00000	46	92	11.5	23.1	-0.959009
7.00000	29	121	7.3	30.3	-0.567356
8.00000	54	175	13.5	43.9	-0.175704
9.00000	80	255	20.1	63.9	0.215948
10.0000	71	326	17.8	81.7	0.607600
11.0000	25	351	6.3	88.0	0.999253
12.0000	35	386	8.8	96.7	1.39090
13.0000	11	397	2.8	99.5	1.78256
14.0000	2	399	0.5	100.0	2.17421
TOTAL	399	399	100.0	100.0	

COMMAND: REGR

$$$ MULTIPLE LINEAR REGRESSION $$$

DEPENDENT VARIABLE: 3 R 399 SAMPLES

COEFF OF DETERMINATION: 0.9362 ESTIMATED CONSTANT TERM: -14.1543
MULTIPLE CORR COEFF: 0.9676 STANDARD ERROR OF ESTIMATE: 1.3039

ANALYSIS OF VARIANCE FOR THE REGRESSION:

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST
REGRESSION	2	9873.38	4936.69	2903.86
RESIDUALS	396	673.219	1.70005	
TOTAL	398	10546.6		

VARIABLE	REGRESSION COEFFICIENT	STANDARDIZED COEFFICIENT	CORRELATION WITH DEPENDENT
1 K	1.27212	0.835480	0.966303
2 P	0.281863	0.139805	0.921600

COMMAND: XTAB

$$$ CROSS TABULATION $$$

2 P 1 K : DISCRETE

DISCRETE	13.0000	14.0000	15.0000	16.0000	17.0000	18.0000	19.0000	20.0000	21.0000	OTHER	TOTAL
2.0000	2	6	2	1	0	0	0	0	0	0	11
% TOT	0.5%	1.5%	0.5%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%
% ROW	18.2%	54.5%	18.2%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
% COL	100.0%	100.0%	25.0%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
3.0000	0	0	6	6	0	0	0	0	0	0	12
% TOT	0.0%	0.0%	1.5%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%
% ROW	0.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
% COL	0.0%	0.0%	75.0%	54.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
4.0000	0	0	0	3	6	0	0	0	0	0	9
% TOT	0.0%	0.0%	0.0%	0.8%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%
% ROW	0.0%	0.0%	0.0%	33.3%	66.7%	0.0%	0.0%	0.0%	0.0%	0.0%	
% COL	0.0%	0.0%	0.0%	27.3%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
5.0000	0	0	0	1	8	5	0	0	0	0	14
% TOT	0.0%	0.0%	0.0%	0.3%	2.0%	1.3%	0.0%	0.0%	0.0%	0.0%	3.5%
% ROW	0.0%	0.0%	0.0%	7.1%	57.1%	35.7%	0.0%	0.0%	0.0%	0.0%	
% COL	0.0%	0.0%	0.0%	9.1%	44.4%	17.2%	0.0%	0.0%	0.0%	0.0%	
6.0000	0	0	0	0	4	13	26	3	0	0	46
% TOT	0.0%	0.0%	0.0%	0.0%	1.0%	3.3%	6.5%	0.8%	0.0%	0.0%	11.5%
% ROW	0.0%	0.0%	0.0%	0.0%	8.7%	28.3%	56.5%	6.5%	0.0%	0.0%	
% COL	0.0%	0.0%	0.0%	0.0%	22.2%	44.8%	38.2%	5.6%	0.0%	0.0%	
7.0000	0	0	0	0	0	10	9	10	0	0	29
% TOT	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.3%	2.5%	0.0%	0.0%	7.3%
% ROW	0.0%	0.0%	0.0%	0.0%	0.0%	34.5%	31.0%	34.5%	0.0%	0.0%	
% COL	0.0%	0.0%	0.0%	0.0%	0.0%	34.5%	13.2%	18.5%	0.0%	0.0%	
8.0000	0	0	0	0	0	1	31	22	0	0	54
% TOT	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	7.8%	5.5%	0.0%	0.0%	13.5%
% ROW	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	57.4%	40.7%	0.0%	0.0%	
% COL	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%	45.6%	40.7%	0.0%	0.0%	
9.0000	0	0	0	0	0	0	2	19	45	14	80
% TOT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	4.8%	11.3%	3.5%	20.1%
% ROW	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	23.7%	56.2%	17.5%	
% COL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	35.2%	97.8%	8.9%	
10.0000	0	0	0	0	0	0	0	0	1	70	71
% TOT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	17.5%	17.8%
% ROW	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	98.6%	
% COL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	44.6%	
11.0000	0	0	0	0	0	0	0	0	0	25	25
% TOT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	6.3%
% ROW	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
% COL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.9%	

COMMAND: ANOV1

$$$ 1 WAY ANALYSIS OF VARIANCE $$$

SAMPLE	SIZE	MEAN	STD DEV
1 K	399	21.0677	3.38083
2 P	399	8.44862	2.55329
3 R	399	15.0276	5.14772
4 PT	399	375.401	285.989
5 GD	399	13.6742	4.00049

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST
AMONG SAMPLES	4	4.15953E+07	1.03988E+07	635.246
WITHIN REPLICATIONS	1990	3.25758E+07	16369.8	
TOTAL	1994	7.41711E+07		

COMMAND: ANOV2

$$$ 2 WAY ANALYSIS OF VARIANCE $$$

SAMPLE	SIZE	MEAN	STD DEV
1 K	399	21.0677	3.38083
2 P	399	8.44862	2.55329
3 R	399	15.0276	5.14772
4 PT	399	375.401	285.989
5 GD	399	13.6742	4.00049

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	F TEST
AMONG SAMPLES	4	4.15953E+07	1.03988E+07	650.290
AMONG TREATMENTS	398	7.11808E+06	17884.6	1.11841
ERROR	1592	2.54577E+07	15991.1	
TOTAL	1994	7.41711E+07		

COMMAND: PAIRT

$$$ STUDENT'S T STATISTICS $$$

VARIABLES:	1 K	2 P	3 R	4 PT	5 GD
1 K	0.00000				
2 P	-188.182	0.00000			
3 R	-58.2179	44.3197	0.00000		
4 PT	25.0144	25.8054	25.5824	0.00000	
5 GD	-144.590	63.4918	-16.0356	-25.5637	0.00000

DEGREES OF FREEDOM = 398

COMMAND: SRANK

SPEARMAN RANK $$$ CORRELATION MATRIX $$$

VARIABLES:	1 K	2 P	3 R	4 PT	5 GD
1 K	1.00000				
2 P	0.965180	1.00000			
3 R	0.964069	0.958539	1.00000		
4 PT	0.994018	0.978825	0.981867	1.00000	
5 GD	0.989396	0.977747	0.983244	0.996776	1.00000

Figure 3

Report

There is a series of special commands you can use for your reports. The help screen appears like this:

PON Assigns report output to printer (132 columns)
PON 80 Assigns report output to printer (80 columns)
POFF Assigns all output to terminal (80 columns)
DATE Set date to print on report headings (12 characters, any format)
TITLE Set title to print on report headings (64 characters, any format)
TEXT Include documentary text from a file

When you create a COMM file you probably will eventually run a report. When you do so, if you use the DATE and TITLE options you will get a professional looking output to your printer or disk which requires a minimum of effort to use.

If instead of PON 80, you use the command PON 80 B:SAMPLE you will create your report on the disk rather than on the printer. The command says to create a file called SAMPLE on the B drive.

There is only one thing to note here. When you are creating your reports to the disk you do not see anything on the screen.

Graph

There are two types of graphs constructed automatically by ABSTAT. They are bar graphs and plots of the data. These are not the fancy Hi-Res plots you might be used to, but they do get the point across and print with any printer. See Figure 4.

Bargraph also has a AUTO function. The auto function will look at your data for you and automatically scale the data. See Figure 5.

(begin Fig. 4)

```
COMMAND: BARG

VARIABLE:  1 K

AT LEAST       13.0000                    5         10         15         20
BUT NOT OVER:  FREQ     %   +----------+----------+----------+----------+
     1.00000      0   00.0  I
     2.00000      0   00.0  I
     3.00000      0   00.0  I
     4.00000      0   00.0  I
     5.00000      0   00.0  I
     6.00000      0   00.0  I
     7.00000      0   00.0  I
     8.00000      0   00.0  I
     9.00000      0   00.0  I
     10.0000      0   00.0  I
     11.0000      0   00.0  I
     12.0000      0   00.0  I
     13.0000      2    0.5  IX
     14.0000      6    1.5  IXXXX
     15.0000      8    2.0  IXXXXX
     16.0000     11    2.8  IXXXXXXX
     17.0000     18    4.5  IXXXXXXXXXX
     18.0000     29    7.3  IXXXXXXXXXXXXXXXXX
     19.0000     68   17.0  IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
     20.0000     54   13.5  IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
     21.0000     46   11.5  IXXXXXXXXXXXXXXXXXXXXXXXXXXX
     22.0000     33    8.3  IXXXXXXXXXXXXXXXXXXX
     23.0000     35    8.8  IXXXXXXXXXXXXXXXXXXXX
     24.0000     30    7.5  IXXXXXXXXXXXXXXXXX
     25.0000     21    5.3  IXXXXXXXXXXXX
     26.0000     11    2.8  IXXXXXXX
     27.0000     11    2.8  IXXXXXXX
     28.0000      3    0.8  IXX
     29.0000      5    1.3  IXXX
     30.0000      6    1.5  IXXXX
     31.0000      0   00.0  I
     32.0000      0   00.0  I
     33.0000      2    0.5  IX
                             +----------+----------+----------+----------+
      TOTAL    399  100.0               5         10         15         20
```

```
COMMAND: PLOT

                13.0000      18.0000      23.0000      28.0000      33.0000
                     15.5000      20.5000      25.5000      30.5000
                -+-----+-----+-----+-----+-----+-----+-----+-----+
          2327.00 +                                               2
                  I
                  I
                  I
          2017.07 +
                  I
                  I
                  I
     4    1707.14 +
                  I
                  I
     P            I                                          5
     T    1397.21 +
                  I                                     1
                  I                                1    1
                  I                                3
          1087.27 +                                1
                  I                           1
                  I                        2  1
                  I                     1 5
          777.344 +                     3 4
                  I                     3
                  I                  C  4
                  I               9 9
          467.413 +             6  C
                  I          1  T  9
                  I       5 W
                  I    1  *  *
          80.0000 +2  6 8  B I  T  * 2
                -+-----+-----+-----+-----+-----+-----+-----+-----+
                13.0000      18.0000      23.0000      28.0000      33.0000
                     15.5000      20.5000      25.5000      30.5000
                                     1 K
```

Figure 4

```
COMMAND: BARG

VARIABLE:  1 K        AUTO

AT LEAST       13.0000                    5         10         15         20
BUT NOT OVER:  FREQ     %   +----------+----------+----------+----------+
     13.0000      2    0.5  IX
     14.0000      6    1.5  IXXXX
     15.0000      8    2.0  IXXXXX
     16.0000     11    2.8  IXXXXXXX
     17.0000     18    4.5  IXXXXXXXXXX
     18.0000     29    7.3  IXXXXXXXXXXXXXXXXX
     19.0000     68   17.0  IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
     20.0000     54   13.5  IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
     21.0000     46   11.5  IXXXXXXXXXXXXXXXXXXXXXXXXXXX
     22.0000     33    8.3  IXXXXXXXXXXXXXXXXXXX
     23.0000     35    8.8  IXXXXXXXXXXXXXXXXXXXX
     24.0000     30    7.5  IXXXXXXXXXXXXXXXXX
     25.0000     21    5.3  IXXXXXXXXXXXX
     26.0000     11    2.8  IXXXXXXX
     27.0000     11    2.8  IXXXXXXX
     28.0000      3    0.8  IXX
     29.0000      5    1.3  IXXX
     30.0000      6    1.5  IXXXX
     33.0000      2    0.5  IX
                             +----------+----------+----------+----------+
      TOTAL    399  100.0               5         10         15         20
```

Figure 5

Summary

ABSTAT is a well designed easy to use statistical package for the CP/M environment. It has enough statistics to solve many problems. It could use additional functions such as curve fitting (looking at a data set and saying which type of curvilinear, exponential, power, logarithmic, or polynomial best fits the data). There could also be some beta weights calculated as part of the regression functions. But those things are really nitpicking. If you work in the CP/M world and need statistical analysis of your data, then you should have this program as part of your library.

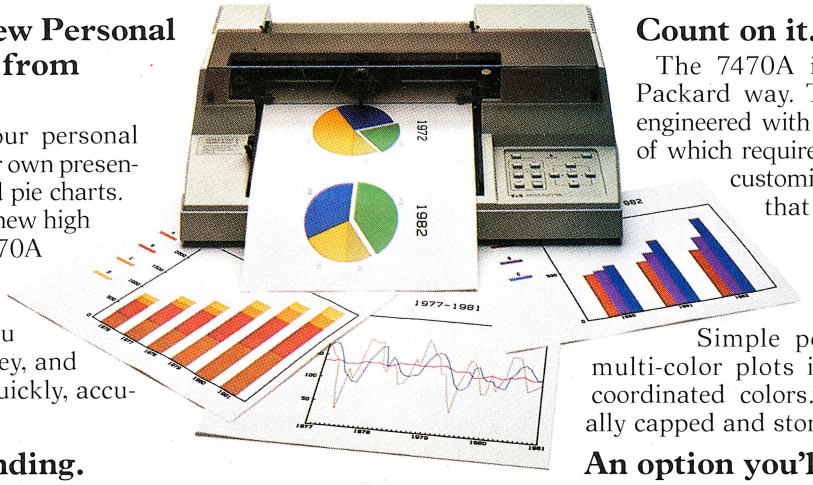
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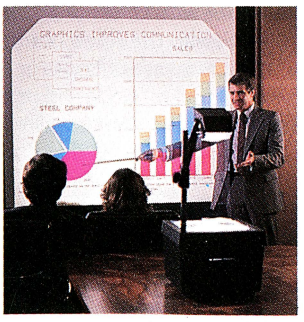
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Three 128K RAM Cards

Review by Neil D. Lipson, P.E.

The RAMcard is potentially the most significant peripheral available for a computer, because it expands the computer's overall capability to perform many tasks. As it came from the factory, the Apple II had 48K of memory. The Apple //e has 64K. With more memory, larger programs and data files can be handled. This article will deal with three plug-in RAM cards, the RAMEX-128, the SATURN 128, and the LEGEND 128.

Any one of these cards will add 128Kbytes of memory to your computer, extensively expanding its use. Pros and cons will be discussed on each card with some emphasis being placed on economy and compatibility. We'll pass up the opportunity to recall the days when 16K was considered more than adequate. The cards work perfectly on the Franklin as well as the Apple II Plus. Most of the cards also work on the Apple //e, with limitations described.

In general, all three cards measured up well, but there were some strong points for some of them in particular areas. If the article generates enough interest, we'll cover some of the other RAM cards and in addition cover some interesting applications in their uses.

The Ramex-128

The Ramex-128 retails at $499 and includes quite a bit for this price. It has a super fast load for VisiCalc which takes about 20 seconds. It will allow use of 136K VisiCalc, and it has a fast DOS 3.3 phantom disk.

The Super Expander for VISICALC is separate. However, there are three versions, so you pay for only what you need:

SUPER EXPANDER	$65.00
SUPER EXPANDER 80	$99.95
SUPER EXPANDER PLUS	$125.95

Here's where I feel this card has the edge on the other cards. It appears that all of the software from the Saturn disk works perfectly on the Ramex-128 and vice-versa. Only Super Expander Plus will not work on the Saturn card; the other Omega software will work. Because the two cards are similar hardware-wise I cannot say that one card is better than the other with respect to hardware. However, software is another matter. It appears that the Ramex-128 gives an excellent value for the money.

The Ramex-128 can be plugged into any slot, and because there is no jumper, there is little chance of making a mistake (as long as the power is off - this applies to any peripheral card). If you use the card on the Franklin Ace 1000 in Slot 0, you must first move the jumper wire on the motherboard to disable the top 16K of RAM. I chose Slot 0 for one reason only: I had to. I have no room for any other peripherals, so Slot 0 it was. If you want to use it on a Franklin and have the 64K of the machine in addition to the 128K of the card, then you must use another slot. Of course the Apple //e has no Slot 0, so you have no choice here. This information also applies to the Saturn card.

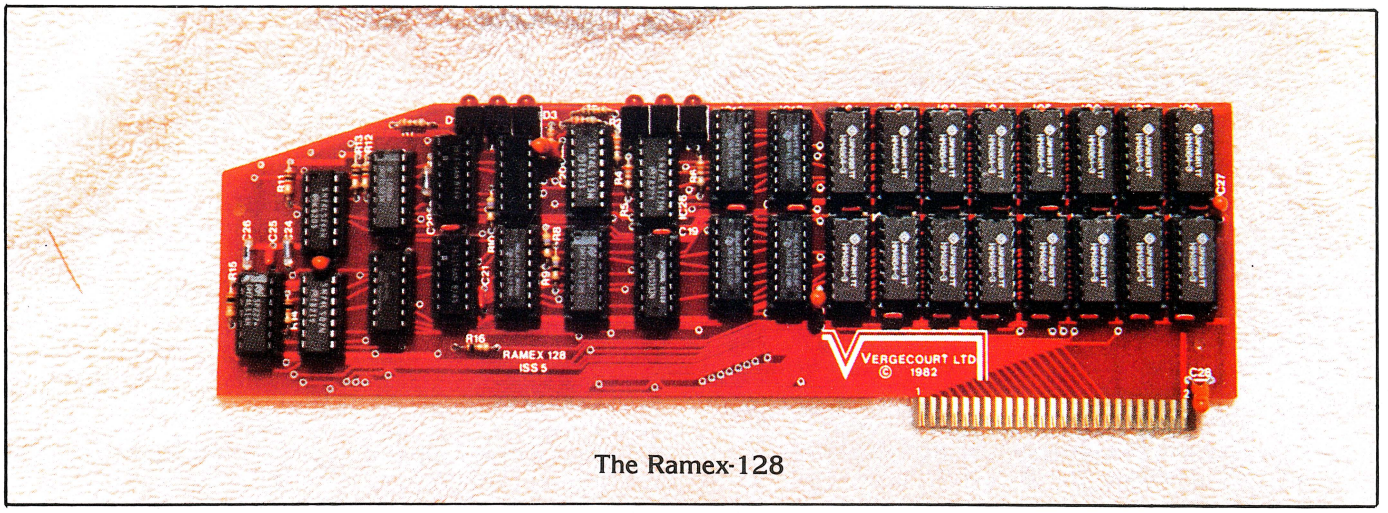
There are some minor limitations in using the Super Expander with other disk cards. The software at present does not work with the Rana controller card. It works beautifully with a Rana drive on an Apple or Franklin controller card; however, there is some code on the Rana card that causes some problems. This can be solved by Rana with an update EPROM, so it is possible by the time this article hits the press, the problem may be solved. This only applies to the Super Expand series of disks, not the other software which works perfectly on any controller. This bug is with Rana, not the Ramex.

I ran time tables on the speed of all three of the RAM cards, and all were within a few percent of each other with respect to speed. I have some other tricks up my sleeve in using the Ramex-128 which I will cover in a future article, so stay tuned.

HIDOS

To use HIDOS you must first configure the disk. You choose the appropriate DOS type and INIT accordingly.

The instructions for creating super HIDOS are somewhat confusing, but I shall clear it up here. If you use the Ramex-128 in Slot 0, then you can choose DOS types 1, 2 or 3. Pick any one, it doesn't matter. If you have two 16K cards with one in Slot 0 and the other in a slot *before* the Ramex-128, then you can also choose any one of the DOS types 1, 2, or 3. If you have one 16K card in Slot 0 and the RAMEX-128 in a Slot from 1 through 7, then you can pick DOS types 1 and 3 (this is the choice also if you have a Franklin Ace and you plug the RAMEX in a Slot from 1 through 7). Lastly, if you want to load the alternate language to Slot 0 along with DOS to the motherboard RAM and 128K of virtual memory, then use DOS type 2.



The Ramex-128

You can experiment and pick the DOS type that best fits your purpose. I know that the description sounds a little like "who's on first (base)", but it all falls into place. From here on it is all downhill.

SOLIDOS

SOLIDOS is broken down into numerous commands which will be summarized here:

1. MOUNT is used to transfer all of the data tracks from a floppy diskette to the Ramex-128. To save the contents of a floppy diskettes, enter the #INIT command before the #MOUNT command. The MOUNT card track loading is determined by the Ramex 128 slot residence.

2. DUMP is an unconditional data dump from the Ramex 128 to a floppy diskette, which overwrites all existing data on a floppy diskette except the DOS tracks. It must be used carefully or you can destroy information. This command is the opposite of the #MOUNT command. As a result the same rules and restrictions apply to the DUMP command. A common use of the #DUMP is to transfer an updated program from the Ramex 128 to a floppy diskette.

3. PROTECT write-protects a Ramex 128 virtual disk, but has no effect if applied to a floppy diskette slot.

4. CLEAR cancels a previous write-protect instruction.

5. INITIALIZE is used to initialize Ramex 128 and not save a HELLO program. Normal DOS INIT command can initialize the Ramex 128 and save a HELLO program in memory. Either INIT command is required before using a Ramex 128 as a virtual memory disk.

6. STORE is an array command that stores the data portion of a numeric array to a floppy diskette or the Ramex 128. The STORE command is available for Applesoft programs only.

7. RECALL is an array command that retrieves the data portion of a numeric array that was transferred to a disk or virtual disk via the #STORE command. This command is also available only for Applesoft programs.

8. SAVE is a file name command that saves a program segment and transfers it to a flopy diskette or virtual disk in "S" lot; from line XXXX to line YYYY inclusive under the "file name".

9. ATTACH is a file name command that loads "saved" programs by file name from a diskette or a virtual disk and appends it to the program already in memory. All variables are saved between line XXXX and YYYY. Any existing line between and including lines XXXX and YYYY are overwritten.

The following commands are enhancements of BASIC:

1. ERASE is a BASIC command that removes a numeric array from a diskette or virtual disk that has been previously #SAVE'd and is for Applesoft only.
2. DEL is a BASIC command that can be used in either the direct or indirect mode to delete program lines.

There are numerous machine codes which will not be discussed here, but enhance operations in machine language.

I used the Ramex UTILITY to load the disk full of Hi-Res pictures into the disk emulator, and it worked perfectly. Some of the fast load programs didn't work with the disk emulator, so I informed the software manufacturers, and I am sure by the time this hits print it will be compatible with most if not all of the fast load programs. This is a very minor point, but is worth mentioning.

I then tried the Saturn software on the Ramex card, and every program worked perfectly again. The fast load programs from the Saturn software also worked perfectly on the Ramex. I also heard, though I could not check it out myself, that the Ramex software also works on the Prometheus card. Therefore, you cannot go wrong by buying the Ramex software as long as you do not try to run it on the Legend.

In the disk emulator mode everything ran faster, including text files. Text files are by far the most difficult item to speed up, but the emulator had no problem with it. I do make one exception for not using an emulator to save information. This exception is VisiCalc. VisiCalc takes forever to load and to save. By using the Ramex you can dramatically reduce the time 20 seconds loaded and saved. This is nothing to sneeze at. Needless to say, this reduces wear and tear on the disk drive as well as on me.

Technical information is supplied with the manual. It is well documented and very professional with the entire manual being typeset.

SUPER EXPANDER PLUS BY OMEGA MICROWARE

I am providing a special section here on this program as it excels in its class. It sells for $125.95 retail. It includes quite a bit for this price. First you have 136K of VISICALC to use. Second, you have it on 80 columns. Third, you have numerous extra commands, in addition to the 20 second save and load.

A summary of the new commands are listed here. These commands dramatically improve VISICALC to a point where it is comparible with VISICALC ADVANCED VERSION. They are as follows:

COMMAND LOCAL

/LC Local or variable column width
/LD Data Type validation for a field/cell
/LH Locally hidden field/cell
/LP Locally protected field/cell
/LT Locally tabbed field/cell

ADDITIONAL GLOBAL COMMANDS

/GH Turns on/off hidden fields via a password
/GP turns on/off cell/field protection
/GT turns on/off tab function

ADDITIONAL STORAGE COMMANDS

/SE Expand Inits a data disk
/SK Saves a data file to data disk (136K in 20 secs)
/SM Loads a data file from disk to memory
/SG Garbage collection of memory

COMMAND FORMAT (ADDITIONAL TO REGULAR FORMAT COMMANDS)

/FM Creates a 2 character wide margin to cell
/FP Creates a 2 character prefix to a cell
/FS Creates a 2 character suffix to a cell
/F% Adds the % symbol as a format to cell
/F(Displays a negative cell value in brackets
/FC Displays a positive cell with a 'Cr' format if the cell is negative then the symbol 'Dr' is displayed
/FB Blanks or removes all field/cell formats

ENHANCEMENT OF REGULAR FORMAT COMMANDS

/F1 Displays a value cell format to '1' decimal place
/F3 Displays a value cell format to '3' decimal places

COMMAND OVERWRITE

/OF Replicates format over a range of cells
/OC Replicates cell content thru a range of formats

The Saturn 128K RAM Board

The Saturn card is a well designed memory card. It requires no jumper and therefore can be used with the Apple II, Apple II Plus, the Apple //e and all of the Franklin Ace machines including the Ace 1000, Ace 1200, and the AcePro. The card comes with a complete manual, and three diskettes for CPM, DOS and Pascal. Nothing is left out so there is little to go wrong.

Most of the users will be concerned with the standard DOS disk which includes MOVEDOS, RAMEXPAND, and DOS PSEUDO-DISK. Also included are the Pascal Pseudo-disk and the CPM Pseudo-disk.

MOVEDOS does exactly what it sounds like. It will relocate DOS 3.2 or 3.3 into the second 16K bank of the 128K RAM board, which will free up about 10K of memory. There are numerous applications where this extra memory is useful.

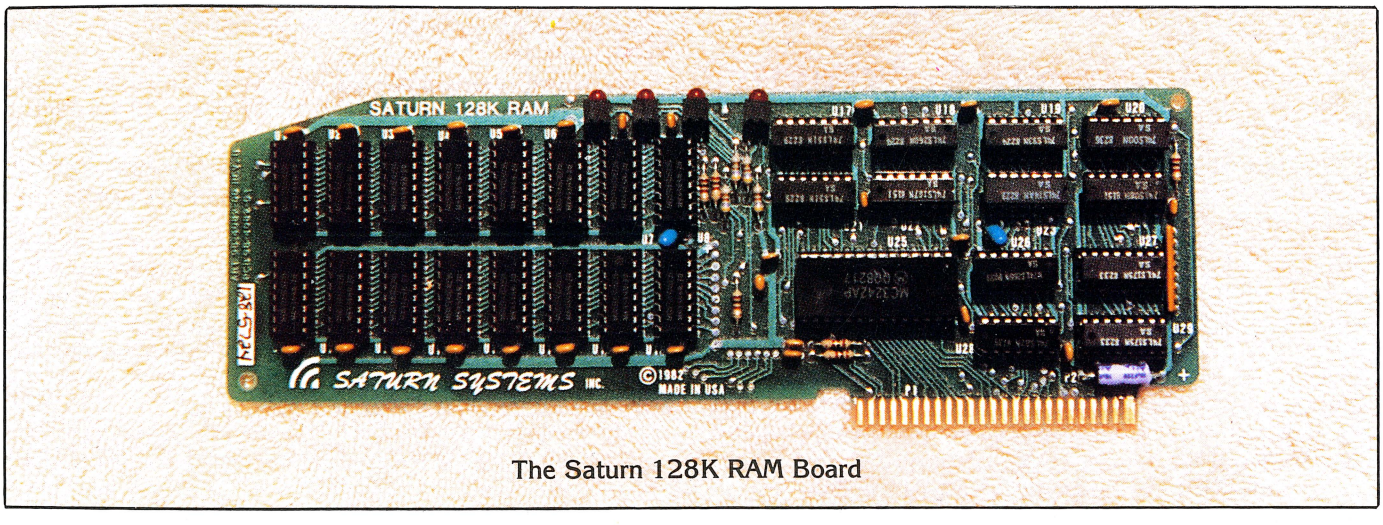
RAMEXPAND will actually extend the apparent RAM of your machine. The technique used is bank switching and is done quite rapidly. This portion will also work within the relocated DOS environment as well as the normal DOS.

DOS PSEUDO-DISK allows use of the Ram card as a disk emulator. I tried my favorite trick of using a fast DOS, such as the Microseeds and some of the other fast DOS programs, and they seemed to work beautifully in this mode. Needless to say, I was getting DOS to run extrememly fast (about 50 to 70 times faster!!) with this trick. To accomplish this, you must patch the DOS with a patch program (which is included in many of the fast load programs). You *cannot* just boot up with the fast DOS; it just will not work (I have tried it a few times).

I understand that a new Saturn card called the "Accelerator" is being released and in future articles I will be comparing speed tests with this product and the RAM cards. The Accelerator will speed up the 6502 about 3.6 times, so it will be interesting to see the combined results of both cards running at the same time.

The Saturn 128K RAM card will go in any slot, so if you have a RAM card in Slot 0 or if you have a Franklin Ace then put it in any slot except 0. If you must put the card in Slot 0 in the Franklin, you must move the jumper wire on the Franklin motherboard which is described in the Franklin documentation. This is necessary in order to turn off the top 16K and turn on Slot 0. You lose the 16K in the machine, but if you have no other place to plug it in because you have too many peripheral cards, then this is the answer.

The one big reason that you would want a RAM card is because you either are running out of memory for a variety of reasons or you want a disk emulator for high speed disk access. You can get high speed disk access if you go with a hard disk drive, but you may not want to pay the $2000 for it, along with the other inherent problems of a hard disk. The disk emulator makes a nice compromise in this area. It obviously does not have the enormous amount of memory of a hard disk, but it is far cheaper. In addition, you can't use a hard disk to



The Saturn 128K RAM Board

expand the memory of the computer, so here the RAM card is the clear winner.

Most of the testing that was done was on the RAMEXPAND and DOS Pseudo-disk. This is the area that most people will be using the card, so this is where I spent most of my time.

RAMEXPAND

RAMEXPAND is a software package consisting of a set of functions for extending the amount of RAM available to Applesoft and Integer programs. RAMEXPAND will use the memory on one or more Saturn 32K, 64K, or 128K RAM boards as well as that on any 16K board present in the system. Information in the form of data and programs or subroutines can be saved on these extension RAM boards for later retrieval. RAMEXPAND allows you to save complete programs which can later be loaded and run, overlay and chain subroutines and program segments, or save and recall arrays.

Flexibility has been incorporated into RAMEXPAND to allow portions of the memory boards to be reserved for such things as the alternate BASIC dialect. This memory can be reclaimed for use by RAMEXPAND at any time it is desired.

There are, of course, some precautions that must be taken when working with RAMEXPAND. RAMEXPAND occupies Block 64 in the memory map, so you cannot use this area for anything else, or you'll clobber the routines that do memory management. Once RAMEXPAND is installed, you cannot increase MAXFILES. This should not present a problem as long as you remember to set MAXFILES before you run the RAMEXPAND load portion. If you must reload RAMEXPAND, then make sure to execute the MAXFILES command to reset HIMEM before you reload. By the same token you must be careful when using FP or INT as the data saved by RAMEXPAND will be lost. Simply set your HIMEM accordingly to protect this area. This value is given when you run the program "RAMEXPA.LOAD". The entry points for RAMEXPAND are at the locations 11-12 in the memory map block. If these areas are changed you must reset them with a "CALL 10". Lastly, any variables that are to be used as parameters in RAMEXPAND command strings should be declared before they are used. If this is not done, an error message will occur.

DOS Pseudo-disk

This feature of the Saturn software is by far my favorite. Why, do you ask? (I love asking rhetorical questions). Well here's the reason: Many people would think that a program will run faster if there is little or no disk I/O. This is true with a normal disk. Of course, who in their right mind would write a 100K BASIC program? How would you debug such a monster? If you were smart, you would write it in modules, and then debug or modify the modules at a later date much more easily than a large program. Of course you would be concerned that constantly going back to the disk would slow things down.
With a disk emulator, it's a different matter altogether. With the use of DOS Pseudo-disk, we can have the best of both worlds. Even better, we can use an existing program with the Pseudo-disk as long as we are careful about one point . . . *the disk must not be copy protected.* You can't dump a copy protected disk into the emulator. I mentioned this point in the article called "Speeding Up DOS" (**Apple Orchard**, Vol. 3 No. 5, p. 18), and still a few people didn't read it and were disappointed. However, there is a distinct trend now toward selling normal DOS diskettes, so they will work with a hard disk as well as a disk emulator. Check your software first!

I made one very stupid mistake when trying to use the Pseudo-disk. However, I'm sure that there are many of you out there that will do the same thing, so here it is. I grabbed a disk of programs to download into the emulator, and found that the last three programs were not there. I couldn't understand why. Then, I realized that the DOS had been expunged from that disk to enable it to hold more data. A normal DOS 3.3 diskette holds 143,360 bytes. Well, if you eliminate the first three tracks, which are DOS, you are down below 128K. In reality I was trying to load more than 128K onto the RAM card, because the three tracks contained data. Like Cosmo Fishhawk's word processor, it threw up. Therefore, be careful what you load onto the card.

The Pseudo-disk was a breeze to set up, as all you had to do was run a program called PSEUDODISK. It's all menu driven so there is no point in repeating the procedure here. It takes a minute or two in downloading the disk into the RAM card, but once it is done, it acts exactly like a disk drive, but much faster, and with no noise. There is probably some noise created by the electron flow, but I couldn't hear any (you'll need some pretty sensitive hearing for that).

I then tried the ultimate test. I ran one of my fastload programs from a patch file, and as fast as a bunny, I grabbed my HIRES picture disk to test out the speed. It was about 60 times faster than a normal disk drive! Is Saturn aware of this fact? I suspect that maybe some of their engineers are, but it is not presented in their literature or if it was, it was not emphasized. The disk emulator is only 8 times faster without the fastload program. Maybe after reading this article, they will advertise this point. The strong point, in my opinion, is the ability to speed up text files. This comes naturally with the Pseudo-disk, but in using it with the fastload programs, you have to pick the proper program for the proper application. We'll cover this in more detail in another article.

When you use the Pseudo-disk, you must catalog not Slot 0, if that is where it is placed, but in the default of Slot 5. If you reboot, you must re-patch the Pseudo-disk file with the appropriate selection in the menu (option 3). You can hit «RESET» all you want, and the emulator is unaffected, which is great.

There are, however, some precautions that must be taken. Once the Pseudo-disk is loaded, please don't load something else on top of it, like BASIC. You must also take care in initializing new diskettes, as the RWTS routines are patched, and the patched version will be written onto the new disk. This disk will not boot properly, so be fore-warned. You do not have to run the set-up portion of the Pseudo-disk every time it is installed, but only when a change in configuration is desired.

This feature of the Saturn is by far (in my opinion) the best selling point of the card. With the addition of the other routines mentioned earlier, it just enhances the value even more.

The Legend 128K Card

The Legend 128K card has been out for a while. The software is very refined and the documentation is excellent. It appears to have one limitation, and that is that it requires a jumper onto one of the memory chips. This does not present a problem as long as you use it only on an Apple II Plus, but if you update to an Apple //e, the card will not work. They have a new version for the //e, so you must be careful which card you purchase. I'm not sure if the //e version works on the old II Plus, so you may not be able to just plug in the old card into the new computer (or vice versa) and expect it to work perfectly.

The package comes with the 128K Utilities, the CP/M Fast disk, and the Pascal Soft-Disk. The software appears bug free and the programs run with a minimum of problems. The 128K disk has a nice demo on it, which illustrates the uses of the card.

The hardware design for the Legend card is substantially different from the other two cards (the Ramex and the Saturn). This does not make it bad, it just means that you cannot use their software with the card, but then again, it has most of everything you want so this is no big sacrifice.

Installation of the Legend card must be done with care. You cannot just plug it in any old way. Proper orientation of the cable in the memory chip is absolutely essential in avoiding burning out anything. If the plug is inserted backwards you could do damage to both the computer and the card, so care must be taken. The directions are good in this area, but you must read them. Don't laugh. Many people just try to wing it. Unfortunately, on the cable from the card, pin 1 is not identified, so you must route it carefully according to the directions given in the instructions. My recommendation is for Legend to put a white dot over Pin 1 for dummies (like me).

I will not get into the theory of operation as I'm sure it will bore most of you (and myself included), so I will get to the meat of the card, which is the software use.

Memory Master is the memory management program of the set of programs on the master disk included. It has numerous features which are described here:

1. You can now access the RWTS routines through the standard DOS page 3 vectors with no additional space being used by the software (Memory Master).

2. FLIP lets you go from DOS 3.2 to DOS 3.3 which makes life very easy for those of you that have old DOS programs. It is a nice feature, but in reality most people don't even know or have any DOS 3.2 diskettes, let alone DOS 3.1. I have plenty of all three so I like it, but this is my area of interest.

3. SHOW tells you which DOS you are in, which is very similar to item 2 in usefulness.

4. BSTAT is similar to the old program by the same name which shows the starting address and length of the last Binary file Bloaded or Brun.

5. MONITOR will put you into the monitor.

The documentation has extensive listings so even the advanced user can get into things if he or she wants to.

The disk emulator was, of course, my favorite program, and it worked perfectly. The fast load skew factors were already made to the disk. This allowed the emulator to be used in the fastest mode. The actual emulator uses only 512 bytes of memory, so there is little waste here. HIMEM is set accordingly. To use the disk emulator, you must assign a pseudo slot and drive, which is quite easy.

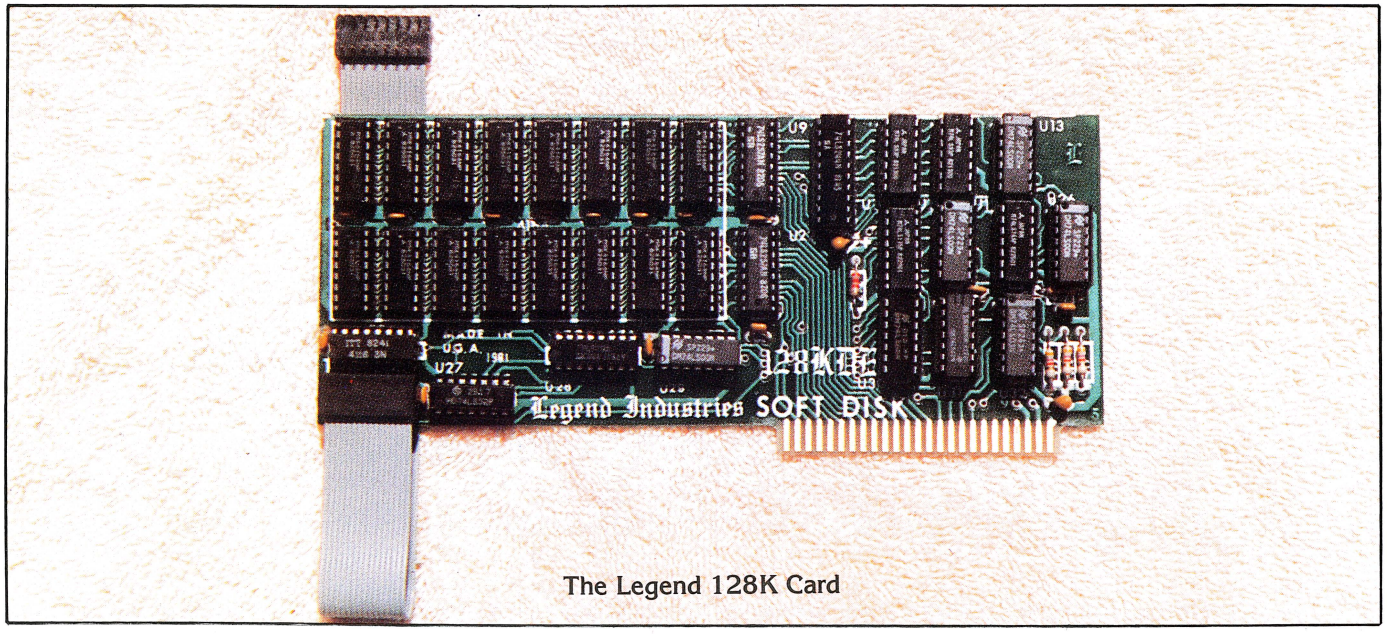
You can use the emulator for up to four Legend cards, each with 128K or RAM, but this would not be cost effective. The 128K is satisfactory for most applications. If you have to go higher, then a hard disk is required and is also much more cost effective per extra byte of memory. MOUNT takes a normal DOS 3.3 disk and puts it into the emulator. The Disk Emulator has different configurations, so it is quite flexible. For the Disk Emulator, you must follow instructions carefully, as it is easy to become confused as I was. Again, you must read the manual here.

There is also a TURNKEY EMULATOR included which will BLOAD the emulator into the memory and poke in the required slot and drive information for you. Again, extensive documentation is included along with listings.

One thing that you must take care of with all emulators is this: you must not forget to resave the information back to a *real* disk. Whenever I work with any kind of file that requires saving, I personally never use an emulator because I always forget to save the information. You almost need a note on the power switch. I really believe that all emulators that use normal RAM are best for reading information, which is what 90% of you readers want to use it for. Can you imagine working for about 2 hours, and having a power hiccup and losing all the work you did? Of course, these are my personal feelings and you should weigh the advantages yourself.

There is a SPECIAL FORMAT program which allows you to create special "partial" diskettes for storage. This makes the MOUNT command safer to use as you know where you are in memory management. There is another program callled FIRMWARE SELECTOR which allows you to use your firmware card more effectively if you have one.

The LEGEND SLIDE SELECT is a program specifically set up for showing slides very quickly. There is a configuration mode and numerous other options in the use of the program. This is nice for showing slides with the emulator.



The Legend 128K Card

VC PLUS

This program will allow you to use VisiCalc with increased memory, and it gives you 40 or 80 columns of information on the screen. You must remember that the disk will hold only 140K of information, so this is a limitation. Also, as the manual states, there is a loss of speed in certain areas because of bank switching. This is most apparent when you are tight for space.

While the CP/M and PASCAL disk emulators were included, time limitations did not allow me to run extensive tests on them.

The entire package which includes the disk emulator, 128K card, Memory Master, Slide Select, VC Plus, Firmware Selector, Hires Demo, Floppy Formatter and Memtest retails at $650.

Conclusion

I intentionally picked three of the most popular cards. These three cards offer the most reliable operation, the best documentation, and the most sophisticated software. Which card is best for you is a choice you must make after accessing all of the information.

However, I feel that the Ramex card is an excellent buy, with the Saturn a close second. The Legend is priced higher, but there is some extra software included, so you must make the accessment of whether it is worth the extra price to you. The Super Expander Plus is also an excellent value at $125.95 and the fact that it works with the Saturn card makes it universal. I tried almost all of the Ramex software on the Saturn and from what I saw, it was indeed compatible. I should warn that in spite of the fact that I tried some and what I tried did work, I did not try every single feature on every single program. However, unless I am mistaken, the two cards are extremely similar in hardware configuration. Unless you or I can find some distinct hardware differences, my gut feeling would be that everything should be interchangeable. Of course, I cannot guarantee this, but this is my feeling.

As time goes on, the uses of the cards will increase. Already the Diversi-DOS printer buffer works on all three cards, and I am sure there are more to come. Look forward to more articles on the use of these cards in other areas, and remember that the Lisa only has a megabyte of memory inside . . . what am I saying???

The Ramex 128 is available for $499.00 from Omega Microware,222 So. Riverside Plaza, Chicago, IL. 60606. Phone 312-648-4844.

The Saturn 128 is available for 499.00 from your local dealer.

The Legend 128 is available for 599.00 from you local dealer, or contact Legend Industries, 2220 Scott Lake Rd., Pontiac MI. 48054. Phone 313-674-0953.

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CP/M -> SOS TEXTMOVER

Transfer CP/M Text Files to SOS

by Arthur E. Anderson ///

See ad - Page 17!

You say you're tired because your Softcard /// (CP/M) programs can't mingle with your SOS files? Do you feel run-down because you can't use CP/M files with Business BASIC, the Pascal screen editor or Pascal, Applewriter ///, Access ///, and all your (sigh) nifty programs under SOS? You say that your software transfers the data from SOS to CP/M files, but *not* from CP/M to SOS? You say that your Softcard is a data sink, and you want some of it back?

Well, lift your head up high, fellow Apple///er, because this demented hacker has a cure for all of your ills (well, at least some of them). *You* need CP/M—>SOS TEXTMOVER. CP/M—>SOS TEXTMOVER is the key that lets files helplessly trapped in CP/M emerge to SOS; it will cure make you feel young again fast, *fast, FAST*, will cure all of mankind's ills, and it tastes good too! (Perhaps I've overstated things a bit.)

CP/M—>SOS TEXTMOVER is a program that transfers CP/M diskette files to SOS format files. If you transfer the CP/M file to a SOS floppy, then two diskette drives are required. CP/M—>SOS TEXTMOVER is menu driven, provides handy character filters, uses friendly I/O error-trapping, and allows CP/M cataloging capability. In short, it conveniently fills the CP/M to SOS gap.

Don't Blame Me . . .

No warranties, express or implied are offered, as is the case with all software. The only difference is that we're stating this up front, in the same size type as the rest of the article. Your sole recourse if you dislike this program is to erase the diskette and say nasty things about my ancestry. However, I have found this program an absolute godsend, if not a necessity, and I sincerely hope that you too will like this program. Best of all, this utility did not or will not set you back $100.00 or more. (*And, it worked for me when we transferred the text for this and other articles from CPM to SOS. That means it should work for almost anybody.—PCW*)

Who's in Control Here?

CP/M—>SOS TEXTMOVER is conveniently menu driven. The menu style was shamelessly stolen from the Apple /// utilities. It features cursor selection of input and output devices. It uses multiple menu screens to prompt and inform you. It traps I/O errors and responds with human-intelligible error messages. And if you have an Apple /// clock chip installed, it even ticks away the time.

Down to Business

Figure 1 shows the main menu of CP/M—>SOS TEXTMOVER. Typing '**L**', the first choice on the menu, will list the catalog of CP/M files. The catalog listing includes filename and type, USER number, the number of records used, file size in bytes, the number of file EXtents used, the ACCess attribute, and the SYS/DIR attribute for each file on the diskette. Under CP/M, system files such as MAG2.TXT and MAG3.TXT are so indicated with parentheses.

Typing "**T**", the second option of the main menu, initiates the "Transfer file" command. The program then requests a valid and unambiguous CP/M filename, as shown in Figure 2. (CP/M—>SOS TEXTMOVER considers upper and lower case filenames as different, thereby allowing access to "system files" which can be in lower case ASCII and "directory" files which are always in UPPER case ASCII.) The CP/M **filename.typ** is checked for syntax, and is verified to be on the disk. The transfer then proceeds.

Pascal I/O is not known for its lightning speed, so for long files, go get a cup of coffee. Just to show what's happening, CP/M—>SOS TEXTMOVER provides a block count on the

screen while it's doing its work. However, for faster operation you may turn the screen off (using the auxiliary keypad: CTRL-5), and the program will turn the screen back on after it finshes. With the display off, the transfer time will be reduced by about 20%. Transfer time is about 20 seconds per kilobyte when transferred to .CONSOLE, and 35 seconds per kilobyte when transferred to a floppy disk.

```
CP/M-->SOS TEXTMOVER                                    12:35:15
MAIN MENU                                               Jul 13 1983
--------------------------------------------------------------------------------


   L(IST CPM DIRECTORY
   T(RANSFER FILE
   S(OURCE DRIVE.................[.D2]
   D(ESTINATION DEVICE...........[.CONSOLE]
   F(ILE ON DESTINATION DEVICE....[]
   M(ODE OF TRANSFER.............[TEXT]
   Q(UIT




--------------------------------------------------------------------------------

ENTER: L, S, T, D, F, M, OR Q(UIT
```

Figure 1

```
CP/M-->SOS TEXTMOVER                                    12:35:15
MAIN MENU                                               Jul 13 1983
--------------------------------------------------------------------------------


   L(IST CPM DIRECTORY
   T(RANSFER FILE
   S(OURCE DRIVE.................[.D2]
   D(ESTINATION DEVICE...........[.CONSOLE]
   F(ILE ON DESTINATION DEVICE....[]
   M(ODE OF TRANSFER.............[TEXT]
   Q(UIT




ENTER CPM NAME.TYPE :
--------------------------------------------------------------------------------
```

Figure 2

The next two options on the main menu select the source drive and the destination device. After pressing the option, selection is made by cursor manipulation of an arrow which rotates through all the possible choices. Figure 3 shows the four CP/M floppy choices for the CP/M diskette. CP/M—>SOS TEXTMOVER does not support CP/M files on hard disk, so "PIP", your Profile files to floppy, if necessary. CP/M—>SOS TEXTMOVER does, however, support output to the .PROFILE driver. For floppy-to-floppy transfers, two disk drives are required. CP/M—>SOS TEXTMOVER will transfer most any CP/M file, with the exception of (rare) "random record" files.

When transferring data from a CP/M file, the destination device can be one of the following: .D1, .D2, .D3, .D4, .PROFILE, .CONSOLE, .PRINTER, .PARALLEL, .SILENTYPE, .RS232. Figure 4 illustrates this.

Of course, CP/M—>SOS TEXTMOVER disallows a transfer in which the source and destination drives are the same. Selection of the input and output devices is made with visual cursors. The cursor facilitates quick assignment of an output device. You can preview a file on the console, print the file on a printer, and transfer the CP/M file to a SOS disk with a minimum of fuss. For CP/M files sent to disk drives, a SOS ".ASCI" or ".DATA" file is created, based on the chosen mode of transfer. The ".ASCI" files are desirable because they may be accessed in both Pascal and BASIC, and most other programs. Pascal ".TEXT" files are not so accomodating!

```
CP/M-->SOS TEXTMOVER                                    12:35:15
MAIN MENU                                               Jul 13 1983
--------------------------------------------------------------------------------


   L(IST CPM DIRECTORY
   T(RANSFER FILE
   S(OURCE DRIVE.................[.D2]                  --------
   D(ESTINATION DEVICE...........[.CONSOLE]           |       |
   F(ILE ON DESTINATION DEVICE....[]                  |   .D1 |
   M(ODE OF TRANSFER.............[TEXT]              | -->.D2 |
   Q(UIT                                              |   .D3 |
                                                      |   .D4 |
                                                      |_______|




--------------------------------------------------------------------------------

SOURCE DRIVE: UP/DOWN ARROWS ROTATE, RETURN SELECTS, OR [ESC] ESCAPES
```

Figure 3

```
CP/M-->SOS TEXTMOVER                                    12:35:15
MAIN MENU                                               Jul 13 1983
--------------------------------------------------------------------------------


   L(IST CPM DIRECTORY                                 ---------------
   T(RANSFER FILE                                     |               |
   S(OURCE DRIVE.................[.D2]                |   .D1         |
   D(ESTINATION DEVICE...........[.CONSOLE]           |   .D2         |
   F(ILE ON DESTINATION DEVICE....[]                  |   .D3         |
   M(ODE OF TRANSFER.............[TEXT]              |   .D4         |
   Q(UIT                                              |   .PROFILE    |
                                                      | -->.CONSOLE   |
                                                      |   .PRINTER    |
                                                      |   .PARALLEL   |
                                                      |   .SILENTYPE  |
                                                      |   .RS232      |
                                                      |_______________|




--------------------------------------------------------------------------------

SOURCE DRIVE: UP/DOWN ARROWS ROTATE, RETURN SELECTS, OR [ESC] ESCAPES
```

Figure 4

Where to Go

If a CP/M file is to be transferred to disk, then a filename is required. Typing "**F**" from the main menu commands CP/M—>SOS TEXTMOVER to request the pathname (including any ndesired subdirectories beyond the name of the destination device). Figure 5 shows such an example. This pathname is carried forward to the main manu as shown in Figure 6. Hence the CP/M file will be transferred to ".d2/letters/magazine.text". The filename is ignored if the transfer is not made to disk.

A la Mode, Please!

Typing "**M**", the last choice of the main menu, results in the mode menu shown as Figure 7. One of four modes of transfer may be chosen. Each mode represents a different set of

character filters applied to the transfer. This option allows the filtering out of nasty unprintable ASCII characters. Four filter options are offered which range from an unfiltered binary transfer to a transfer consisting of a very simple ASCII character

```
CP/M-->SOS TEXTMOVER                                        13:42:34
FILE-TO-WRITE ENTRY                                         Jul 13 1983
--------------------------------------------------------------------------------


IF THE DESTINATION_DEVICE IS DISK , THEN A PATHNAME IS REQUIRED.
                                   OTHERWISE IT IS IGNORED.

 PLEASE ENTER PATHNAME ON DESTINATION_DEVICE AND [RETURN]
                          OR
              (<ESC> RETURN TO ESCAPE)




APPLE#
--------------------------------------------------------------------------------
```

Figure 5

```
CP/M-->SOS TEXTMOVER                                        12:35:15
MAIN MENU                                                   Jul 13 1983
--------------------------------------------------------------------------------


   L(IST CPM DIRECTORY
   T(RANSFER FILE
   S(OURCE DRIVE.....................[.D2]
   D(ESTINATION DEVICE.............[.CONSOLE]
   F(ILE ON DESTINATION DEVICE....[APPLE]
   M(ODE OF TRANSFER..............[TEXT1]
   Q(UIT









--------------------------------------------------------------------------------
ENTER: L, S, T, D, F, M, OR Q(UIT
```

Figure 6

set. The binary transfer results in a ".DATA" file. A very handy mode is the "TEXT1" mode of transfer, which limits the character set to the printable ASCII, «RETURN», and «SPACE». This mode also re-expands tabs to every 8 columns. The mode menu explains each of the four preconfigured modes. Should you feel like inventing a new mode, feel free to hack at the source code and make a filter to your liking. That's an advantage of having the source code.

A Secret Map

The way that CP/M stores data on a diskette, at first, appeared as a secret. Armed with a disk zap routine, a sleepless night, and some researched information on Apple II and Apple /// formats, I proceeded to tear apart known CP/M formatted diskettes. The Apple II CP/M format is referred to as "Format RR", and appears to be mostly the same for Apple /// CP/M. This program has been used with both.

But all the Sectors Look the Same.

CP/M assigns each track to have 4 blocks of 1024 bytes (4 sectors) each. Consider a CP/M disk addressing scheme

```
CP/M-->SOS TEXTMOVER                                        16:38:83
MODE_OF_TRANSFER MENU                                       Jul 13 1983
--------------------------------------------------------------------------------

 1..."TEXT1" TRANSFERS THE DATA INTO AN .ASCI TEXT FILE. IT LIMITS
     THE CHARACTER SET TO: PRINTABLE ASCII, CR, SPACE. IT EXPANDS
     TABS TO EVERY 8 COLUMNS. ALL OTHER CHARACTERS ARE FILTERED OUT.
     (THIS IS USEFULL FOR EDITORS.)

 2..."TEXT2" TRANSFERS THE DATA INTO AN .ASCI TEXT FILE. IT LIMITS
     THE CHARACTER SET TO: PRINTABLE ASCII,ACK, BEL, BS, HT, LF,
     VT, FF, CR, SO, SI, DLE, NAK, ESC,SPACE. ALL OTHER CHARACTERS
     ARE FILTERED OUT. (USEFUL FOR LINEPRINTER OUTPUTS.)

 3..."TEXT3" TRANSFERS DATA INTO AN .ASCI TEXT FILE.
     ONLY CNTRL-C(PASCAL EOF) IS FILTERED OUT. THIS MAY HAVE
     STRANGE EFFECTS ON NONDISK DRIVERS. USE WITH CARE!

 4..."BINARY" TRANSFERS THE DATA (BYTE FOR BYTE) INTO A .DATA FILE.
     NO TRANSLATION IS MADE ON THE DATA. THIS MAY HAVE STRANGE
     EFFECTS ON NONDISK DRIVERS. USE WITH CARE!

--------------------------------------------------------------------------------

  TYPE:   1, 2, 3, 4 OR [ESC] TO EXIT
```

Figure 7

where we start addressing at physical track 3. We continue addressing to track 35, then wrap around and pickup tracks 0, 1, and 2. Therefore, CP/M logical blocks 0, 1, 2, and 3 are on physical track 3. CP/M logical blocks #124 . . . 127 are on physical track 35 and CP/M logical blocks #128 . . . 139 are on physical tracks 0, 1, and 2.

The Apple/// blockread procedure reads 512-bytes, i.e. two 256-byte sectors. The high and low part of the 8 blockreads per track therefore yield the well known sixteen sectors per track. CP/M—>SOS TEXTMOVER addresses each sector by using either the high 256 bytes, or the low 256 bytes of the blockread. The required disk mappings and formulas were derived, by disk zapping many files. The details of the disk mappings are contained in the Pascal source code.

F.Y.I.

I hope this program solves your CP/M to SOS transfer problems and illuminates some of the CP/M data structures. For further reading on the subject I recommend the following references:

1. Art Messeler, "Disk Mapping the Z-80 CP/M System" *Call -A.P.P.L.E.* December 1982, pp. 45 & 46.
2. Dr. Jay H. Lieske, in a letter, *Call -A.P.P.L.E.*,February 1983, p. 66.
3. Val J. Golding, "CP/MUFFIN", *Call A.P.P.L.E.*, March 1983, pp. 81-86.
4. Inside CP/M, A guide for Users and Programmers with CP/M-86 and MP/M2, by David Cortessi, Holt, Rinehart And Winston, © 1982.
5. "CP/M USER", David P. Babcock, *Journal of Pascal and ADA*, Jan-Feb. 1983, pp. 13-14
6. Softcard /// manuals from Apple Inc.
7. Apple /// Pascal manuals from Apple, Inc.
8. Timothy C. O'Konski, "A Little Apple SOS with Your Pascal", *BYTE*, December 1982, pp. 448-482.
8. Apple /// SOS Reference Manual (Draft), copyright 1982, Apple Computer, Inc.
9. The Apple /// Pascal Technical Reference Manual (Draft), copyright 1982, Apple Computer, Inc.
10. SOS Device Driver Writer's Guide (Beta Draft), copyright 1982, Apple Computer, Inc.



The Franklin Ace 1200

by Neil D. Lipson, P.E.

THE FRANKLIN ACE 1200

Franklin Computer Corporation started in late 1981. At this writing, they have more than 350 employees in 6 New Jersey plants. They started out with the Ace 100 and updated it to the Ace 1000. Their latest product is the Ace 1200, and this article will center on it.

The basic system consists of the Ace 1200, which includes a combination parallel/serial card, a Z-80 card with 64K of RAM, and a Videx-compatible 80 column card. That compatibility is very important, as the industry needs another new 80 column card format like a hole in a head. There are already too many 80 column cards on the market, and the software manufacturers are having headaches trying to stay compatible with all of them. It was a smart move on Franklin's part to make it Videx compatible, as this is one of the most popular cards, if not the most popular.

The numeric keypad is dual function. In normal mode you use it to enter numbers (no kidding!); but when you press Control-pause, it turns into a word processing keypad. More on this later. The 1200 computer has all the features of the Ace 1000, and in reality is an Ace 1000 with the extra peripheral cards, sold as a package. Let's look at the cards one by one.

The Z-80 Card

The Z-80 card is similar to the PCPI card with 64K of RAM. One extremely powerful feature is that this card runs at 6 MHz, which is three times faster than the Microsoft card and the other "generic" cards on the market. This means that all CP/M programs (with a few exceptions) will run faster, in some cases much faster. They all do not run an exact factor of three times faster, but it varies up to three times.

Provided are Version 2.2 CP/M, CP/M Version 2.2 Utility disk, and CBASIC Compiler Version 2.08. This is a healthy amount of included software. The CP/M manuals are somewhat sparse, I recommended that you purchase another CP/M manual such as *The CP/M Handbook* by Zaks.

Unfortunately, the card is not completely compatible with all software; according to some sources, the Microsoft software will not boot on it. However, I tried both Multiplan and MBASIC, and they seemed to work perfectly although I did not give them an exhaustive test. I was also told that GBASIC would not work, but sure enough, when I tried it in my limited test, it worked fine. The one thing that it would not do is boot up the Microsoft CP/M diskette, but by using the Franklin version, I had no problem. Also, don't forget that MBASIC is included (there is no question that this version works).

Wordstar also works fine, along with DBASE II. I suspect there are some Microsoft products that will give some problems, but in my search I could find none. You see, Microsoft put some special code on their Z-80 card. What this code is, whether it is hardware or software I don't know, but I have been told it is there. If you have a better handle on this, let us know. Personally, I like all of these programs running much faster, so I would settle for some incompatibility.

Benchmarks

We ran some benchmark tests comparing the Microsoft card, the Z-80 from Franklin (called the 80 CPU card) and plain old Applesoft. Here are the results. It's interesting to note that the Ace card is faster than Applesoft too.

Benchmark	Microsoft card	Applesoft	Ace 1200 Z-80
I=1 TO 3000	7 seconds	4	3.2
I=I+ TO 3000	7.7	8.6	3.7
SIN (3) (500)	11.9	13.7	4.5

The speed of the Ace 1200 Z-80 is unbelievable, as can be seen by the above times. For use with DBASE II and Wordstar it cannot be touched.

Needless to say, for those of you that do machine language programming, and want the extra commands the Z-80 card offers, this card will run the fastest machine language of any computer that I can think of. I have not done benchmark tests of all the micros on the market, but I doubt that any would be significantly faster than this card; and in addition, probably nowhere near the low cost.

It is a shame that the extra 64K on the card cannot be used by the 6502, but you can't have everything.

The 80 Column Card

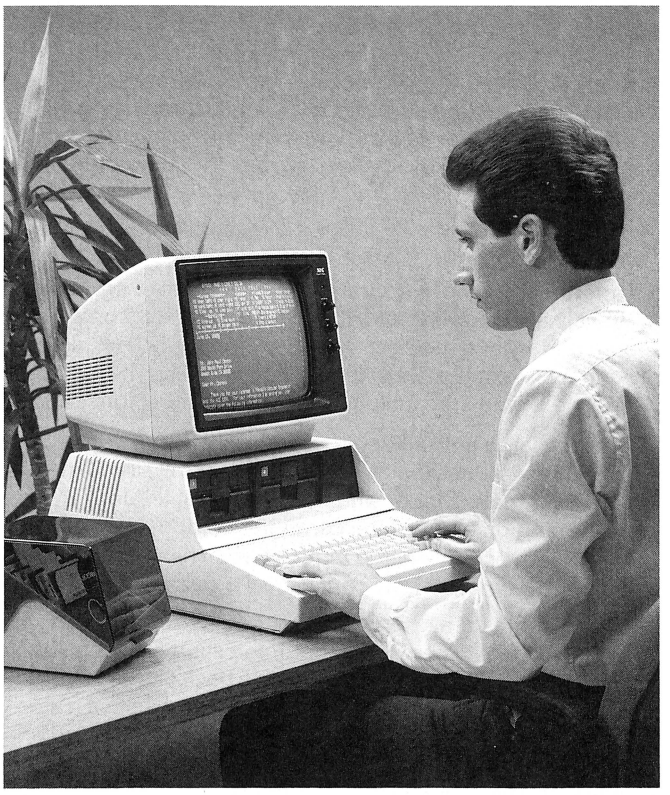
The 80 column card (called the Ace Display Card) is truly Videx compatible. I thought I would try one sneaky thing, and replaced one of the 2516's on the card (chip no. U24) with my half-intensity Videx chip to see what I would get on the screen. Lo and behold, it worked perfectly. It's hardware compatible as well as software compatible. By trial and error, I found out that U24 is the normal font, and U23 is protocal chip. You will notice a special sleeve on the MOLEX connector, which makes the plug polarized. You cannot put the jumper cable on incorrectly. The jumper goes from this plug on the card to the mother board.

The softswitch and inverse are included. You must be careful when using other 80 column cards in the Ace 1200, as some will cause a jitter on the 80 column display. This doesn't happen all the time, but it is common. It only happens when the unit has the Franklin color modification and you use a softswitch, such as the Videx softswitch. If your Franklin does not have any color, you can use anything.

My biggest concern with Videx compatibility was whether the Videx font editor would work with it; it does. In a future article, I will be discussing character fonts, for both the Videx card, and the computer. The Videx font editor will let you generate any kind of font. You can take any of the hundreds of public domain fonts, and load one into the font editor, burn it into an EPROM and put on the 80 column card. In fact, by using the techniques described in my EPROM article (June 1983 **Apple Orchard**, back copies still available), you can put a few fonts on the card.

There is one slight drawback to the Franklin 80 column card. The Videx card has a separate alternate character chip, which lets you plug in anything, but most people use it for the inverse chip. The Franklin, however, takes the normal chip and electronically turns it into inverse when you need it. Therefore, there is no inverse chip on the card, so you cannot replace it with another font. You can replace the normal chip with another font, but then everything you type will be in this font.

Is there a way around this? Fortunately, yes, there are a few ways. You can burn a 2732, place it in the 2716 socket and put a second font on that and switch between them (see the EPROM article again). Or you can simply replace some of the unused characters on the character set (there are many of them). The problem is trying to switch from software, so this is somewhat difficult if, for example, you want many fonts on the screen at the same time. This is the only limitation, however, as the card is completely Videx compatible.



The Franklin Ace Dual Interface Card

This card is a combination parallel and serial printer card. There are three switch groups also on the card. The parallel card portion is a pure Centronics compatible card. It has no graphics or other fancy features. It will also work with other parallel printers; the manual shows how.

The serial portion has settings for "printer ready", parity - seven or eight bits, baud rates from 45.5 up to 38400, and a serial port setup menu called with a CALL 49714. It also allows for use of a phantom slot so you can use two printers (one parallel and one serial) hooked into the one card.

The parallel portion uses CTRL I N or TAB N to control the video output. You can if you want, change the CTRL I to a CTRL D or anything else. You have the option of many other changes, such as eliminating the line feed, or extending the range of character codes transmitted by the Dual Interface Card.

You must understand, however, you do not have the ability to do screen dumps or graphics dumps unless you have the appropriate software already loaded in. Other cards on the market have these routines in hardware, such as the Interactive Structures PKASO card. However, if you want the luxury of having one card operate two printers, this Dual Interface Card is your choice.

Hardware

One area where Franklin excels is hardware. Let's start from the beginning. The power supply is about 60% more powerful than the Apple power supply. Second, it has a fan built in. The power supply is bolted together, not riveted, so you can replace any item in it much more easily than the Apple power supply. You may ask, why do you need so much power. Well, I'll give you one excellent reason. For you old timers, do you remember the 2 drive, 2 slot copy program that would copy a diskette

in about 25 seconds. Apple had to discontinue the program because it was burning out power supplies. This program was quietely squashed for this reason. It blew the doors off of even the fastest copy programs of today. It would turn on both drives at once and copy track by track, without formatting. As long as the programs were not copy protected, you could copy anything, including CP/M and PASCAL all in 25 seconds. Now that we have the ACE, we can go back to this. It does require having two controller cards, and two drives, but that is it.

Unfortunately, most programs are set for Slot 6, drives 1 and 2. What I have done is have a third drive on its own controller in Slot 7 and I have the best of both worlds. There is floating around a fast copy program for DOS 3.3, which many people have, and it works beautifully with this combination.

With the large power supply, you never have to worry about overloading you computer, *regardless*. I have all seven slots filled (I even have Slot 8, which is a switchable Slot 7). Even when turning on many of the cards, the computer just laughs. In fact, when it is very quiet at night, you can hear the computer laughing. (*Neil, have you considered a vacation? —PCW.*)

The fan blows air through the power supply onto the computer board. There are more interesting features. If you look to the left of the video output on the back of the board, you will see space for the cassette I/O devices. To use this feature, you must first solder in the sockets and plug in the components. However, the motherboard EPROMS must have the routines on them. What Franklin did is remove the cassette routines and replaced them with something else. However, if you refer back to my EPROM article, you could easily put the routines back on a 2732 and you're done. All you would have to do is switch them back and forth when needed. Needless to say, this voids the warranty on the Franklin, and you would have to use the monitor routine from your Apple II, but it could be done if you absolutely had a reason to do so (I'm sure I'm making tons of friends at Apple and Franklin by telling you this). We're merely discussing the technical possibilities here; consult your lawyer before proceeding.

Other Features

There are more features, most of which are not advertised. The I/O slots are a little farther apart than the Apple II and //e. This extra space does wonders for tight cables. It is a sheer joy to plug in some of the tough cards with this extra space, especially when all slots are loaded. Because the motherboard is larger than that of the Apple II, the traces are a little wider also, and this improves reliability, as there is less chance of a broken trace with this setup. Also, the motherboard is supported in more places than the Apple, so the board does not flex, also reducing trace and chip problems.

The Color Board

The color board from Franklin is unbelievable. Believe it or not, it has about 16 chips in it. It will give the capability of 48 colors and 256 shades, which is staggering. However, there is special software needed to accomplish this. This is where you will see a split between Franklin and Apple. The Apple //e has the enhanced graphics but only 16 colors, while the Franklin has the 48 colors and 256 shades. With all of these colors, it will be possible to have true flesh tones. I chuckle when I think of the job that Dave Turner at Interactive Structures is going to have in dumping all these colors to some new super color printer with some new super deluxe PKASO card.

The Keyboard

Without question, this is where the ACE 1200 excels. It has 72 keys including the «RESET» key, which is located under the front, so it is nearly impossible to hit it accidentally. The numeric keypad is a dual function keypad.

Now for some heavy stuff. The arrangement of the keys is done in EPROM. Can you smell what I am getting at by now? If you want to change the word processing keypad to a VisiCalc keypad, it can be done by reprogramming the EPROM. In fact, you could have two ROM sets on a 2732 and have both by flipping our famous switch. Again, refer to my EPROM article. Suppose I wanted the 7 key to be ESC-X, which is delete in FORMAT II. I could reprogram the EPROM for this function. I'm not that smart, but I'm sure that someone else is. It is only a matter of time before someone does it. Keyboard layout, even languages other than English, are possible. Just a matter of time.

The key tops are dished. One nice feature would be to have a dimple on the D and K keys for touch typing, but this was not included. There is a dimple on the 5 key on the keypad, which is nice for numberic data entering. Because the key tops pop off, it is possible to put on custom key tops for foreign languages, if so desired. I have no idea of who makes them, but I suspect one of the 50,000 people reading this article will tell us, and then we can tell the whole world.

As with all keyboards, yo have to get used to them. It takes a short while, but it is nice once you get used to it. I use the back arrow quite a bit, but I keep hitting the "=" key instead. I'll eventually get used to it though.

Comments

The Ace 1200 is an excellent machine if you want to work heavily in both regular 6502 and CP/M. The Z-80 card is the fastest on the market and does an excellent job in speeding up CP/M programs. It will do nothing, however, to speed up disk I/O. Unfortunately, you cannot access the 64K from the 6502 mode. There are other cards on the market that do allow this, but they only run at 2 MHz instead of 6 MHz. You win some, you lose some.

The computer is much sexier looking with the drives built in, but there is a price to pay. With individual drives, adjusting the speed is a (relative) breeze. You can drill a hole in the drive case (the Ace 10 drive came with it) to stick a small screw driver into and easily adjust the speed without opening the case or voiding the warranty. With the Ace 1200, you must disassemble the complete top portion, which is not an easy job. However, fortunately you do not have to adjust drive speed that often.

If you like to pop the cover every so often for whatever reason, the Ace 1200 top (called the Ace 1100) does not "pop" off that easily. It contains two disk drives and weighs the same. Therefore you should not remove the cover unless necessary or you are a glutton for punishment.

The compiler that is included in the Ace 1200 package makes this package a real bargain. I know of no other Z-80 card that includes a compiler, as they can cost an additional $200 or more.

All in all, the Ace 1200 is an excellent CP/M package that includes some very powerful software, fast hardware and excellent reliability and all the features of the Apple with numerous extras. It gives by far the most economical package for the 6502 and CP/M user on the market that also gives Apple compatibility.

The Ace 1200 list price without a printer card is $1995.

Some Very Good Reasons to Buy an Echo Speech Synthesizer.

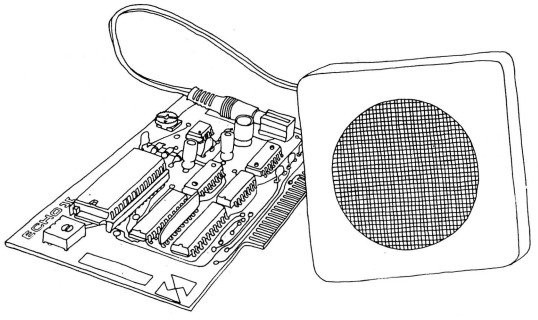
We're confident we have the most intelligible, versatile, and economical speech synthesizer on the market. Once you hear it, we're sure you'll be convinced too. All ECHOs are capable of speaking in four different voice modes which range from a robotic machine voice to natural female speech. (The fixed speech and custom modes are optional.)

It's Easy To Use

Unlike other speech systems, the ECHOs are very simple to use. It only takes a minute or two to get the ECHO talking. Any text which can be printed to the screen can be spoken. If you've written a BASIC program you can add speech with simple modifications.

Software Compatibility

Not only can you add speech to the programs you write yourself, over 25 top educational and adventure software manufacturers are currently designing programs to be compatible with the ECHO][. Be watching for details.



Value

Each ECHO comes ready to use with a speaker and tutorial-style manual. The ECHO][, priced at $149.95, also comes with a variety of demonstration and utility programs. The new ECHO GP (General Purpose), priced at $199.95 is a stand-alone unit with its own on-board microprocessor; it will interface with any computer through the serial port. All ECHOs have a two year warranty.

Bells And Whistles

If you want bells, whistles, music and sound effects, plus state-of-the-art sprite graphics capabilities, the ECHO technology is available on Synetix Systems' new Supersprite Board.

Check It Out

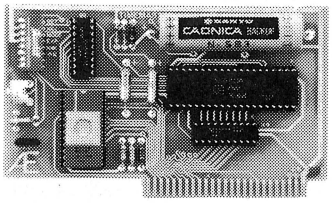
Most Apple dealers have the ECHO][available for demonstration as part of Street Electronics/ Orange Micro's unique Grappler+™, Bufferboard™, ECHO][™ Talking Demonstration.

Street Electronics Corporation
1140 Mark Avenue Carpinteria, CA 93013
Telephone (805) 684-4593

The Echo][is a registered trademark of Street Electronics Corporation. The Grappler+ and Bufferboard are registered trademarks of Orange Micro.

APPLIED ENGINEERING
THE BEST PERIPHERALS FOR THE BEST COMPUTER

The TIMEMASTER
Finally a clock that does it ALL!



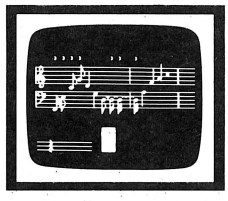
- Designed in 1983 using I.C. technologies that simply did not exist when most other Apple clocks were designed.
- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- Powerful 2K ROM driver — No clock could be easier to use.
- Full emulation of most other clocks, including Mountain Hardware's Appleclock (but you'll like the TIMEMASTER mode better).
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time. (Many examples are included)
- On board timer lets you time any interval up to 48 days long down to the nearest millisecond.

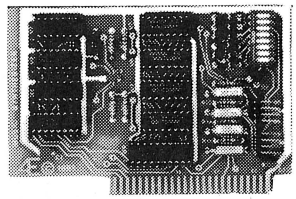
The TIMEMASTER includes 2 disks with some really fantastic time oriented programs (over 25) plus a DOS dater so it will automatically add the date when disk files are created or modified. This disk is over a $200.00 value alone — we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER.

If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER.

PRICE $129.00

Super Music Synthesizer

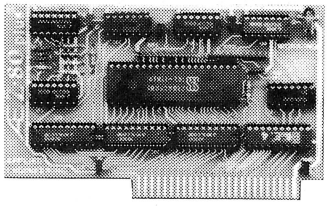




- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all the features of this board. Their software sounds the same in our synthesizer.)
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

PRICE $159.00

Z-80 PLUS!



- 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).
- All new 1983 design incorporates the latest in I.C. technologies.
- Red "CP/M WORKING" LED indicator, the Z-80 Plus does not interfere with non-CP/M programs.
- An on-card PROM eliminates many I.C.'s for a cooler, less power consuming board. (We use the Z-80A at a fast 4MHZ)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

PRICE $139.00

COMING SOON: The Z-80 Plus for the Apple III

Viewmaster 80

There used to be about a dozen 80 column cards for the Apple, now there's only ONE.

- TOTALLY Videx Compatible
- 80 characters by 24 lines, with a sharp 7x9 dot matrix
- 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 on the card are made with standard video connectors, no cables are soldered to the board
- All new 1983 design (using a new Microprocessor based C.R.T. controller)

JUST COMPARE!

	PRICE	BUILT-IN SOFTSWITCH	SHIFT KEY SUPPORT	PASCAL COMPATIBLE	7X9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	**169**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUP'RTERM	375	NO	YES	NO	NO	NO	YES	YES
WIZARD80	245	NO	NO	YES	YES	NO	YES	YES
VISION80	375	YES	YES	YES	YES	NO	NO	NO
OMNIVISION	295	NO	YES	NO	NO	NO	YES	YES
VIEWMAX80	219	YES	YES	YES	YES	NO	NO	YES
SMARTERM	360	YES	YES	YES	NO	NO	YES	NO
VIDEOTERM	345	NO	NO	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, Viscalc, and many others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE $169.00

MemoryMaster IIe 128K RAM Card

- 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)
- Available in 64K and 128K configurations
- Bank select LED's for each 64K bank
- Permits your IIe to use the new double high resolution graphics
- Automatically expands Visicalc to 95K storage in 80 columns! The 64K configuration is all that's needed, 128K can take you even higher.
- Complete documentation included, we show you how to use all 128K.

If you already have Apple's 64K card, just order the MEMORYMASTER 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 with 128K	**$249**
Upgradeable MemoryMaster with 64K	**$169**
Non-Upgradeable MemoryMaster with 64K	**$149**

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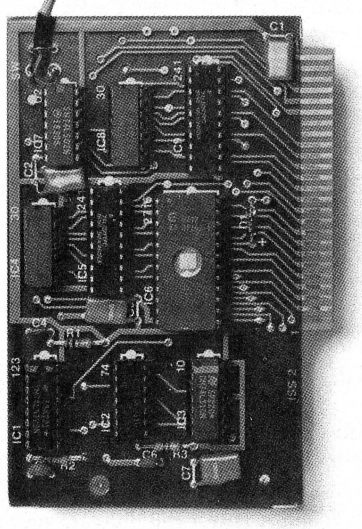
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The Status of Unit (1)

by John B. Matthews, M.D.



When a program is doing some lengthy processing or other, it is often desirable to check the keyboard occasionally to see if the user has pressed a key in an effort to interrupt that process. Apple thoughtfully provided a function in the APPLESTUFF UNIT to accomplish just this. It is a BOOLEAN function, called KEYPRESS, which returns TRUE if a key has been pressed. For a description, please see Chapter 7 of the Apple Pascal Language Reference Manual on special units.

When this is the only function needed in a program, it seems wasteful to include the entire APPLESTUFF UNIT from the System Library. Listing 1 is a short demonstration program which includes a Pascal function to accomplish the same thing. It too is named KEYPRESS and returns a BOOLEAN value indicating whether a key has been pressed. To do this, it invokes a built in procedure named UNITSTATUS which is more rigorously described in the document Attach-Bios by Barry Haynes (see Apple-Dayton DOM P1).

The general form for a call to this procedure is **UNITSTATUS (unitnumber, var, control)**. Here unitnumber is an integer specifying an I/O unit; in this case it is 1 for the CONSOLE. The unit's status is returned in var. The size and type of var depends on what unitnumber is given. For CONSOLE, it is a one word integer which is the number of bytes buffered in the direction asked for by control. This last parameter, control, is set to 0 for output status or 1 for input status. We are interested in CONSOLE input (control =1) hence, var will return the number of characters in the type ahead buffer.

If this number is non-zero then we know that a key has been pressed. If type ahead is not implemented on your system then UNITSTATUS will always return 0 and KEYPRESS will never return TRUE. Please note that this function will operate reliably only if there is output to the CONSOLE between calls to KEYPRESS. If you desire to call KEYPRESS during I/O to some other device, you should add a statement such as **WRITE (CHR(0))** before the call to UNITSTATUS. This will force the system to check the keyboard; writing null to the CONSOLE should produce no visible effect.

The test program simply reads lines from a known text file and writes them to the CONSOLE until it runs out of text or the user presses a key. The statement **UNITCLEAR(1)** clears the type ahead buffer before exiting; otherwise the Pascal command level would see any characters typed and try to execute them. Usually this would only cause the screen to clear, but if you typed an '**A**' to abort the listing then the system might try to assemble the work file. Try compiling the program with and without the **UNITCLEAR(1)** statement to see the effect.

Give the person at the console a break with KEYPRESS!

```
PROGRAM TEST;
VAR T: TEXT; S: STRING;

  FUNCTION KEYPRESS: BOOLEAN;
 VAR COUNT: INTEGER;
    BEGIN
      UNITSTATUS (1,COUNT,1);
      KEYPRESS:= COUNT>0
    END;

BEGIN
  PAGE(OUTPUT);
  WRITELN('Press any key to abort');
  RESET(T, '*:SYSTEM.WRK.TEXT');
  WHILE NOT (KEYPRESS OR EOF (T)) DO
    BEGIN READLN(T,S); WRITELN(S) END;
  UNITCLEAR(1)
END.
```

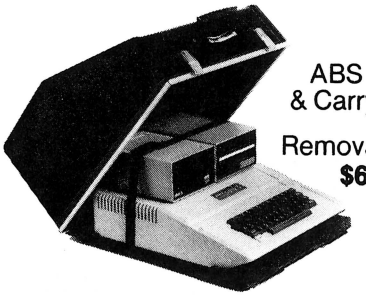
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Debugging Applesoft Programs

by Mike Kramer

Houston Area Apple Users Group

Applesoft BASIC on both the Apple II Plus and the Apple //e provides the user with an impressive number of capabilities which are designed to permit easy program testing and debugging. Unfortunately, there is no one place in the manuals that discusses the topic of debugging or how to use the tools provided. This article will discuss those capabilities and attempt to outline procedures which should help the relatively new Applesoft programmer to find program errors more quickly.

Examining Variables

One of the most valuable debugging aids provided by Applesoft is the ability to examine the last value of any variable in a program after its execution has been stopped for any reason. This permits checking the results of calculations, disk file inputs, or any other real, integer, or string value used in your program. You can do this by issuing (with program execution halted) an immediate PRINT command through the keyboard, with the name of the desired variable or variables, e.g., "PRINT A$". If the variable does not exist in the program or it has not been assigned a value yet, it will have a value of zero if it is numeric, or will display no value at all if it is a string. This capability is actually a feature of the BASIC language, not just Applesoft, so this technique will also work on your TRS-80.

As you will recall, changing the program in any way or issuing a RUN command will set all numeric variables equal to zero and will assign all strings a null value. This is great most of the time, since you can follow the poor programming practice of not initializing variables or including a CLEAR command at the beginning of your program. When you are debugging, however, it is absolutely essential that you do not add, modify, or delete a line in the program if you wish to look at the last value(s) of your variable(s).

At this point it is probably best to illustrate how to examine variables and attempt to show why this might be useful. First key in the following program and RUN it:

```
100 A = 10 : B = 5 : C = 2
110 A$ = "APPLE " : B$ = "COMPUTER"
120 D = A + B : E = B / C
130 C$ = A$ + B$
140 END
```

Next enter the following commands from the keyboard and see what happens:

```
[ PRINT A,B,C,D,E
[ PRINT A$,B$,C$
```

You should have seen a series of numbers and the words "Apple Computer" twice representing the last values of the variables in the program. The results were fairly predictable, but it should be obvious that similar commands could be very useful in tracking down unexpected results in more complex programs.

Although the example above was fairly short, immediate commands are limited to 256 characters, the size of the keyboard input buffer, and must not begin with a line number. In addition to PRINTing the last values of a variable, it is also possible to change the value of a variable by using an immediate command. The following example shows how all the values in an array can be checked and how a variable can be changed. First key in the following program and RUN it. Don't forget to first clear out the earlier program by typing NEW.

```
100 DIM A(20)
110 I = 20
120 FOR J = 1 TO I
130 A(J) = J
140  PRINT "A(";J;") =";A(J)
150 NEXT J
160 END
```

You should have seen a list of numbers on the screen starting with "A(1) = 1" and ending with "A(20) = 20".

Now type in the following immediate command:

```
] FOR K = 1 TO 20 : ? "A(";K;") =";A(K) :
NEXT K : I = 10 : GOTO 120
```

This should have resulted in listing of the 20 original values of A(I) followed by a short delay and a RUNning of the program with only ten values listed.

Trace

The Applesoft TRACE command causes the line number of the line being executed to be written on the screen. This is most useful when a program seems to hang up in an infinite loop or if the logic flow you intended does not seem to be followed. TRACE works without a problem if your program uses no DOS (PRINT D$ . . .) commands. As pointed out on Page 44 of the DOS 3.3 manual, use of TRACE can cause problems when accessing a disk file. Try running a program that writes to a file with TRACE in effect! You should end up with program line numbers in the file. The DOS manual suggests that defining D$ = CHR$(13) + CHR$(4) will make most DOS commands work properly but doesn't elaborate.

If you follow the practice of stacking multiple program statements in a program line, remember that the line number will be written on the screen for each statement in the program line. If you find it difficult to read the line numbers as they flash past your eyes, you might want to use the SPEED= command from the keyboard to slow down program execution. A comfortable speed is about 150. Be sure to reset it back to SPEED = 255 when you're through.

Monitoring DOS Activity

When you begin reading from or writing to disk files you'll often wonder whether things are happening as you intended. You can easily watch the activity between the computer and the disk using the DOS MON command described on Page 42 of the DOS 3.3 manual. The MON command can be issued from the keyboard before running a program or can be issued from within the program in a PRINT D$ statement. You may optionally display on the screen the commands as they are issued, the data as it is written to the disk, the data as it is read from the disk, or any combination of the three. The early versions of Apple DOS defaulted to the MON state on bootup, so many programs such as FILE CABINET issue a NOMON command at the beginning. If you are curious about the structure of FILE CABINET files, change the NOMON to MON, set SPEED = 150 and run the program. Many times it is useful to include a MONC,I,O statement in a program, as in my AUTOMATIC POKE MAKER in the June 1983 issue of **Apple Orchard.**

Note: All of the techniques described above also work with Apple /// Business BASIC, except for the MON command. In addition, Business BASIC does not reinitialize the variables when you type RUN.

Print Statements

A tried and proven method of debugging is the addition of PRINT statements to your program to print values of selected variables at various points in the program. In fact, adding WRITE statements is an essential debugging tool with compiled languages such as ForTran (*or even Pascal! —PCW*) since they don't offer the tools you have with Applesoft BASIC. The use of diagnostic PRINTs can be effective but is time consuming, can introduce new errors, and requires surgery to remove after debugging is complete.

Flow Charts

If you follow good programming practice, you probably flowchart your programs before writing or typing in any code. Sure you do. Well, it now appears that some computer math teachers teach that flow charts are a "waste of time". Unfortunately, it's easier to conceive an idea for a program and begin typing it in, so most of us tend to write a program and then wonder why it doesn't work. That's also a "waste of time".

Often you can find the problem by taking the time to flow chart the faulty program. You don't have to be very fancy or follow any particular rules. Just draw blocks, label them to indicate the major function they represent, and connect them with arrows indicating the program flow. Don't attempt to write down every line of the program or you will quickly become tired of flowcharting.

Summary

Software debugging is like any other troubleshooting skill, which is learned through experience. I have attempted to describe some of the tools and techniques and briefly how to use them. The rest is up to you.

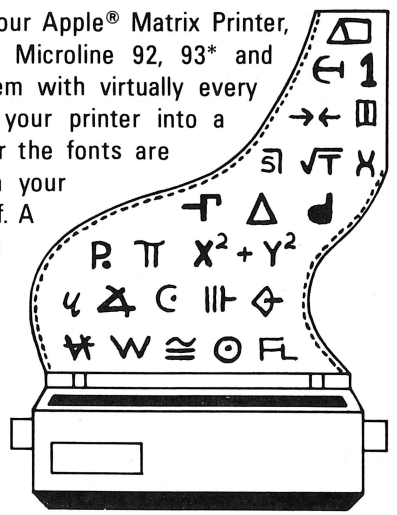
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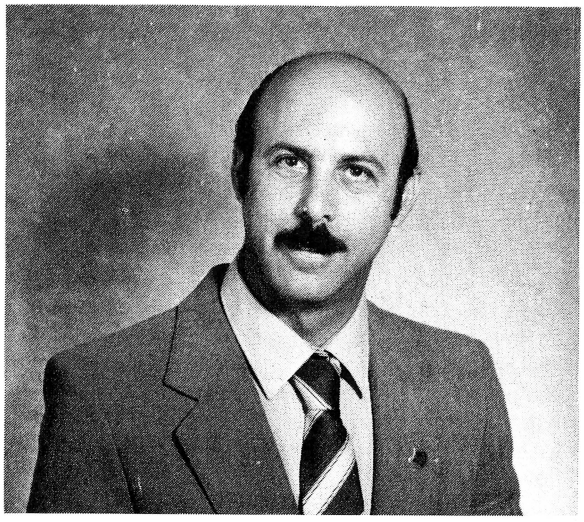
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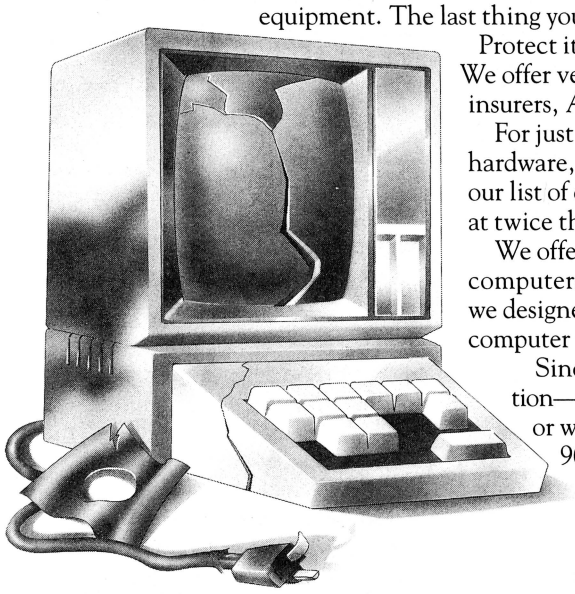
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Apples in France

by Andre Babeanu

Hello; I am a French Apple user. This year I came to the United States and had the occasion to see what Apple means here, and I felt about it just the way a dwarf feels like when facing some giant. For there's not much in common between what one may see here and what's overseas.

Let me explain. There may be some 35,000 Apple II users in France (the ///'s are really few in number, and are used most of the time for business purposes). One may classify these users into three groups: individuals who use their Apple II for their own purposes, companies which use it as a professional piece of hardware (there are quite a lot of them that do so) and, for the last two years, some private schools where computer science is shyly taking its place among the other courses. Obviously the first category represents the great majority of Apple II users.

What do they do with their computers? Well, I guess the same things as any other user: play games, use it for housekeeping, and many other things. There's one thing to notice: most of them are only at the beginner level or just above. There are several reasons for this. First, the Apple II, as just any good microcomputer, has only become affordable to quite everybody a couple of years ago. The most spectacular price falls took place last year when the "new generation" of micros entered the market. You will be about to tell me that one can learn a lot about how to use an Apple II in two years' time. You will be right, but he may need some help. And here comes my second point and the big difference between France and the States.

In the U.S., there are many Apple User Groups where every owner of an Apple, be he a beginner or an advanced programmer, may come and discuss, exchange hints and programs, and find advice. Every month many of the groups produce a diskette with plenty of general purpose programs, that is available for all. It's really difficult not to get out of trouble when you are in it.

There's nothing like this in France. Of course, there are clubs that deal with computers; I dare say there are a lot of them. But *very* few are specific to Apple users and these are not very well known. One may find in such a club every sort of hardware from Sinclair to IBM through Sharp and Apple, depending upon how wealthy the club is and how generous its donors. People who attend the meetings have often no computer themselves; there they find an opportunity to learn something about the computer, and to use one.

As a matter of fact, these clubs have three major purposes: to help beginners get started, to give those who cannot afford buying a computer the possibility of working with one, and to develop some software good enough to be sold and so get the money to improve the hardware and software available to the members. In all this, the beginners can get some programming basics. But as far as solving any specific problems they may be faced with, they are often left to themselves, either because nobody knows how to fix them or because those who do are busy, or not there, or have even left the club after buying their own computer (which sometimes occurs).

The interesting thing with these clubs is they have quite wide-open meeting times, and their own clubhouses. Many of them are open three to five afternoons a week and in some, one can get a key from one of the members of the hotline at any time and go and work there. Quite often people meet according to their points of interest creating SIGs (which have a slightly different meaning from the U.S. definition, as the point of interest may just be a particular computer or one of the pieces of software the club is developing or whatever people want to meet for).

Another point is that software is really expensive in France. As there are very few companies that develop software for Apple in France, and as most of what they do is for professional use (essentially business), almost all of the programs concerning games, utilities and everything that is not connected to business (and often even that) comes from the States. This means the average selling price in France is 1.5 to 3 times higher than in the U.S. It is a pity to say it, but that leads to much copying not for commercial purposes, but only to be able to afford some additional programs.

Things started to improve two years ago when a group of about ten users decided to create *POM'S*, the French magazine for Apple users. Since this magazine publishes lots of hints, utilities, general purpose programs and reviews, people who have an Apple can now find the information they need. *POM'S* provides a place where one can write and ask for help when there's a problem. The most difficult thing for us is to find the right compromise between articles des-

tined to beginners and to advanced programmers. For a time the beginners felt a bit frustrated, but as they proved to be the major part of the subscribers, things are now changing.

Whatever the level of the programs published in *POM'S*, everybody can use them all even if he doesn't fully understand how they work. That is in great part due to the fact that each issue comes with a diskette in which the code and source of every program listed in the magazine are present. This is most appreciated for it avoids typing in the programs (which are sometimes very long) and allows those who haven't got the right assembler or the Pascal compiler to also run these programs. Moreover, every program is thoroughly tested before publication and so are the diskettes. This means that all the errors one may do when typing in a program are avoided; the program will always run. Which doesn't mean it is 100% bug free: conceptual errors may have been left (by the way have you ever seen a program doing *always* exactly what it is supposed to do?). However, the source is given for those who'd like to fix such errors or bring their own improvements to it.

Of course, none of our diskettes is copy-protected and as a matter of fact we do expect people to copy them and hand them around. A diskette without the magazine is just as a commercial program without its documentation. We have discovered that each copy of the magazine is read by three to five Apple users. Which means that although we sell only 6,000 copies per issue (that's not too bad after just 18 months), we have about 20,000 to 25,000 readers or at least users of our diskettes. And we guess that once people have seen what the magazine is like they will subscribe, just because they want to have their own copy at hand at any time.

In this way *POM'S* has become a real link between the French Apple users and made things a bit easier then they were before. We still do lack User Group structures and it will take some time to build them up. However, things are on their way now and I hope there will be some people in France that will take inspiration in the American model.

(Andre has been working with us, as part of an "idea exchange" between **POM'S** *and* **Apple Orchard.** *His efforts are quite likely to improve both magazines, and we thank him.—PCW)*

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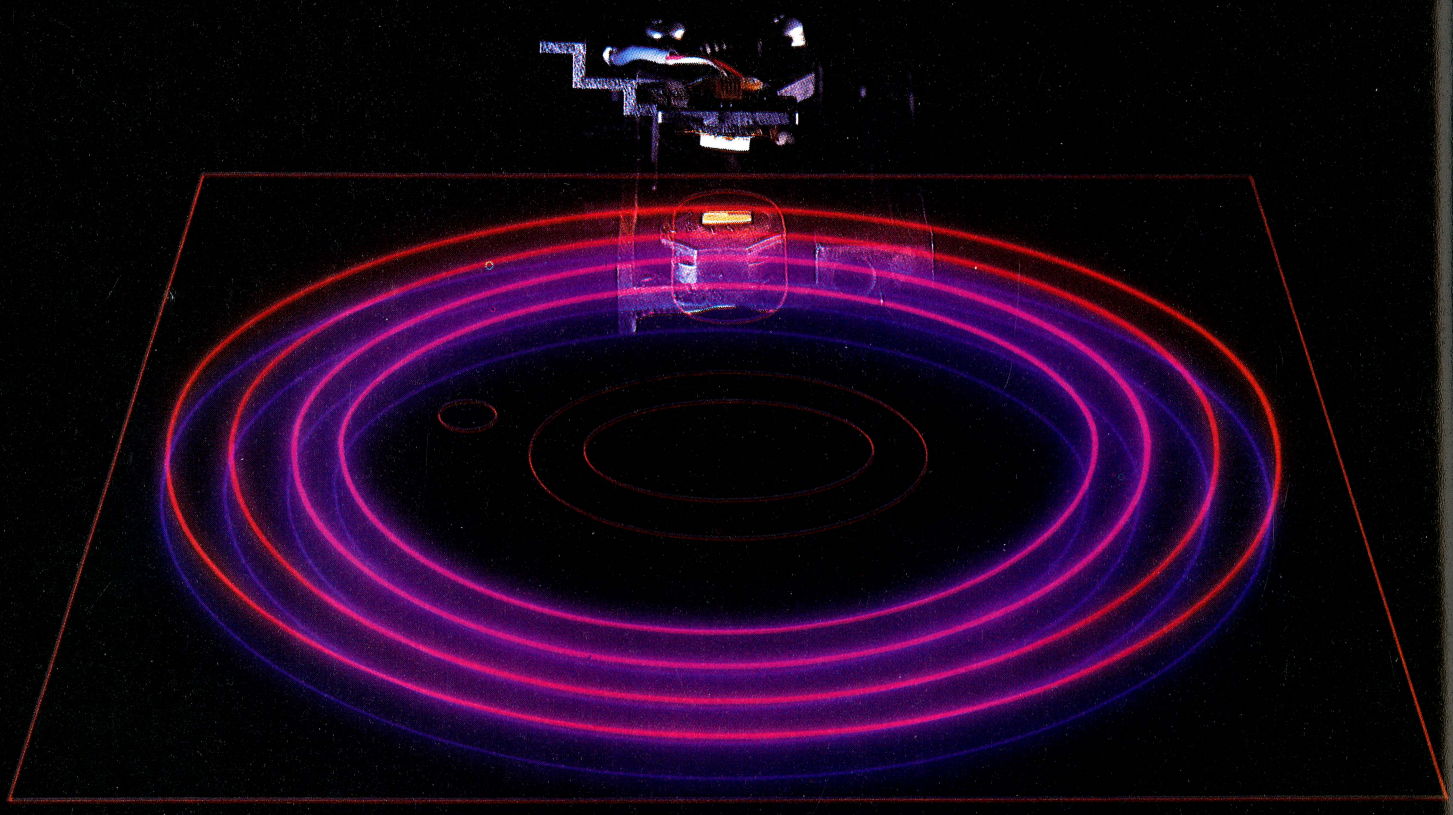
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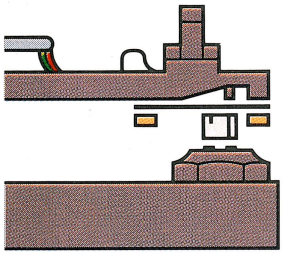
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We put our heads together to give you a superior disk drive.

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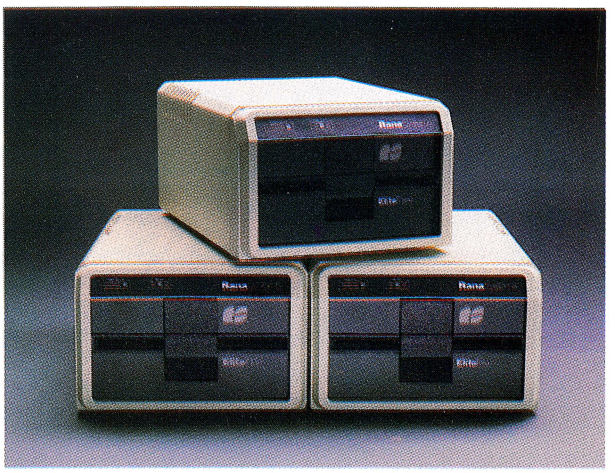
It takes 4½ Apples to equal the capacity of our superior Elite Three.



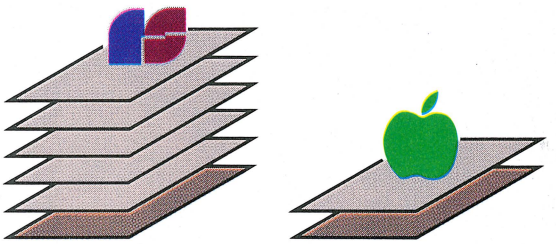
The Elite Two offers an impressive 326K bytes and 40 tracks on each side. This drive is making a real hit with users who need extra storage, but don't require top-of-the-line capacity. Costwise, it takes 2½ Apple drives to equal the performance of our Elite Two. And twice as many diskettes. Leave it to Rana to produce the most cost efficient disk drive in the world.

We've always had the guts to be a leader.

Our double sided head may be an industry first for Apple computers, but nobody was surprised.



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Your word processor stores 5 times as many pages of text on an Elite Three diskette as the cost ineffective Apple.

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Kids Can't Wait

by Nicole Lefcourt





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In my ten months with **Apple Orchard**, I have heard a great deal about Apple Computer Inc., its plans, and its products, many times each week. I have met various Apple employees at our office but had never been to the Apple Computer offices. So, I was not prepared when I entered those offices and was asked to sign in, wear a visitor's badge, have the receptionist announce my arrival and escort me to an elevator where she used a plastic card to electronically activate my transport. I was told I would be met at my destination and that I was to sign out upon finishing my business. All this was done very respectfully, but security was the goal all the same. I later revealed my *naivete* when upon inquiring about the formality of my reception, the response was "to deter computer espionage." One gets the impression that as Apple has grown, some of these lessons were learned the hard way.

Why am I telling you all this? Because it's an interesting aspect of a corporation like Apple, whose new products must be better, faster, bigger, smaller, cheaper, and flashier than their competitors. This same company that spends so much energy keeping that information from their competitors is also involved in an information dissemination program called Kids Can't Wait. Depends on the information, I guess.

How it all Started

Kids Can't Wait (KCW) evolved from the original brainchild of Apple Chairman Steve Jobs. He proposed a national program whereby large corporations would be eligible for increased federal tax credits if they donated scientific equipment to schools. Unfortunately, in 1982 Congress adjourned before passage was achieved. But in the California state legislature, such a bill was passed and enacted into law. Companies donating computer equipment to public and private elementary and secondary schools in California will receive State tax credits equal to 25% of the fair market value. This law went into effect January 1, 1983.

Apple Computer had been waiting for this opportunity for some time. Now that the door was opened, a donation program had to be developed. So, in December 1982, Apple Computer hired a young man named Steve Scheier. Is Mr. Scheier a computer expert? He is not; his background is in legislative support and public program administration. He was given the challenge of developing the Kids Can't Wait program; simply to offer an Apple //e computer, at no cost, to each of approximately 9000 schools.

How do you give away 9000 computers in an orderly fashion? How do you regulate their use? Most importantly, how do you prepare the recipients for this new machine when they may have had no exposure to your product? How do you make this offer appealing and believable? After all, who gives away something for nothing? (Well, almost nothing.)

Steve had worked with the State Department of Education, and is aware of the red tape and piles of paperwork one must pass through to consummate any deal with a school district. He must also be aware that teachers and administrators are overwhelmed with paper work and meetings. So what he has done is create a unique program, which appears to be well organized with a minimum amount of confusion and paperwork. If his plan works, approximately 9280 Apple //e computer systems will have found their way into California schools at about the time this magazine is published.

Apple's Philosophy

"We are in the midst of a revolution that is of the same magnitude and power as the industrial revolution of the nineteenth century. It is changing our society, our skills, and the character of employment in the United States." so said Steven P. Jobs, chairman of Apple Computer. He continues:

"At its heart is the electronic computer—invented in America 36 years ago and destined to become as essential and pervasive a tool in the 1980's as the calculator became in the 1970's.

"To maintain America's technological leadership, we must begin training students—of *all* grade levels—in today's computer technology. If we do not, we risk producing a generation of Americans who will be both non-competitive and non-literate in the information society now evolving.

"To address this, we've created the Kids Can't Wait program. It's a partnership, comprised of Apple, teachers, parents and kids; each of us doing our best to work toward the final goal.

"Putting one computer in each school won't solve the problem alone. But the program will serve as a catalyst, to give teachers, parents and students the equipment they need to begin to work to find a solution—to experiment, to innovate, to learn."

Steve Scheier adds that it is Apple's hope and their one request that students and teachers will take the time to learn and begin to understand computer technology. Apple asks that they become active participants, not passive recipients.

How the Program Works

In mid-May, letters were sent to all eligible public and private schools and district administrators in California. These letters invited them to participate in the KCW program. Schools considered eligible were:

1) All K-12 public schools.
2) Tax-exempt private schools with enrollments of 100 or more.
3) State-certified private special education schools.
4) Selected institutions operated by the County Offices of Education.

Each school would receive an Apple //e personal computer with 64K memory, monitor, floppy disk drive, manual, and Apple Logo (a powerful computer language designed especially for students). The suggested retail value is $2,364.00. In addition, schools will receive coupons for free and discounted hardware and software from participating accessory manufacturers and software publishers. Apple will also provide Applesoft BASIC Program and //e Reference Manuals, and a software directory.

So what was the hitch? It can't be so easy, can it? Must the recipients swear to only purchase Apple computers from this day forward? No. Must all teachers and students recite a daily mantra which includes the word "Apple"? No. Must all schools fly an Apple flag? No! Apple's requirements are minimal and seem reasonable. Schools are asked to sign an acceptance statement assuring Apple that the computer will be used directly for student education purposes and that each computer will be placed in its individual destination school rather than being "collected" and grouped together at any one site. In addition, they must agree not to sell or exchange the donated system.

The other requirement involves one school representative attending a mandatory 60- to 90-minute orientation session, given by a local Apple dealer, *prior to delivery* of the system. This has been done between July and September in order that all computer distribution can be completed by September 30, 1983.

I attended one of these orientations to observe the instruction from the viewpoint of a computer neophyte. Prior to working here at **Apple Orchard**, my degree of computer literacy was limited to the words "hardware" and "software". Although I had developed a working knowledge of many of the computer's functions, my understanding of computer architecture was still minimal. Therefore, I felt I was in an appropriate position to evaluate the orientation.

I was fortunate to attend a session given by Ian Browde, a sales executive for Exectec in Los Gatos, California. One could tell he was a veteran trainer. His talent for interjecting humor into his presentation made the hour pass by quickly. In addition, his ability to organize complex computer concepts into easily understood elements, through the use of analogies to the human mind, made the information more tangible. Mr. Browde dealt mainly with the areas of hardware, software, and applications. We were given a tour of the inside of the computer and shown how information is stored and transferred. We were then given a short tutorial on basic computer architecture and its use of binary notation to represent numbers and letters. In addition, we received elementary instruction in other computer topics such as diskette handling, booting the system, keyboard functions, warranty, RAM, ROM, and DOS. We concluded with a hands-on session using the Apple program called *Apple Presents . . . Apple.* After the session, orientation certificates are signed which acknowledge participation. This clears the way for delivery of the computer system.



Ian Browde conducting one of the teacher orientation sessions.

As a gesture of appreciation to participating dealers, Apple Computer will give one //e computer to a dealer for every 50 certificates they sign. Each school is given one certificate, although more representatives from the school may be able to attend the orientation.

Mr. Browde spoke of how impressed he was with the Kids Can't Wait program. He feels that their effort is "indicative of the professional attitude at Apple Computer."

To further aid in the successful implementation of the program, International Apple Core member clubs have been contacted and asked to "adopt" a school in their area. The members could serve as resource persons to that school in terms of answering questions and aiding in the set-up of the system once it arrives. Stephen Scheier feels that the clubs can make a "positive contribution to spreading computer literacy in our schools through the Kids Can't Wait program."

Future of KCW

As of July 1, about 8500 schools had accepted Apple's offer. It's not surprising to see such enthusiastic response to this program.

Meanwhile, Steve Jobs' original idea is by no means forgotten; in both the U.S. Senate and the House of Representatives, new bills have been introduced which, if passed, would permit projects such as Kids Can't Wait to expand nationwide. Interested parties in other states have also indicated interest. According to Mr. Scheier, Apple Computer hopes to place 80,000 computers in schools across the nation.

We can't wait.



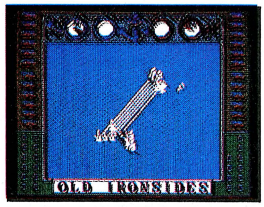
For families who are serious about FUN...

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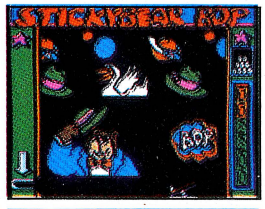
Children delight in the bubble-gum colors and cartoon-like animation. Grownups and game connoisseurs are challenged by the expert skills and strategy required to survive to the final rounds.

Look for this new software — created by Optimum Resource, Inc. and distributed by Weekly Reader Family Software — in finer computer stores. Or call toll-free 1-800-852-5000, Dept. AB-29.

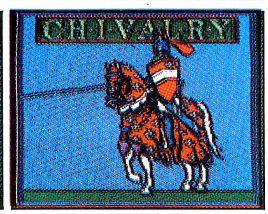
Apple II or Apple II+, with 48K and one disk drive, 3.3 DOS; and Apple IIe or Apple III. Keyboard, paddles or joy stick.



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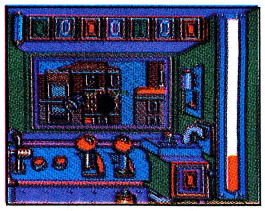
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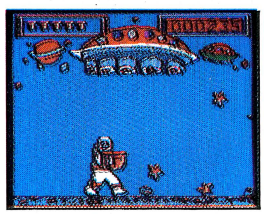
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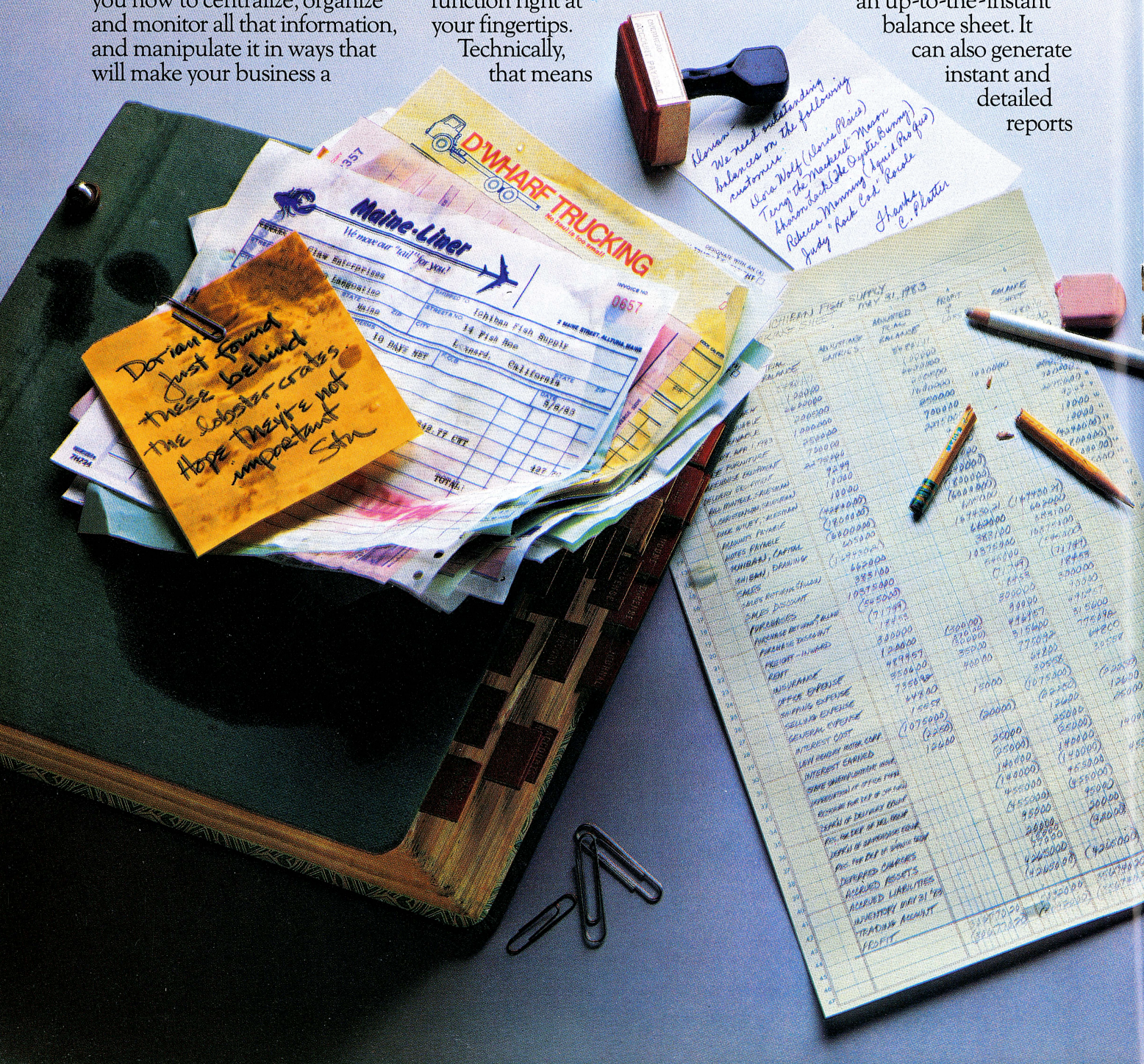
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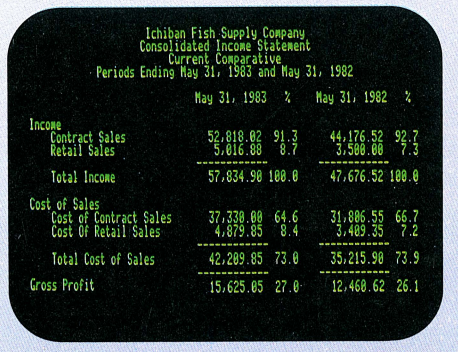
on your customers and vendors.

So you know who owes whom, how much, and how come.

And just how well your cash flow is flowing.

And where to give credit where credit is due (a customer inquiry feature allows you to make credit decisions based on the most current information).

You can also list your purchases by discount dates. And take advantage of them in no uncertain net terms. You can even keep payroll records without paying more, because it's part of the same package.



Ichiban Fish Supply Company
Consolidated Income Statement
Current Comparative
Periods Ending May 31, 1983 and May 31, 1982

	May 31, 1983	%	May 31, 1982	%
Income				
Contract Sales	52,818.02	91.3	44,176.52	92.7
Retail Sales	5,016.88	8.7	3,500.00	7.3
Total Income	57,834.90	100.0	47,676.52	100.0
Cost of Sales				
Cost of Contract Sales	37,338.00	64.6	31,806.55	66.7
Cost Of Retail Sales	4,879.85	8.4	3,409.35	7.2
Total Cost of Sales	42,289.85	73.0	35,215.90	73.9
Gross Profit	15,625.05	27.0	12,460.62	26.1

Your Apple can generate instant income statements (with expense ratios) or balance sheets, and let you compare them to last month's or year's, then print them out to suit your banker.

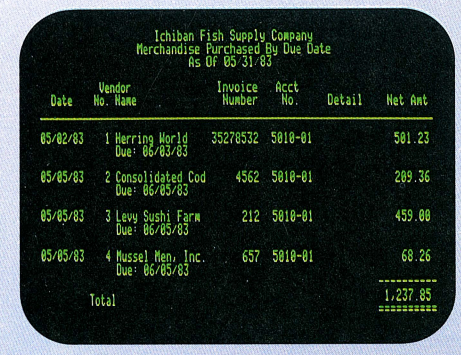
Profit from history.

In business as in life, experience is the best teacher. And the Apple/BPI system can provide you with instant comparisons of this-month-this-year vs. this-month-last-year, or this-year-to-date vs. last-year-to-date.

So you can quickly spot changing expense ratios and make decisions with 20/20 foresight.

The BPI General Accounting Package also lets your income statements be coded by location, department or product line. So you know where your money's coming from.

And where it's not.



Ichiban Fish Supply Company
Merchandise Purchased By Due Date
As Of 05/31/83

Date	Vendor No.	Name	Invoice Number	Acct No.	Detail	Net Amt
05/02/83	1	Herring World Due: 06/03/83	35278532	5010-01		501.23
05/05/83	2	Consolidated Cod Due: 06/05/83	4562	5010-01		289.36
05/05/83	3	Levy Sushi Farm Due: 06/05/83	212	5010-01		459.00
05/05/83	4	Mussel Men, Inc. Due: 06/05/83	657	5010-01		68.26
Total						1,237.85

It can also allow you to take full advantage of merchandise discounts. So you'll know whom to pay, when to pay, how much to pay—and save a lot of clams in the process.

Make a timely statement.

Add an Apple Dot Matrix or Daisywheel printer to your Apple III, and you can print out your entire balance sheet in minutes.

Or any number of reports, from cash receipts to payroll ledger to income. You can even print checks and customer statements.

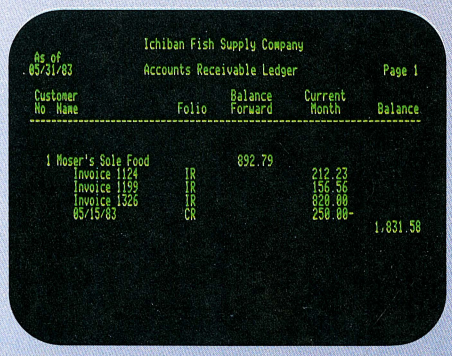
The impressively professional



results will make an important statement to everyone you deal with—including your banker.

More ways Apples pay.

There are more people in more places doing more things with



As of 05/31/83
Ichiban Fish Supply Company
Accounts Receivable Ledger
Page 1

Customer No	Name	Folio	Balance Forward	Current Month	Balance
1	Moser's Sole Food		892.79		
	Invoice 1124	IR		212.23	
	Invoice 1199	IR		156.56	
	Invoice 1326	IR		820.00	
	05/15/83	CR		250.00-	
					1,831.58

To avoid fishy transactions, you can instantly display customer's payments, charges and current balance. In this case, a few more cans of tuna would put Mr. Moser over his $2,000 limit.

Apples than with any other personal computer in the world.

Because for one thing, there's more software for Apples than for any other personal computer in the world. So the same Apple that handles all your accounting needs can also handle financial spreadsheets, word processing and electronic filing.

You'll also find programs that are designed specifically for your kind of business. Be it dentistry, architecture or swine herding.

Of course, the best way to learn all the ways Apples can help you make better business decisions is to visit any one of over 1500 authorized Apple dealers.

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6

Willow Glen's Computer Quest

by Lenore A. Shelley, Principal

(In a sense, this is the story of a school that couldn't wait. So the Principal, an Apple owner, organized and moved a co-operating group of volunteer parents, children, and teachers toward an apparently unattainable goal: computers for the kids. In the accompanying article, Ms. Shelley is, we are told, unduly modest about her role in the computer project at Willow Glen School, one elementary school in the San Jose (CA) School District. What counts is the results. From our standpoint, it's gratifying to see a group of folks working together to solve a large problem, rather than just waiting for somebody else (like the government) to help them. Those who had a part in the Willow Glen experience have every reason to be proud of their continuing achievement, and we're proud to share the story with you.—PCW)

How were we going to get computers for our elementary students? A group of concerned parents and teachers were holding their first meeting to discuss this question. We *knew* that a knowledge of computers should be a vital part of the curriculum at the elementary level, and had organized to determine the activities necessary to achieve this goal.

It soon became apparent that this wasn't going to be an easy project. Questions: *what* would the Computer curriculum be? *Where* would the computers be housed in an already crowded school? *Who* would teach the computer program, when we were already under-staffed? *How* would the faculty learn about computers in their already busy schedules? *What software* would we need for the curriculum we wanted to present? *What brand of computer* would have the most appropriate software, and would be the easiest for our kids to learn and operate?

And then there was the toughest question of them all . . . how were we going to *fund* the computer program in this land of Proposition 13? At the onset, it seemed to be an almost overwhelming task to tackle, but the committee members were committed, interested and willing to spend many hours working on the problems. It was our belief that kids should have a chance to use computers, and it was our job to be sure that the Willow Glen Elementary students had this opportunity to learn!

We decided that our first task was to see what was happening in schools that already had started computer programs. Visits to several neighboring districts were set up, substitutes were hired for committee members, and our quest began. We also met with Jim Mc Cauley from the Santa Clara County Office of Education. It quickly became apparent that Jim would be an important resource, as he had been active in the computer movements in his school district, and had been hired for this task by the County office. We also found that there was a person in charge of funding sources in the County Office; Marcella Sherman was asked to meet with our committee to discuss funding ideas.

Our first visit was to the Campbell Elementary School District. We met with Art Ring, the coordinator of the computer program there. His enthusiasm served to further cement our committment to computer education. Art explained that the computers in Campbell had been allocated to schools at their request, and that curriculum had been developed centrally for their Computer Assisted Instructional program. One program, for math, was given to each school. Other programs were available for check-out at the district office.

A visit to Rolling Hills School showed us that we had a long way to go! Here was a beautiful computer lab, housed in an entire classroom. The fifteen computers were "networked" (a new term to us) so that they could all be set up with the same program, when it was booted on the master computer. An entire class came into the Computer Lab. Half of the students worked on drill and practice in multiplication, while the remaining students worked at desks on seatwork assignments. At mid-period, the groups were switched. This lab had a paid staff member who conducted the program. Staffing was provided by the district and School Improvement Program



Judy Johnson teaches computer literacy.

funds. The principal also discussed the security measures taken to secure the lab; a special alarm system, deadbolts on the doors, and bars on the windows. This visit showed us that there were even more points to consider before we were ready to begin our computer program.

The next visit was to the Cupertino School District office. What was happening in Apple's home city? Cupertino had purchased one computer for each school through building funds. They had installed the computers as each school requested them. The Cupertino people stressed the importance of not forcing the computers on schools or staff members, but in letting them discover the uses and versatility of the computers for themselves. Cupertino's computer program includes special programs for the gifted students, who came to one school for this work.

A visit was made to Blue Hills School to see their unique program. The computers were mounted on portable carts. Each class had their scheduled computer time, and student helpers wheeled the carts to the assigned classroom. Each of the six computers had its' own name, given by the students. The classroom teacher decided on the program to be used, and each student in the class was assigned to a certain amount of time on the computer, while the rest of the class went on with their regular work.

We observed students from first to sixth grades working independently on some very challenging programs. Many of the programs being used at Blue Hills School were to develop thinking skills and logic. Many different ideas were gleaned at Blue Hills by our committee members; here was an entirely different approach to computer education!

After several visits, from which new and valuable ideas were derived, our committee met again. We felt that our computer program should probably be in a laboratory setting, as our plant did not lend itself to moving the computers from class to class. Half of our classrooms are out of the main building, and computers would have had to be wheeled over blacktop and through the weather. We also determined that housing must be in a central area, and that security for the systems was critical. We felt that several types of programs should be implemented. Some children would benefit from Computer Assisted Instruction, and some teachers would prefer this option, while others would really thrive on the creative-thinking, logic type of programs.

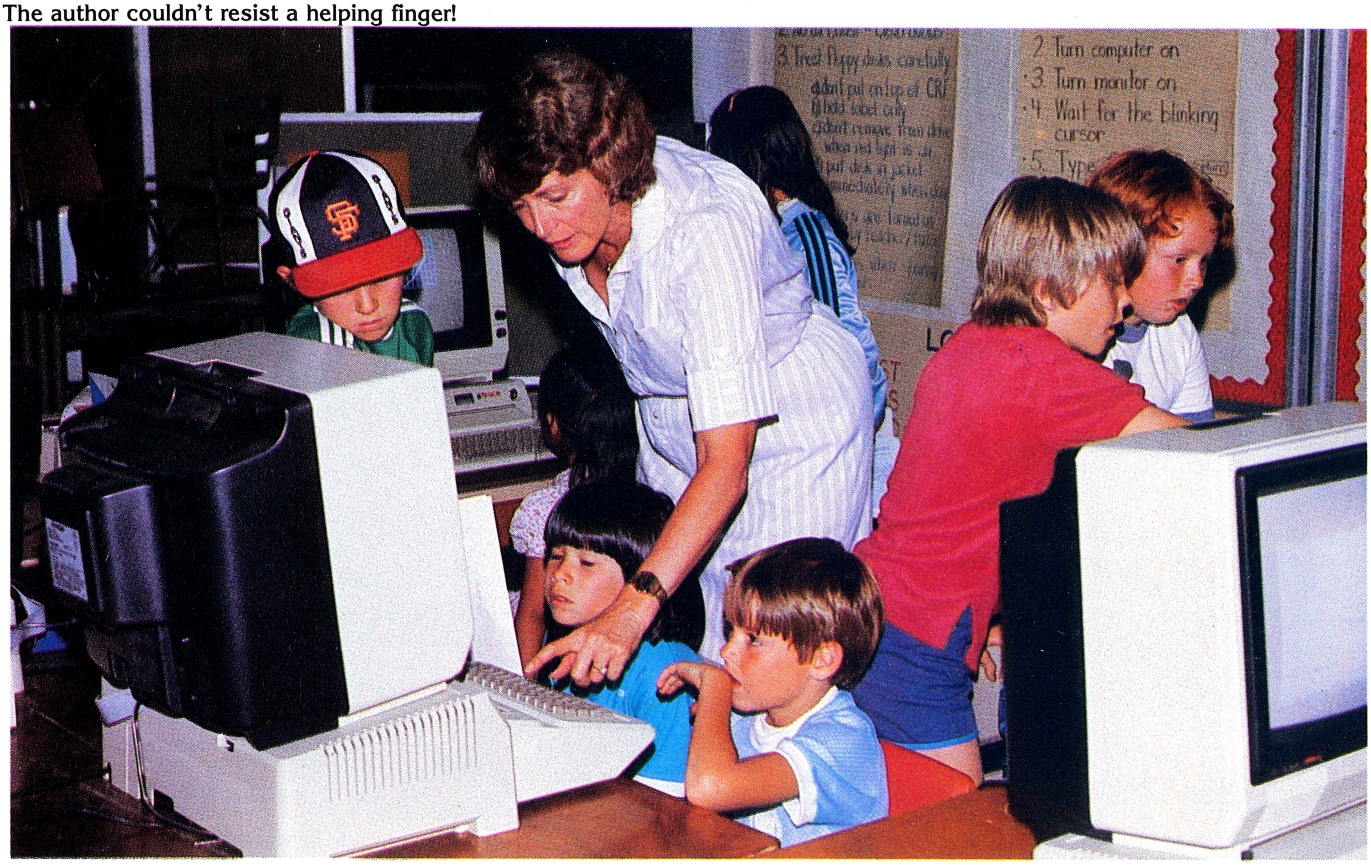
Jim Mc Cauley arrived for the first staff "inservice" meeting. He discussed the possibilities for computer education, and showed us the fascinating Apple Logo program. Logo is a first exposure to programming; students learn commands to make a "turtle" move graphically on the screen. They can create fascinating patterns and designs, and learn about angles to create different forms. Logo was to be a must! We visited the County Resource Center to review other available software. Many of the programs were the type which caused students to expand their thinking skills. More and more, we became convinced that the computers should be helping children with skills that they could not do with pencil and paper in the classroom.

We felt that the students needed to be literate in the use and operation of computers, to be aware of the possibilities for them, and to utilize programs which were creative in their approach to this goal. In addition, many fine programs are available for management of grades, test data, and student achievement records as well. These programs would be very useful to the classroom teachers.

Funding, funding, funding . . .

Meanwhile, we still had to decide how we were going to fund the computers. Our school district was in severe financial difficulties. (*Ms. Shelley puts it mildly; the San Jose School*

The author couldn't resist a helping finger!



District was the first in California to declare bankruptcy. — PCW) We knew financial assistance from the district was an impossibility. Marcella Sherman met with the committee, and gave us much material on grant funding possibilities. She stressed, however, that there were not a great many grants available (how right she was!), and suggested that we rely on local fund-raising efforts to get our computers. Local business sources were suggested; firms in the Willow Glen area as well as the larger companies in the Santa Clara Valley. One of our parent members went through the student files to see which parents worked for these firms. Another volunteer contacted these parents to see if they would take a computer proposal to their companies.

Committee chairman Cindy Peterson and I went to a "Grantsmanship" workshop, at which we learned that the usual educational proposal was *not* the way to obtain grants or funding in the public sector. The workshop leader stressed the importance of being brief, succinct, and using a completely different format in writing our proposal. She was extremely helpful in getting us organized. After the two-day workshop our task was to write the proposal, and return the next month with the proposal ready for critique. Cindy and I struggled with this, asked other committee members to make suggestions and revisions, and finally completed a wonderful proposal! One of the committee members took the proposal to her husband, a very involved computer buff—and he tore it to shreds. Using his helpful suggestions, we revised it once again. This time we took it to the faculty, and, following their suggestions, revised it again!

The following month we attended the second session of the Grantsmanship Workshop and, of course, revised the proposal again. Now the proposal was perfect! We looked in vain for somewhere to submit it. I called many of the funding sources in the two-inch thick book, and was told they were not interested, did not fund elementary schools, that computer hardware was not being funded, did not reach the key people involved in the foundation, etc. etc. Parents were contacted to take the proposal to their large industries, such as Hewlett Packard and IBM. The proposal disappeared into their depths, probably forever.

So much for the "traditional" funding channels. But the parents were just as interested in getting these computers as was the staff, and our PTA became involved! They had already set aside $1700 for computers the previous year, so we did have a start! In the proposal budget we had determined that we needed about $10,000 in the first year for our computers and software.

Fund raising began! The kids began selling calendars all over the district, with two PTA volunteers working on the calendar distribution. To everyone's amazement, the kids sold $14,000 worth of calendars! Our profit, after deducting the bad checks and returned calendars, was $5,500! Individual parents donated several hundred dollars to the computer fund. A school carnival, a flea market and a Spell-a-thon put us over the top, with the PTA donating another $2,000 gleaned from their other fund-raisers. Software would be obtained through our state-funded School Improvement Project.

Apples Picked

During our many committee meetings we had discussed the type of computers that would meet our needs. After reviewing the software available, we determined that the Apple computer



Inservice night for parents with consultant Mary Humphries.

was the one we wanted. The most software programs of the type we wanted were available for the Apple. I have an Apple at home; it's versatile, easy to use, and maintenance-free. Further, the school district was recommending that the schools purchase Apples, as they employed a person who could repair them free to the schools. One parent suggested we contact Ian Browde of Exectec, as he had been very helpful to her in her work as a computer program designer. She also thought we might get a "good deal" through Ian. We found him to be knowledgable, excited about computers in the Elementary Schools, and interested in assisting us in our quest!

It's Computer Week!

Meanwhile, back at the school, the staff was beginning to ask a lot of questions. Why were we spending all this time and effort on getting computers when we were short of paper and pencils in the classrooms? Who was going to teach computers once we did get them? Where were we going to put them? Were they going to become the all-important thing at the school, perhaps replacing the classroom teacher? The troops were getting restless! The answer? A Computer Week at Willow Glen to motivate staff, students and community. Ian arranged for the loan of ten Apple Computers from Apple Computer, Inc. We would be able to use them for an entire week!

Once again the hard-working committee met, and divided up the tasks! We needed to schedule each class for their computer time, plan an orientation program for each grade-level, plan activities for parents during the week, and staff development activities. Committee members took on different grade levels. The curriculum planning was aided by Kathy Swanson, our most knowlegable parent, who programmed an introductory program for each grade level and then prepared twenty individual disks to use.

An excellent literacy program was found, complete with worksheets. These materials were duplicated for use along with an accompanying film strip on 'What Computers Can Do'. Half of the class would be on the computers, while the other half worked on the literacy materials and viewed the filmstrip. The literacy program, published by S.V.E., had been rushed to us from the company two days before computer week started! Meanwhile, Ian informed us that the Apple //e computer had just been introduced, and that was what we should buy, and what we would have for Computer Week! What could be better?

Cindy and I went to Palo Alto to pick up the Apples. We met Ian, who helped us carry all ten systems to my van. Monday morning, early, we "installed" the computers! We were so concerned about security that we put the computer systems on carts every evening and locked them in a closet! Another task for the hard-working computer committee.

We hired an outside resource person, Marcia Henry, to meet with the staff that week, and to hold an evening parent class. Each class was scheduled for one full period on the computers. Parent volunteers once again came through to help us with the students. When the kindergartens came we almost had one adult to one student! It is an under-statement to say that the week was enjoyed by all! Excitement prevailed at Willow Glen! The kids couldn't wait for their turn on the computers! It's safe to say that they did not fail to tell their parents what they had learned that day at school, instead of the usual "Nothing", when asked this question! The motivation worked. Now we couldn't wait for *our* Apples to arrive!

Arrival

Since we were purchasing five systems, we were able to take advantage of a wonderful offer by Apple, even before the "Kids Can't Wait" program. For each five systems purchased, a school could receive one free system. The order was placed, and finally, in April, our *six* computers arrived during the spring break! Ian Browde was on deck to install the systems the Monday following vacation. They all WORKED!

We placed the computers on tables in a small area in the center of our open space school. They looked wonderful, with their color monitors glistening. Staffing was still a problem to deal with. With only six computers, only 12 students could work at one time. (We found it better to put two students at each computer). I felt it was imperative that students begin to use the computers as soon as possible, so that they, and the teachers, would feel that all the hard work was worthwhile.

The Program Begins

I began working with each class on the computer literacy materials. Each student was to receive two hours of literacy. We took a post-test on 'What a Computer Can Do' which reviewed the uses of the computer, and stressed the fact that computers are controlled by people, and *not* the other way around. (It was amazing how many students thought that computers could think!) We utilized the "Apple Presents . . . Apple" disk which came with the Apple //e; it showed many facets of the operation of the machines. We found that even students who could not read were able to work with this program.

A group of "Computer Tutors" were trained during this period. Two students were selected from each class to become tutors and to assist their classmates when they were in the literacy program. These students were fantastic in their interest, and in the amount of knowledge they gained with a few extra sessions on the computers. It was great to see even six-year olds able to turn on the computer, load a program, and explain it to their peers! Sometimes the tutors even started teaching the group the literacy lesson if I was a few minutes late. Computer Tutors received a special badge when they completed four periods of training. They all kept wanting to know when we would have another "meeting".

Cindy Peterson began teaching computer classes after school in the Enrichment Program. This is a fee-based program at Willow Glen, and students were charged for the extra courses. Part of the proceeds were returned to the school for use of the computers. This money enabled us to purchase more software.

Meanwhile, parents began helping in the computer instructional program. Two parents who had been active on the computer committee each volunteered one-half day per week in the lab, and another parent also volunteered to help. They conducted the curriculum I had planned. This gave us the idea for staffing next year. Computer literacy courses were taught to adults during the summer, for a fee of $25.00 for eight hours, *or* free if they volunteered to give one-half day per week to the computer lab during the coming school year. Over forty responses were received from interested parents. Our S.I.P. Resource teacher, Joanne Chambers, volunteered to coordinate the lab next year, and to plan the curriculum for the volunteers. After a Fall orientation for parents, they will be scheduled on a regular basis, with plans for substitutes in the event someone can't make it on their day.

Trace Stations were installed to secure the computers to the tables, as well as the disk drives and monitors. A printer has arrived, so that word processing will become a part of our curriculum next year as well. The computers will be used by parents and summer school classes this summer. Parents are using the wonderful VersaForm Data Base program to catalog our software and type up class lists for next year.

Our plans include the hope of getting up to eight systems, which would enable half of a class to use the computers at once. We could then have a teacher bring an entire class, and use the Campbell idea of having some on computers while others work at written tasks nearby. We are one of the schools to receive a free computer from Apple as part of the "Kids Can't Wait" program, so the fund-raising will be a bit easier in the fall.

A creative idea has been proposed by one father: he feels we should rent computer time to adults in the evenings at school (as do some libraries and computer firms) and use this revenue for more software programs and other computer needs. In fact, he has volunteered to help us get this started in September. Believe it or not, fund-raising through Bingo is another possibility.

So the Computer Program at Willow Glen Elementary was born! It took the combined efforts of many people, staff, parents and students to make it happen. It seems to be the consensus that it was worth it all. When I watch the students at the computers, see their excitement and happy faces, and observe the creativity the computers are able to generate, I *know* that it was worth all of the time, effort, worry and meetings it took to bring it about. Our Student Council voted the computers their favorite activity this year (along with the carnival). Students ask every day when they will get to use the computers again. Some students have made special arrangements to get computer time during their lunch hours. Parents are excited and involved. More of the staff members are beginning to see the capabilities of the computers. In short, it's *happening* at Willow Glen!

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Apple /// Text File Case Converter

by Mike Kramer

Houston Area Apple Users' Group

Having been an avid Apple II user for almost three years when I bought an Apple ///, I had come to know and love a number of good Applesoft BASIC programs which I wanted to run under Apple /// Business BASIC. Before I had gathered up the courage to attempt any significant conversions, I was given a copy of Apple-CON (available from the IAC for $10). This program, which has been placed in the public domain by Apple Computer, reads an Applesoft program from a DOS disk, converts it to Business BASIC, and stores it on a SOS disk. Unlike the old Integer BASIC to Applesoft converters on the Apple II, Apple-CON translates Applesoft syntax to Business BASIC syntax. The resulting program does usually require some cleanup to eliminate obscure PEEKs and POKEs or other code that Apple-CON cannot convert. Lines containing such code are flagged with a preceding REM statement containing a row of dashes.

One of many nice features of Apple /// Business BASIC is that keywords entered in lower case are converted to upper case when the program is listed. Hence the whole program can be typed in lower case and it will end up with variables in lower case and the BASIC commands in upper case. This proves particularly valuable in verifying correct syntax, since incorrect commands are not converted to upper case.

Since I had become accustomed to having lower case variable names, I was disappointed, but not surprised, to find that programs converted by Apple-CON retained whatever case was in the original Applesoft program. Being lazy by nature and having better sense than to risk introducing errors by retyping the variable names in lower case, I decided to write a program to convert the resulting Apple-CON text file to lower case. Then when the converted program was EXECd into memory, the variables would be lower case and the keywords in upper case. After finishing the first version of the program, I decided that optional conversion to upper case could be provided with little extra code. The program *Text File Case Converter* is the result.

How to Use it

The output file from Apple-CON or any other SOS text file can be converted either to upper case or to lower case. The disk containing the text file should be placed in one drive and the disk containing Text File Case Converter in the other. If you wish, the source and target files can both be on the same disk. Then Text File Case Converter should be RUN.

The first question asked is whether the file is to be converted to upper case or to lower case. Either a "U" or an "L" is sufficient. Next, you are asked for the pathname of the file to be converted. You may end execution by typing "END" or pressing RETURN, or you may list the directory by typing "CAT". If you list the directory, you are again asked for the pathname of the file. The program will immediately attempt to OPEN the named file. If the file cannot be OPENed for any reason, you are asked to enter another name. Next you are asked for the pathname of the target file. You may optionally END or list the directory at this point. If an improper pathname is entered, you will asked to enter another.

Finally, you are asked if you also want the results listed on a display device. If your response is "YES" or "Y", you will be asked for an output device name. Initially the default is .CONSOLE. If you enter another device name, it will be the default on the next run. If the device specified has not been included in the SOS.DRIVER file on your boot disk, you will be asked to enter another device name. If you have made it through all the dialogue, you will be rewarded with a text file containing the converted file. If you obtained the results on a list device you were able to see (with some sacrifice in execution speed) that the conversion was done as requested. To confirm that the conversion was done, fire up Apple Writer or some other text editor and look at the file.

Listing 1 shows a short Applesoft program that was converted to Apple /// BASIC using Apple-CON. Since there were no particularly unusual commands in the Applesoft program, there is no difference in the code generated for the Apple ///. Listing 2 shows the same program after processing with Text File Case Converter. Note that all BASIC keywords in Listing 1 are in upper case. Note also that you may have to go back and manually change some characters in the resulting program to upper case.

By the way, the program in Listing 1 (or 2) is a good example of the Shell-Metzner sorting technique which you may want to add to your library. It allows entry of up to 20 names (first and last), breaks the name into first and last names (provided there is an intervening space), sorts on

last names, and lists the names as entered and in sorted order.

How the Case Converter Works

Text File Case Converter is actually a simple program, consisting of a loop that reads a line from one TEXT file, steps through the line looking at each character for alpha characters to convert, performs the conversion, and writes the resulting line to another TEXT file. The rest of the program is dialog with the user and error handling. The following comments describe how the program works.

Lines 260-300: Perform some initialization and display the title block, setting a window to leave it on the screen.

Line 310: Determine if the file is to be converted to all upper case or all lower case.

Listing 1
After APPLECON

```
100   REM         SORT DEMO
110   REM  WRITTEN BY MIKE KRAMER
120   REM           1/1/83
130   DIM R(20),G$(20,2)
140   TEXT:HOME
150   NR=1
160   PRINT:INPUT"NAME:";NA$:IF NA$="" OR NR=20 THEN 250
170   NR=NR+1:R(NR-1)=NR-1
180   FLAG=0
190   FOR J=1 TO LEN(NA$)
200     IF MID$(NA$,J,1)=CHR$(32) THEN G$(R(NR-1),1)=LEFT$(NA$,
      J-1):G$(R(NR-1),2)=RIGHT$(NA$,LEN(NA$)-J):FLAG=1
210     NEXT J
220   IF FLAG=0 THEN PRINT:PRINT"ENTER FIRST & LAST NAME WITH S
      PACE"
230   GOTO 160
240   REM   SORT FILE
250   M=NR-1
260   M=INT(M/2):IF M=0 THEN 330
270   L=1
280   I=L
290   IF G$(R(I),2)<=G$(R(I+M),2) THEN 310
300   X=R(I):R(I)=R(I+M):R(I+M)=X:I=I-M:IF I>=1 THEN 290
310   L=L+1:IF L>(NR-M-1) THEN 260
320   GOTO 280
330   FOR J=1 TO NR-1
340     PRINT G$(J,1);" ";G$(J,2),G$(R(J),1);" ";G$(R(J),2)
350     NEXT
```

Listing 2
After TEXT FILE CASE CONVERTER

```
100   REM         sort demo
110   REM  written by mike kramer
120   REM           1/1/83
130   DIM r(20),g$(20,2)
140   TEXT:HOME
150   nr=1
160   PRINT:INPUT"name:";na$:IF na$="" OR nr=20 THEN 250
170   nr=nr+1:r(nr-1)=nr-1
180   flag=0
190   FOR j=1 TO LEN(na$)
200     IF MID$(na$,j,1)=CHR$(32) THEN g$(r(nr-1),1)=LEFT$(na$,
      j-1):g$(r(nr-1),2)=RIGHT$(na$,LEN(na$)-j):flag=1
210     NEXT j
220   IF flag=0 THEN PRINT:PRINT"enter first & last name with s
      pace"
230   GOTO 160
240   REM   sort file
250   m=nr-1
260   m=INT(m/2):IF m=0 THEN 330
270   l=1
280   i=1
290   IF g$(r(i),2)<=g$(r(i+m),2) THEN 310
300   x=r(i):r(i)=r(i+m):r(i+m)=x:i=i-m:IF i>=1 THEN 290
310   l=l+1:IF l>(nr-m-1) THEN 260
320   GOTO 280
330   FOR j=1 TO nr-1
340     PRINT g$(j,1);" ";g$(j,2),g$(r(j),1);" ";g$(r(j),2)
350     NEXT
```

Lines 390-410: Get pathname of the file to be converted, list directory, or END.

Lines 420-440: Set variable "which$" to indicate to error routine where error occurred, set up for branch to error routine, and OPEN file to be converted.

Lines 520-560: Get pathname of destination file as done above for source file and OPEN file.

Lines 640-700: See if converted text is also to be listed on display device. Default is initially .CONSOLE, although the next run will use the last device name entered. When RETURN is pressed, the cursor is positioned in the proper line and the device name is output. Line 690 assures correct positioning of device name if the cursor is on the bottom line of the screen when RETURN is pressed. Line 700 OPENs the device for output.

Lines 780-790: Prepare to continue execution at Line 1040 when the end of the file is reached. INPUT line of text from the file to be converted.

Lines 870-880: Initialize temporary string variables to null. Determine whether to convert to upper case or lower case and set conversion variables accordingly.

Lines 890-920: Convert to selected. Step through each character of the line read from the file. If the conversion is to lower case and the character's ASCII code is in the range 65 through 90 (A-Z) subtract 32 to convert to lower case. If the conversion is to upper case and the character's ASCII code is in the range 97 through 122 (A-Z) add 32 to convert to upper case. Concatenate characters into new string "temp$".

Lines 1000-1030: Output converted line to destination file and to the optional display device. Return to Line 790 to read another line.

Line 1160: CLOSE the files and the optional display device.

Lines 1120-1130 See if another conversion is wanted. If not, reset the window, clear screen, and END.

Lines 1210-1350: Check for error conditions and set up proper error message. If none of conditions in Lines 1210 - 1330 exists then display error code and line number and END. If one of these conditions exists, display message and return to appropriate line according to current value of "which$".

Listing 3
TEXT FILE CASE CONVERTER

```
100   REM     ***********************************************
110   REM     **                                           **
120   REM     **          Text File Case Converter         **
130   REM     **                                           **
140   REM     **           Written by Mike Kramer          **
150   REM     **       Houston Area Apple Users Group      **
160   REM     **                 12/27/82                  **
170   REM     **                                           **
180   REM     ***********************************************
190   REM
200   REM     ***********************************************
210   REM     **                                           **
220   REM     **             Print Title Block             **
230   REM     **                                           **
240   REM     ***********************************************
250   REM
260   bell$=CHR$(7):blank$="
                                                    ":output.devi
      ce$=".CONSOLE"
270   TEXT:HOME:INVERSE:VPOS=1:FOR i=1 TO 5:PRINT blank$:NEXT i
280   VPOS=2:HPOS=16:PRINT"***          Text File Case Converter
            ***":HPOS=16:PRINT"***           Written by Mike K
      ramer         ***":HPOS=16:PRINT"***      Houston Area Ap
      ple Users Group     ***":NORMAL
290   WINDOW 0,6 TO 80,24
300   HOME:VPOS=2
310   INPUT"Convert file to upper case or lower case? ";case$:c
      ase$=LEFT$(case$,1):IF case$<>"U" AND case$<>"u" AND case
      $<>"L" AND case$<>"l" THEN 310
320   REM
330   REM     ***********************************************
340   REM     **                                           **
350   REM     **      Get Name of File to Be Converted     **
360   REM     **                                           **
370   REM     ***********************************************
380   REM
390   PRINT:INPUT"Pathname of text file to be converted, CAT, E
      ND: ";source.pathname$
400   IF source.pathname$="CAT" OR source.pathname$="cat" OR so
      urce.pathname$="Cat" THEN CATALOG:GOTO 390
410   IF source.pathname$="" OR source.pathname$="END" OR sourc
      e.pathname$="End" OR source.pathname$="end" THEN 1130
420   which$="source"
430   ON ERR GOSUB 1210
440   OPEN#1 AS INPUT,source.pathname$
450   REM
460   REM    ***********************************************
470   REM    **                                           **
480   REM    **           Get Name of Output File         **
490   REM    **                                           **
500   REM    ***********************************************
510   REM
520   PRINT:INPUT"Pathname of target text file, CAT, END: ";tar
      get.pathname$
530   IF target.pathname$="CAT" OR target.pathname$="cat" OR ta
      rget.pathname$="Cat" THEN CATALOG:GOTO 520
540   IF target.pathname$="" OR target.pathname$="END" OR targe
      t.pathname$="End" OR target.pathname$="end" THEN 1130
550   which$="target"
560   OPEN#2 AS OUTPUT,target.pathname$
570   REM
580   REM    ***********************************************
590   REM    **                                           **
600   REM    **         Get Name of Hardcopy Device       **
610   REM    **                                           **
620   REM    ***********************************************
630   REM
640   PRINT:PRINT"List program lines on output device? (Y/N) ";
      :GET yes.or.no$:PRINT yes.or.no$:IF yes.or.no$<>"Y" AND y
      es.or.no$<>"y" THEN 780
650   PRINT:vtab= VPOS:PRINT"Pathname for output: ";output.devi
      ce$;:HPOS=22:INPUT"";response$
660   IF response$="" THEN 690
670   output.device$=response$
680   which$="display"
690   VPOS=vtab-1*(vtab=19):HPOS=22:PRINT output.device$
700   OPEN#3 AS OUTPUT,output.device$
```

Listing 3 continued

```
710   REM
720   REM   ***********************************************
730   REM   **                                           **
740   REM   **     Read Lines of Text From Source File   **
750   REM   **                                           **
760   REM   ***********************************************
770   REM
780   ON EOF#1 GOTO 1040
790   INPUT#1;line$
800   REM
810   REM   ***********************************************
820   REM   **                                           **
830   REM   **       If Alpha Convert to Proper Case     **
840   REM   **                                           **
850   REM   ***********************************************
860   REM
870   temp$="":c$=""
880   IF case$="L" OR case$="l" THEN lower.code=65:upper.code=9
      0:delta=32:ELSE lower.code=97:upper.code=122:delta=-32
890   FOR i=1 TO LEN(line$)
900     IF ASC(MID$(line$,i,1))>=lower.code AND ASC(MID$(line$,
        i,1))<=upper.code THEN c$=CHR$(ASC(MID$(line$,i,1))+del
        ta):ELSE c$=MID$(line$,i,1)
910     temp$=temp$+c$
920     NEXT i
930   REM
940   REM   ***********************************************
950   REM   **                                           **
960   REM   **     Output to Specified Destination(s)    **
970   REM   **                                           **
980   REM   ***********************************************
990   REM
1000   IF yes.or.no$="n" OR yes.or.no$="N" OR yes.or.no$="" THE
       N 1020
1010   PRINT#3;temp$
1020   PRINT#2;temp$
1030   GOTO 790
1040   CLOSE
1050   REM
1060   REM   ***********************************************
1070   REM   **                                           **
1080   REM   **      Check if Another Conversion Wanted   **
1090   REM   **                                           **
1100   REM   ***********************************************
1110   REM
1120   PRINT:PRINT"Another conversion? (Y/N) ";:GET yes.or.no$:
       IF yes.or.no$="Y" OR yes.or.no$="y" THEN 300
1130   TEXT:HOME:END
1140   REM
1150   REM   ***********************************************
1160   REM   **                                           **
1170   REM   **               Error Handling              **
1180   REM   **                                           **
1190   REM   ***********************************************
1200   REM
1210   IF ERR=23 THEN message$="Files Busy":GOTO 1350
1220   IF ERR=25 THEN message$="I/O Error":GOTO 1350
1230   IF ERR=26 THEN message$="File Too Large":GOTO 1350
1240   IF ERR=27 THEN message$="Disk is Write Protected":GOTO 1
       350
1250   IF ERR=29 THEN message$="Bad Path":GOTO 1350
1260   IF ERR=30 THEN message$="File Not Found":GOTO 1350
1270   IF ERR=31 THEN message$="Path Not Found":GOTO 1350
1280   IF ERR=32 THEN message$="Volume Not Found":GOTO 1350
1290   IF ERR=33 THEN message$="Duplicate File":GOTO 1350
1300   IF ERR=34 THEN message$="Disk Full":GOTO 1350
1310   IF ERR=35 THEN message$="File Locked":GOTO 1350
1320   IF ERR=36 THEN message$="File Not Open":GOTO 1350
1330   IF ERR=37 THEN message$="Device Not Found":GOTO 1350
1340   HOME:VPOS=12:HPOS=30:PRINT"Error "; ERR;" in Line "; ERR
       LIN:TEXT:END
1350   PRINT:PRINT bell$;:PRINT"** ";message$;" **":POP:IF whic
       h$="source" THEN 390:ELSE IF which$="target" THEN 520:EL
       SE 650
```

Disk Map

An Illustration of the Use of Conditional Assembly

by Peter Meyer

Recently, there have appeared several assemblers for the Apple II which incorporate two advanced features: macros and conditional assembly. In this article, I will demonstrate the use of both of these features. The demo program is for a utility routine which will display a graphic representation of the free and the occupied sectors on a disk. (Apple DOS 3.3 is assumed throughout this article, as is a 48K Apple with Applesoft in ROM and DOS at its usual location.) The kind of disk map that this program displays (see Figure 1) will be familiar to users of some of the copy utilities currently available commercially.

A macro is shorthand for a sequence of assembly language instructions. The macro must be defined (as a certain sequence of statements) at the start of the program. Whenever, during the course of assembly, a macro is encountered, its corresponding sequence of instructions is assembled. The use of macros is a great convenience in assembly language programming.

Conditional assembly is also a very useful feature to have in an assembler. This allows you to combine several versions of a program. By specifying the values of one or more variables prior to assembly, different versions of the object code can be produced.

The disk map routine presented in this article comes in two forms: a relocatable version and a non-relocatable one. The latter will function properly only if executed at $7530 (decimal 30000). The former will function properly regardless of its absolute location in memory (this is what "relocatable" means). Conditional assembly techniques are employed in the program so that by putting RM = 0 (at the start of assembly) one obtains the non-relocatable version, whereas by putting RM = 1 one obtains the relocatable version.

The relocatable version is intended to be used as a subroutine invoked from within an Applesoft program. Although there are various ways of interfacing a machine language routine with an Applesoft program, one of the easiest ways is to append the routine using my utility, the Routine Machine (Southwestern Data Systems). Thus the relocatable version of this disk map routine is intended to function as a Routine Machine module, that is, as a machine language routine which has been appended to an Applesoft program using the Routine Machine. (The Routine Machine also permits removal of modules, provides a report of modules appended, etc.)

To understand the source listing for the disk map routine, you should keep in mind that it is really two programs in one. For the most part they coincide, but at several places the non-relocatable version requires its own special instructions and the Routine Machine version requires its own. For example, the Routine Machine version (since it is designed to be called as a subroutine from an Applesoft program) ends with an RTS, whereas the non-relocatable version (since it is designed to be invoked from the keyboard) ends with a JMP DOSWARM, that is, a jump to $3D0, at which is a JMP to a routine in DOS which leads back to BASIC immediate mode (in other words, a warm start). This is coded (using the Merlin assembler) as follows:

```
DO RM
RTS
ELSE
JMP DOSWARM
FIN
```

If RM = 1 on assembly then this code produces an RTS instruction; if RM = 0 then it produces a JMP $3D0. The DO-ELSE-FIN structure is common to conditional assembly in various assemblers, but the syntax may differ (for example, .DO-.ELSE-.FIN in the S-C Macro Assembler).

Let's now look at certain parts of the accompanying source listing. Line 34 allows the assembly variable RM to be defined at the keyboard, thus specifying the version (relocatable or non-relocatable) to be assembled.

```
Tracks along top and bottom, sectors down each side.
          Occupied sectors marked by "*".

  0000000000000000111111111111111112222
  0123456789ABCDEF0123456789ABCDEF0123
0***                * *                *0
1***                * *                *1
2***                * *                *2
3***                * *                *3
4***                * *                *4
5***                * *                *5
6***                * *                *6
7***                * *                *7
8***                * **               *8
9***                * **               *9
A***                * **               *A
B***                * **               *B
C***                * **               *C
D***                * **  *            *D
E***                ****  *            *E
F***                ****  *            *F
  0000000000000000111111111111111112222
  0123456789ABCDEF0123456789ABCDEF0123
```

Figure 1: Sample disk map.

Lines 100-112 constitute the definition of the single macro used in this program, namely, the macro JSR. (This program was produced using Merlin; in other assemblers the conventions for macro definition are slightly different.) The macro JSR is not the same as the Assembly language instruction JSR, although there is a close connection. If RM = 0 on assembly then the macro:

```
>>> JSR.SUBROUTINE
```

will be assembled simply as:

```
JSR SUBROUTINE
```

a normal JSR instruction. But an ordinary JSR will not suffice for the Routine Machine version, since this version must be relocatable. (It must be relocatable since it is intended to function while appended to an Applesoft program, and thus must function properly regardless of its absolute location in memory.)

So the disk map program presented here makes use of a new technique: a method of performing (in effect) an internal JSR in a relocatable routine. An internal JSR is a JSR to a subroutine within the routine, rather than to a subroutine external to it (for example, a subroutine in the Monitor, Applesoft or DOS). Usually an internal JSR renders a routine non-relocatable, since a JSR refers to a subroutine at an absolute location in memory. The technique employed here, however, allows (in effect) internal JSRs provided that the routine is appended to an Applesoft program using the Routine Machine.

An internal JSR may be performed using the following macro:

```
>>> JSR.SUBROUTINE
```

where the macro JSR is defined thus:

```
JSR   MAC
J     LDA #<]1-J-7      low byte
      LDY  #>]1-J-7     high byte
      TSX               stack pointer -> x
      JSR $3F5          &-vector
      <<<
```

Here "]1" is a dummy variable, replaced by the subroutine name when the macro is assembled. Thus the macro instruction:

```
>>> JSR.SUBR
```

will be assembled as:

```
J     LDA #<SUBR-J-7
      LDY #>SUBR-J-7
      TSX
      JSR $3F5
```

For reasons which we cannot go into here, this code is equivalent to a JSR SUBR, but it does not impair the relocatability of the routine. (It is also possible, using a similar technique, to perform internal JMPs in a relocatable routine. For further details see my article "Making Internal JMPs and JSRs Relocatable", *Apple Assembly Line*, December 1982, pp.2-8.)

The JSR macro used in the disk map program is a little more complicated, since it is intended to reduce to an ordinary JSR in the non-relocatable version, and also to become the JSR macro described in the preceding paragraph in the Routine Machine version. So, for example, in the non-relocatable version the macro >>> JSR.SUBR will produce an ordinary JSR.SUBR, but in the Routine Machine version it will produce the four lines of code given above (LDA #<SUBR-J-7, etc.).

Lines 114-130, at the start of the program, provide another example of the use of conditional assembly. In the non-relocatable version (with RM = 0) this code becomes:

```
START   LDA #<START       low byte
        LDY #>START       high byte
        STA ADDR
        STY ADDR+1
```

Clearly what this does is simply place the value of START ($7530 = 30000) at zero-page location ADDR ($FA,FB). This is done so that later in the program we may locate the text to be displayed relative to the start of the routine.

The problem of identifying the location of the routine (and hence of its internal text bytes) is more difficult in the case of a relocatable routine, since the routine is intended to function anywhere. When the program is assembled with RM = 1, lines 114-130 become:

```
START   JSR ERRDIR
        LDA #0
        STA VARPNT+1
        LDA INDEX
        LDY INDEX+1
        STA ADDR
        STY ADDR+1
```

JSR ERRDIR simply checks that this routine is being called from a running Applesoft program. It is not intended to be invoked directly from the keyboard, and if it is then an ILLEGAL DIRECT ERROR message will result. The zero-page location VARPNT+1 ($84) is used initially as a flag, and is here zeroed. The location of the start of the routine is found in the zero-page location INDEX ($5E,5F), and is transferred to ADDR. It is, of course, not evident why the location of the routine can be found in INDEX. This is a convenience which results from appending the routine to an Applesoft program using the Routine Machine. This fact cannot be explained here, except to say that any routine appended using the Routine Machine may (upon invocation) find its own location in INDEX, regardless of where it happens to be located.

Having (in each version) placed its own address at ADDR for later reference, the routine then locates the IOB (Input/Output Block) using the short subroutine at $3E3.

Both the relocatable version and the Routine Machine version allow certain parameters to be specified, in particular, the slot and drive numbers for the disk whose disk map is to be displayed. The syntax for the commands are given at the start of the source listing. It should be remembered that the non-relocatable version is intended to be invoked directly from the keyboard, whereas the Routine Machine version is intended to be invoked from within a running Applesoft program.

For example, if the non-relocatable version has been installed (at $7530) then it may be invoked simply with a CALL 30000. This will produce a disk map for the disk in the last-accessed slot and drive. If you wish to get a map of the disk in drive 2 then you would use CALL 30000, 2. If you are interested in a disk in Drive 1, Slot 5, you would use CALL 30000, 1, 5. (Note: that's *not* "Slot 5, Drive 1".)

When invoking the routine from within an Applesoft program one may use numerical values or numerical variables, as in:

```
100 DRIVE = 2: SLOT = 6
110 & "DISK MAP", DRIVE, SLOT
```

(The syntax used here for the module invocation, and also the initial setup of the ampersand vector, will be familiar to users of the Routine Machine.) In the Routine Machine version one may also specify a title for the disk map, as in:

```
200 DR = 1: SL = 6
210 T$ = "FREE/OCCUPIED SECTORS"
220 & "DISK MAP", DR, SL, T$
```

Lines 136-184 are concerned with reading the parameter list (if any). Lines 186-211 set up the IOB appropriately, whereupon the RWTS routine is invoked to read in the VTOC (Volume Table of Contents). This is normally located on a DOS 3.3 disk at track $11, sector $0 (and the program assumes it to be at this location). If an error occurs when the RWTS routine tries to read in the VTOC then an I/O ERROR message will be generated.

If the VTOC is read in successfully, then the routine first displays the frame of reference, with sectors $0-$F running from top to bottom of the screen and tracks $0-$23 running from left to right, as shown in Figure 1. Track $23 is normally not used (it is less reliable than the others), and normally all sectors in track $23 will be shown as occupied. If it is being used (for example, on 40-track disks) then some sectors may be shown as free.

Lines 307-346 are concerned with the analysis of the information in the VTOC. (See pp.132-134 of the DOS Manual for a full explanation of how the data is organized in the VTOC.) Each place in the disk map displayed on the screen shows either a " * " if the corresponding sector is marked in the VTOC as occupied, or is blank if the sector is marked in the VTOC as free. Occupied sectors in tracks $0-$2, $11 and $23 are shown by means of an inverse " * ", since these tracks are not normally available for file storage. (DOS normally occupies tracks $0-$2, and the directory and the VTOC normally occupy track $11.)

Two internal subroutines are employed (or three, depending how you count), and there are two (three in the non-relocatable version) blocks of text. Each version employs (in effect) six internal JSRs. The non-relocatable version is 469 bytes long, and the Routine Machine version is 512 bytes long. The assembly as shown in the source listing was made with RM = 1, and is thus the Routine Machine version. As will be seen, the instructions peculiar to the non-relocatable version are listed but do not generate any object code.

The non-relocatable version (after it has been assembled with RM = 0 and the object code has been saved to disk) may be BRUN directly (by, for example, BRUN DISK.MAP.30000, if the object code was saved under this name). If it is first BLOADed then it may be invoked using CALL 30000 (with or without a parameter list, as explained above).

To try out the Routine Machine version it must first be appended to an Applesoft program using the Routine Machine. The Applesoft program given below is suitable for this purpose, being a short demo program. Readers who have the Routine Machine may use it to append the relocatable version to this Applesoft program as a Routine Machine module. Interested readers any find further information on the use of such modules in the Routine Machine documentation.

```
1  *--------------------------------
2  *  DISK MAP (BASED ON VTOC)
3  *
4  *  (C) 1983 PETER MEYER
5  *
6  *  ALL COMMERCIAL RIGHTS RESERVED
7  *
8  *  LAST REV.: 2/26/83
9  *--------------------------------
10 *  THIS PROGRAM EMPLOYS CONDITIONAL ASSEMBLY.
11 *
12 *  FOR NON-RELOCATABLE VERSION
13 *  ASSEMBLE WITH RM = 0 AND USE:
14 *
15 *  BRUN DISK.MAP.30000 (OR WHATEVER)
16 *  OR IF ALREADY BLOADED, USE E.G.:
17 *  CALL 30000
18 *  CALL 30000, 1          DRIVE 1
19 *  CALL 30000, 2, 6       DRIVE 2, SLOT 6
20 *
21 *  FOR ROUTINE MACHINE VERSION
22 *  ASSEMBLE WITH RM = 1 AND USE:
23 *
24 *  & "DISK MAP"
25 *  & "DISK MAP", DR
26 *  & "DISK MAP", DR, SL
27 *  & "DISK MAP", DR, SL, T$
28 *
29 *  WHERE DR = DRIVE, SL = SLOT,
30 *  AND T$ IS TITLE (OPTIONAL).
31 *--------------------------------
32       ORG  $7530     DECIMAL 30000
33 *--------------------------------
34 RM        KBD            ; VALUE SPECIFIED
35                          ; DURING ASSEMBLY.
36 *  PUT RM = 0 FOR NON-RELOCATABLE VERSION,
37 *    OR RM = 1 FOR ROUTINE MACHINE VERSION.
38 *--------------------------------
39 *  LOCATIONS
40
41 WNDLFT  =  $20
42 WNDWDTH =  $21
43 CH      =  $24
44 XREG    =  $46
45 STATUS  =  $48
46 INDEX   =  $5E,5F
47 VARPNT  =  $83,84
48 FAC     =  $9D
49
50 ADDR    =  $FA,FB
51 IOB     =  $FC,FD
52 TRK     =  $FE
53
54 AMPJMP  =  $3F5     AMPERSAND VECTOR
55
56 DRVAL   =  $AA68    DRIVE
57 SLOTVAL =  $AA6A    SLOT
58
59 VTOC    =  $B3BB    VTOC BUFFER
```

```
                        60  T:B:MAPS =    $B3F3       TRACK BIT MAPS
                        61
                        62  *   DOS ASSUMED TO BE AT ITS USUAL
                        63  *   LOCATION ON A 48K APPLE.
                        64  *--------------------------------
                        65  *   EXTERNAL SUBROUTINES
                        66
                        67  CHRGET   =    $B1
                        68  CHRGOT   =    $B7
                        69
                        70  DOSWARM  =    $3D0        BACK TO BASIC
                        71  RWTS     =    $3D9        ENTRY TO RWTS
                        72  LOC:IOB  =    $3E3        LOCATE IOB
                        73
                        74  SAVREG   =    $9ED1       ROUTINES IN DOS
                        75  DOERROR1 =    $A6DD
                        76
                        77  STROUT   =    $DB3A       ROUTINES IN APPLESOFT
                        78  STRPRT   =    $DB3D
                        79  CHKSTR   =    $DD6C
                        80  CHKCOM   =    $DEBE
                        81  PTRGET   =    $DFE3
                        82  IL:QUAN  =    $E199
                        83  ERRDIR   =    $E306
                        84  GETBYT   =    $E6F8
                        85  COMBYTE  =    $E74C
                        86  NORMAL   =    $F273
                        87  INVERSE  =    $F277
                        88
                        89  INIT     =    $FB2F       MONITOR ROUTINES
                        90  SETTXT   =    $FB39
                        91  TABV     =    $FB5B
                        92  VTAB     =    $FC22
                        93  HOME     =    $FC58
                        94  COUT1    =    $FDF0
                        95  RESTORE  =    $FF3F
                        96  SAVE     =    $FF4A
                        97  *--------------------------------
                        98  *   MACRO DEFINITION
                        99
                        100 JSR      MAC
                        101
                        102         DO   RM
                        103 J       LDA  #<J1-J-7
                        104         LDY  #>J1-J-7
                        105         TSX
                        106         JSR  AMPJMP
                        107
                        108         ELSE
                        109         JSR  J1
                        110
                        111         FIN
                        112         <<<
                        113 *--------------------------------
                        114 START   DO   RM
7530: 20 06 E3          115         JSR  ERRDIR
7533: A9 00             116         LDA  #0
7535: 85 84             117         STA  VARPNT+1
                        118
7537: A5 5E             119         LDA  INDEX
7539: A4 5F             120         LDY  INDEX+1
                        121
                        122         ELSE
                        123
                        124         LDA  #<START
                        125         LDY  #>START
                        126
                        127         FIN
                        128
753B: 85 FA             129         STA  ADDR
753D: 84 FB             130         STY  ADDR+1
                        131
753F: 20 E3 03          132         JSR  LOC:IOB
7542: 84 FC             133         STY  IOB
7544: 85 FD             134         STA  IOB+1
                        135
                        136 *   READ PARAMETER LIST
                        137
7546: 20 B7 00          138         JSR  CHRGOT
7549: F0 3C             139         BEQ  READ:VTOC
                        140
                        141         DO   RM
                        142                          ; COMMA GOBBLED ALREADY
                        143         ELSE
                        144         CMP  #',
                        145         BNE  READ:VTOC
                        146         JSR  CHRGET      SKIP COMMA
                        147
                        148         FIN
                        149
754B: 20 F8 E6          150         JSR  GETBYT
754E: CA                151         DEX
754F: E0 02             152         CPX  #2
7551: 90 03             153         BCC  >2
7553: 4C 99 E1          154 >1      JMP  IL:QUAN     ILLEGAL QUANTITY
                        155
7556: E8                156 >2      INX
7557: 8A                157         TXA
7558: A0 02             158         LDY  #2
755A: 91 FC             159         STA  (IOB),Y      IBDRVN
755C: 8D 68 AA          160         STA  DRVAL        FOR NEXT DOS CMD
                        161
755F: 20 B7 00          162         JSR  CHRGOT
7562: F0 23             163         BEQ  READ:VTOC
7564: 20 4C E7          164         JSR  COMBYTE
7567: 8A                165         TXA
7568: F0 E9             166         BEQ  >1
756A: C9 08             167         CMP  #8
756C: B0 E5             168         BCS  >1
756E: 8D 6A AA          169         STA  SLOTVAL      FOR NEXT DOS CMD
7571: 0A                170         ASL               ; *16
7572: 0A                171         ASL
7573: 0A                172         ASL
7574: 0A                173         ASL
```

```
7575: A0 01      174           LDY  #1
7577: 91 FC      175           STA  (IOB),Y      IBSLOT
                 176
                 177           DO   RM
7579: 20 B7 00   178           JSR  CHRGOT
757C: F0 09      179           BEQ  READ:VTOC
757E: 20 BE DE   180           JSR  CHKCOM
7581: 20 E3 DF   181           JSR  PTRGET       LOCATE T$
7584: 20 6C DD   182           JSR  CHKSTR       CHECK IT'S A STRING
                 183
                 184           FIN
                 185
                 186  READ:VTOC
                 187
                 188  *   ASSUMES VTOC IS AT TRACK $11, SECTOR $0,
                 189  *   AND VTOC BUFFER IS AT $B3BB.
                 190
7587: A0 03      191           LDY  #3
7589: A9 00      192           LDA  #0
758B: 91 FC      193           STA  (IOB),Y      IBVOL
758D: C8         194           INY
758E: A9 11      195           LDA  #$11
7590: 91 FC      196           STA  (IOB),Y      IBTRK
7592: C8         197           INY
7593: A9 00      198           LDA  #0
7595: 91 FC      199           STA  (IOB),Y      IBSECT
7597: A0 08      200           LDY  #8
7599: A9 BB      201           LDA  #<VTOC
759B: 91 FC      202           STA  (IOB),Y      IBBUFP
759D: C8         203           INY
759E: A9 B3      204           LDA  #>VTOC
75A0: 91 FC      205           STA  (IOB),Y      IBBUFP+1
75A2: A0 0C      206           LDY  #12
75A4: A9 01      207           LDA  #1
75A6: 91 FC      208           STA  (IOB),Y      IBCMD
75A8: C8         209           INY
75A9: A9 00      210           LDA  #0
75AB: 91 FC      211           STA  (IOB),Y      IBSTAT
                 212
75AD: 20 E3 03   213           JSR  LOC:IOB
75B0: 20 D9 03   214           JSR  RWTS
                 215
75B3: A2 00      216           LDX  #0           ZERO $48
75B5: 86 48      217           STX  STATUS
75B7: 90 08      218           BCC  DISPLAY:FRAME   IF NO ERROR
                 219
75B9: A9 08      220           LDA  #8           I/O ERROR
75BB: 20 D1 9E   221           JSR  SAVREG
75BE: 4C DD A6   222           JMP  DOERROR1     AND QUIT
                 223
                 224  DISPLAY:FRAME
                 225
75C1: 20 2F FB   226           JSR  INIT
75C4: 20 58 FC   227           JSR  HOME
75C7: 20 77 F2   228           JSR  INVERSE
                 229
                 230           DO   RM
```

```
75CA: A5 84      231           LDA  VARPNT+1
75CC: F0 24      232           BEQ  >4           IF NO TITLE
75CE: A0 00      233           LDY  #0
75D0: B1 83      234           LDA  (VARPNT),Y   CHECK LENGTH OF T$
75D2: C9 27      235           CMP  #39
75D4: 90 04      236           BCC  >3
75D6: A9 26      237           LDA  #38          TRUNCATE TO 38 CHARS
75D8: 91 83      238           STA  (VARPNT),Y
                 239
75DA: 85 24      240  >3       STA  CH           CENTER TITLE
75DC: A9 28      241           LDA  #40
75DE: 38         242           SEC
75DF: E5 24      243           SBC  CH
75E1: 4A         244           LSR               ; /2
75E2: 85 24      245           STA  CH
75E4: 20 22 FC   246           JSR  VTAB
                 247
75E7: A5 83      248           LDA  VARPNT
75E9: A4 84      249           LDY  VARPNT+1
75EB: 85 A0      250           STA  FAC+3
75ED: 84 A1      251           STY  FAC+4
75EF: 20 3D DB   252           JSR  STRPRT
                 253
                 254           ELSE
                 255           LDA  #12
                 256           STA  CH
                 257           JSR  VTAB
                 258           LDA  #<TITLE-START
                 259           CLC
                 260           ADC  ADDR
                 261           PHA
                 262           LDA  #>TITLE-START
                 263           ADC  ADDR+1
                 264           TAY
                 265           PLA
                 266           JSR  STROUT
                 267
                 268           FIN
                 269
75F2: A0 01      270  >4       LDY  #1
75F4: 84 20      271           STY  WNDLFT
75F6: 98         272           TYA               ; VTAB 2
75F7: 88         273           DEY
75F8: 84 24      274           STY  CH
75FA: 20 5B FB   275           JSR  TABV
                 276
                 277           >>>  JSR.DSPLY:TRK:DIG
                 277
                 277           DO   RM
75FD: A9 B3      277  J        LDA  #<DSPLY:TRK:DIG-J-7
75FF: A0 00      277           LDY  #>DSPLY:TRK:DIG-J-7
7601: BA         277           TSX
7602: 20 F5 03   277           JSR  AMPJMP
                 277
                 277           ELSE
                 277           JSR  J1
                 277
```

```
                        277             FIN
                        277             <<<
                        278
7605: A0 01             279             LDY  #1
7607: 84 21             280             STY  WNDWDTH
7609: 88                281             DEY
760A: 84 24             282             STY  CH
760C: 20 22 FC          283             JSR  VTAB
                        284
                        285             >>>  JSR.DSPLY:SEC:DIG
                        285
                        285             DO   RM
760F: A9 AB             285  J          LDA  #<DSPLY:SEC:DIG-J-7
7611: A0 00             285             LDY  #>DSPLY:SEC:DIG-J-7
7613: BA                285             TSX
7614: 20 F5 03          285             JSR  AMPJMP
                        285
                        285             ELSE
                        285             JSR  J1
                        285
                        285             FIN
                        285             <<<
                        286
7617: A9 27             287             LDA  #39
7619: 85 21             288             STA  WNDWDTH
                        289
                        290             >>>  JSR.DSPLY:TRK:DIG
                        290
                        290             DO   RM
761B: A9 95             290  J          LDA  #<DSPLY:TRK:DIG-J-7
761D: A0 00             290             LDY  #>DSPLY:TRK:DIG-J-7
761F: BA                290             TSX
7620: 20 F5 03          290             JSR  AMPJMP
                        290
                        290             ELSE
                        290             JSR  J1
                        290
                        290             FIN
                        290             <<<
                        291
7623: A9 26             292             LDA  #38
7625: 85 20             293             STA  WNDLFT
7627: A9 01             294             LDA  #1
7629: 85 21             295             STA  WNDWDTH
762B: A9 00             296             LDA  #0
762D: 85 24             297             STA  CH          CURSOR POSITION
                        298                              ; = WNDLFT + CH
762F: A9 03             299             LDA  #3
7631: 20 5B FB          300             JSR  TABV
                        301
                        302             >>>  JSR.DSPLY:SEC:DIG
                        302
                        302             DO   RM
7634: A9 86             302  J          LDA  #<DSPLY:SEC:DIG-J-7
7636: A0 00             302             LDY  #>DSPLY:SEC:DIG-J-7
7638: BA                302             TSX
7639: 20 F5 03          302             JSR  AMPJMP
```



```
                        302
                        302             ELSE
                        302             JSR  J1
                        302
                        302             FIN
                        302             <<<
                        303
763C: 20 39 FB          304             JSR  SETTXT
763F: 20 73 F2          305             JSR  NORMAL
                        306
                        307  * DISPLAY MAP
                        308
7642: A9 23             309             LDA  #$23
7644: 85 FE             310             STA  TRK
7646: A0 90             311             LDY  #$90
                        312
7648: 88                313  >100       DEY
7649: 88                314             DEY
764A: 88                315             DEY
764B: B9 F3 B3          316             LDA  T:B:MAPS,Y
764E: A2 FF             317             LDX  #$FF
7650: E8                318  >101       INX
7651: E0 08             319             CPX  #8
7653: B0 13             320             BCS  >102
7655: 4A                321             LSR
7656: B0 F8             322             BCS  >101        IF SECTOR FREE
                        323
7658: 20 4A FF          324             JSR  SAVE
                        325             >>>  JSR.DISPLAY:SECT
                        325
                        325             DO   RM
765B: A9 31             325  J          LDA  #<DISPLAY:SECT-J-7
765D: A0 00             325             LDY  #>DISPLAY:SECT-J-7
765F: BA                325             TSX
7660: 20 F5 03          325             JSR  AMPJMP
                        325
                        325             ELSE
                        325             JSR  J1
                        325
                        325             FIN
                        325             <<<
                        326
7663: 20 3F FF          327             JSR  RESTORE
7666: 90 E8             328             BCC  >101        ALWAYS
                        329
7668: 88                330  >102       DEY
7669: B9 F3 B3          331             LDA  T:B:MAPS,Y
766C: CA                332             DEX
766D: E8                333  >103       INX
766E: E0 10             334             CPX  #$10
7670: B0 13             335             BCS  >104
7672: 4A                336             LSR
7673: B0 F8             337             BCS  >103        IF SECTOR FREE
                        338
7675: 20 4A FF          339             JSR  SAVE
                        340             >>>  JSR.DISPLAY:SECT
                        340
```

```
                        340             DO   RM
7678: A9 14             340  J          LDA  #<DISPLAY:SECT-J-7
767A: A0 00             340             LDY  #>DISPLAY:SECT-J-7
767C: BA                340             TSX
767D: 20 F5 03          340             JSR  AMPJMP
                        340
                        340             ELSE
                        340             JSR  J1
                        340
                        340             FIN
                        340             <<<
                        341
7680: 20 3F FF          342             JSR  RESTORE
7683: 90 E8             343             BCC  >103              ALWAYS
                        344
7685: C6 FE             345  >104       DEC  TRK
7687: 10 BF             346             BPL  >100
                        347
7689: A9 00             348             LDA  #0
768B: 85 24             349             STA  CH
768D: A9 15             350             LDA  #21
768F: 20 5B FB          351             JSR  TABV
                        352
                        353             DO   RM
7692: 60                354             RTS
                        355
                        356             ELSE
                        357             JMP  DOSWARM
                        358
                        359             FIN
                        360  *--------------------------------
                        361  DISPLAY:SECT
                        362
                        363  *   THIS SUBROUTINE SHOWS TRACK TRK,
                        364  *   SECTOR XREG, AS OCCUPIED.
                        365
7693: A6 FE             366             LDX  TRK               $0-$23
7695: E8                367             INX
7696: E8                368             INX
7697: 86 24             369             STX  CH
                        370
7699: A6 46             371             LDX  XREG           V = XREG + 3
769B: E8                372             INX
769C: E8                373             INX
769D: E8                374             INX
769E: 8A                375             TXA
769F: 20 5B FB          376             JSR  TABV
                        377
76A2: A9 AA             378             LDA  #"*
76A4: A6 FE             379             LDX  TRK
76A6: E0 03             380             CPX  #3
76A8: 90 08             381             BCC  >201
76AA: E0 11             382             CPX  #$11
76AC: F0 04             383             BEQ  >201
76AE: E0 23             384             CPX  #$23
76B0: 90 02             385             BCC  >202
76B2: 29 7F             386  >201       AND  #$7F             INVERSE
76B4: 4C F0 FD          387  >202       JMP  COUT1            AND RTS
                        388  *--------------------------------
                        389  DSPLY:TRK:DIG               ; DISPLAY TRACK DIGITS
                        390
76B7: A9 A0             391             LDA  #<TRK:DIG-START
76B9: 18                392             CLC
76BA: 65 FA             393             ADC  ADDR
76BC: 48                394             PHA
76BD: A9 01             395             LDA  #>TRK:DIG-START
76BF: 10 08             396             BPL  BELOW         ALWAYS
                        397
                        398  DSPLY:SEC:DIG               ; DISPLAY SECTOR DIGITS
                        399
76C1: A9 EF             400             LDA  #<SECT:DIG-START
76C3: 18                401             CLC
76C4: 65 FA             402             ADC  ADDR
76C6: 48                403             PHA
76C7: A9 01             404             LDA  #>SECT:DIG-START
76C9: 65 FB             405  BELOW      ADC  ADDR+1
76CB: A8                406             TAY
76CC: 68                407             PLA
76CD: 4C 3A DB          408             JMP  STROUT         AND RTS
                        409  *--------------------------------
                        410  *    TEXT
                        411
76D0: 20 30 30
76D3: 30 30 30
76D6: 30 30 30
76D9: 30 30 30
76DC: 30 30 30
76DF: 30 30 31
76E2: 31 31 31
76E5: 31 31 31
76E8: 31 31 31
76EB: 31 31 31
76EE: 31 31 31
76F1: 32 32 32
76F4: 32 20             412  TRK:DIG    ASC  / 000000000000000011111111111111112222
/
76F6: 0D                413             HEX  0D
76F7: 20 30 31
76FA: 32 33 34
76FD: 35 36 37
7700: 38 39 41
7703: 42 43 44
7706: 45 46 30
7709: 31 32 33
770C: 34 35 36
770F: 37 38 39
7712: 41 42 43
7715: 44 45 46
7718: 30 31 32
771B: 33 20             414             ASC  / 0123456789ABCDEF0123456789ABCDEF0123
/
771D: 0D 22             415             HEX  0D22
                        416
771F: 30 31 32
7722: 33 34 35
7725: 36 37 38
```

```
7728: 39 41 42
772B: 43 44 45
772E: 46 22

                417  SECT:DIG ASC  /0123456789ABCDEF"/
                418
                419       DO   RM
                420
                421       ELSE
                422  TITLE    ASC  / NATTY DISK MAP "/
                423
                424       FIN


--End assembly--

512 bytes

Errors: 0

]LIST

100  REM  DEMONSTRATION OF THE USE OF THE DISK MAP ROUTINE
110  REM  WHEN APPENDED AS A ROUTINE MACHINE MODULE.
120 :
130  CALL  PEEK (175) + 256 *  PEEK (176) - 46: REM SET UP &-VECTOR
140  & "DISK MAP": REM  NO PARAMETER LIST
150  PRINT : PRINT "WANT TO CONTINUE?  ";
160  GET A$: IF  NOT (A$ = "Y" OR A$ = "N") THEN  CALL  - 1052: GOTO 160
170  VTAB 22: HTAB 1: CALL  - 958
180  IF A$ = "N" THEN  END
190 :
200  SL =  PEEK (47081) / 16:DR =  PEEK (47082)
210  REM LAST-ACCESSED SLOT AND DRIVE
220  PRINT "DRIVE?  ";DR; CHR$ (8);
230  GET DR$: IF  NOT (DR$ =  CHR$ (13)) THEN DR =  VAL (DR$): PRINT DR;
240  HTAB 20: PRINT "SLOT?  ";SL; CHR$ (8);
250  GET SL$: IF  NOT (SL$ =  CHR$ (13)) THEN SL =  VAL (SL$): PRINT SL;
260  PRINT : PRINT "TITLE?  ";T$;: HTAB 9
270  INPUT "";NT$: IF NT$ > "" THEN T$ = NT$
280  VTAB 23: HTAB 9: CALL  - 958: PRINT T$;
290  & "DISK MAP",DR,SL,T$: GOTO 150
```


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AO2

The Missing Applesoft Random Number

by Mark Isaacson

The Applesoft manual states that a random number may be generated for the Apple by using the Applesoft command PRINT RND(1). This command has many uses in games and in simulations. However, the Apple does not generate *true* random numbers with the RND command. Let's look at the problem Applesoft has with generating random numbers, and attempt to remedy the situation.

The Random Number

First, a random number is a number between certain limits, selected by chance. The ideal is that any number within the defined range has an equal probability of being selected. The classic illustration is 20 equal-sized pieces of paper put in a hat, and one number is picked. Random numbers are useful in programs where one of many things may happen, or a program in which chance has a role. A game might use a random number to determine whether a ball moves left or right, or if something occurs or does not, or which one of a number of conditions is set up.

The Apple contains a function that picks random numbers electronically. A random number is generated in Applesoft by the commands PRINT RND(1), or A=RND(1). In the first example, the Apple will print a randomly selected number that is in the range between zero and one. In the second example, the computer will assign to variable A a random value between zero and one. This is the only type of random number Applesoft can print. For example, typing PRINT RND(100) would not give an error in Applesoft, but the number generated would still be a number between zero and one.

To get the computer to generate larger random numbers, the number from the random command must be multiplied. For example, to get some number between zero and ninety, type PRINT RND(1) * 90. To get whole numbers, use the INT command, e.g. PRINT INT(RND(1) * 90). The INT command truncates numbers, so if A=3.3, INT(A) would produce a value of 3.

A program might use the RND function this way:

```
100 S = RND(1) * 10
110 IF S = 2 THEN PRINT "THE MONSTER HAS DIED"
```

We have defined a range of ten possible outcomes, and assigned a consequence to one of these possibilities. So there is a one-in-ten chance of the monster's demise at this time. Other possible outcomes can be covered by other IF statements, or program control can be effected using ON... GOTO.

The Problem With Applesoft Random Numbers

Although random numbers are very useful for Applesoft programs, they suffer from a significant "bug". Applesoft random numbers are not truly random at all. I noticed this first when I had been using a professional quiz program written in Applesoft. I noticed that when I turned off the Apple and later re-ran the program, the program asked the same questions with the same choices, in exactly the same order! The same problem occurred when I wrote a program to simulate a roulette wheel. The same supposedly random numbers were generated when I ran the program a few hours later. The RND bug was especially bothersome now, in a program where the random numbers played such a vital role.

The true nature of random numbers can be seen by turning off the computer, turning it back on, and typing "PRINT RND(1)". The computer will always respond with the same "random" number, .973136996. Also, since the Applesoft random number generator uses a seed for finding random numbers (one number is used in a complex formula to find the next), and the Apple's seed number is always the same initial value, the *pattern* of random numbers Applesoft produces will continue to be the same. In other words, the Apple will generate the *same set* of random numbers *every time* it is turned on.

The problem arises from the place where Applesoft gets its random numbers. On Page 141 of the Applesoft (Apple II) manual is a listing of important memory locations to Applesoft. Included in this list are the locations that Applesoft uses to get its random numbers. These locations are $C9 to $CD (in decimal, from 201 to 205). The problem with these locations is that they hold the exact same values every time the Apple is turned on.

But there is a solution to this problem. The Apple does have a real random number generator, which is located from $4E to

$4F (in decimal, that's locations 78 and 79). These two locations are set randomly by the Apple whenever it is waiting for a key to be pressed. One way to make Applesoft have random numbers is to "feed" the real random numbers from the machine language generator to the not-so-random Applesoft random number generator. This would set RND(1) to a truly random value the first time it was printed, and it would also randomize the Applesoft random number seed. That would create a "set" of totally different random numbers. Here is a very short machine language routime to give Applesoft the real random numbers from the machine language generator.

```
AD 10 C0    LDA C010      ; Clear keyboard
20 0C FD    JSR FD0C      ; Randomize 4E and 4F, wait for
                            keypress
A6 4E       LDX $4E       ; Load X from randomized 4E
86 CA       STX $CA       ; Store X at byte CA of Applesoft RND
                            generator
A6 4F       LDX $4F       ; Load X from other randomized loca-
                            tion
86 CB       STX $CB       ; Store X in another byte of Apple-
                            soft RND generator
60          RTS           ; End subroutine
```

The program is totally relocatable. To type it in, for example, at $300 (decimal 768), enter machine language by typing CALL -151, then type:

```
300:AD 10 C0 20 0C FD A6 4E 86 CA A6 4F 86 CB 60
```

-then press RETURN.

Reenter BASIC. To save this subroutine to disk, type `BSAVE RND,A$300,L$10`

How The Program Works

The program first clears the keyboard strobe. This insures that if a key has just been pressed, it will not stop the READKEY subroutine from waiting for a keypress. The program then jumps to READKEY (JSR FD0C). This merely waits for a keypress. The important thing is, READKEY randomizes the machine language random number generator at $4E and $4F. The program then loads the newly-randomized $4E into the X register, and saves it in $CA, a part of the Applesoft random number storage area. It does the same thing for the memory location $4F, which was also randomized. The subroutine then ends (RTS).

Running The Program

To run the program, BLOAD it into memory, then CALL it. It will wait for a keypress. For example, type

```
BLOAD RND
CALL 768
PRINT RND(1)
```

Note that the call to 768 assumes that the program was saved at $300, which is the same place. The number returned will be a truly random number, which corrects Applesoft's random number deficiency. I recommend that you employ the above subroutine into all your Applesoft games and other programs that rely upon the RND statement. Who knows what new surprises await you the next time you run them?



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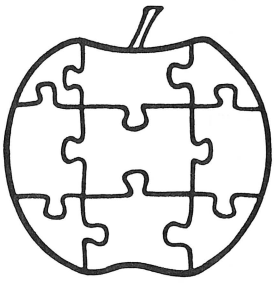
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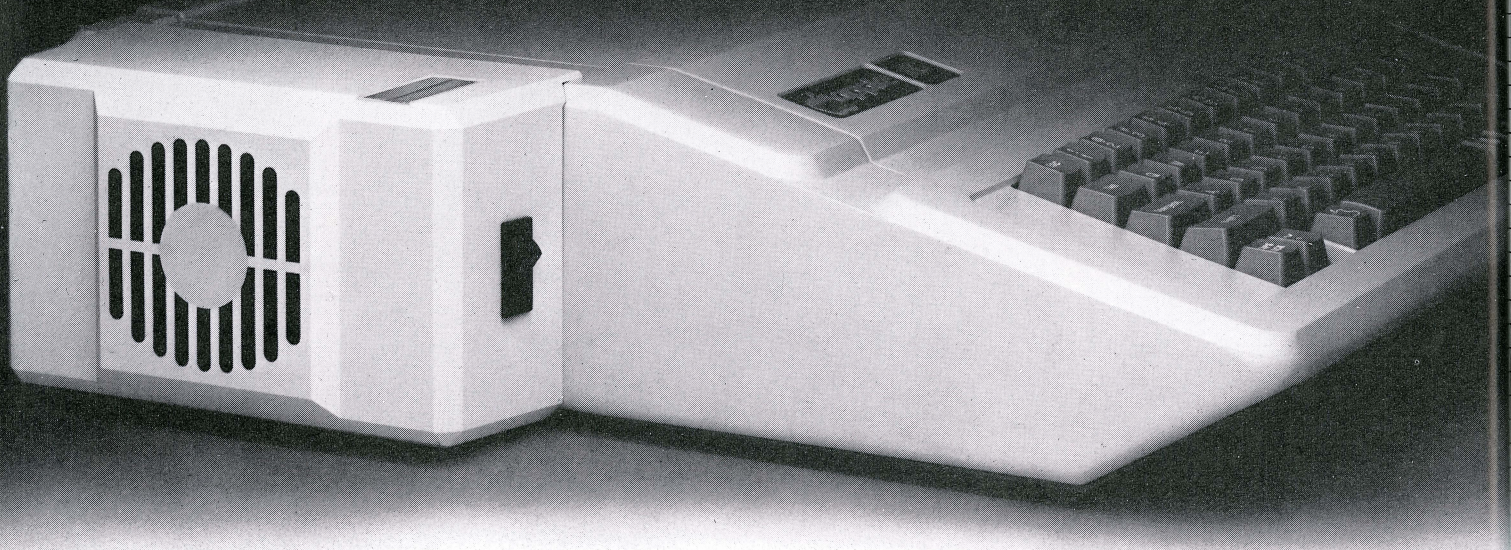


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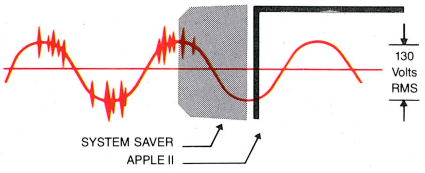
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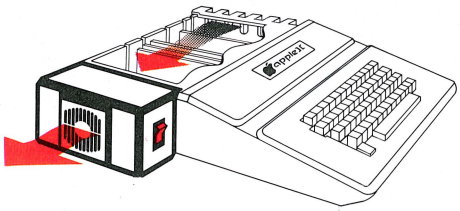


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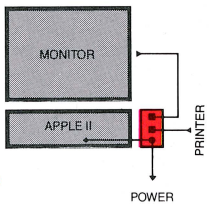
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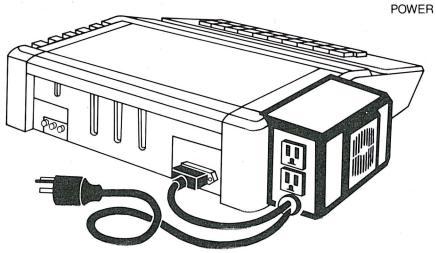
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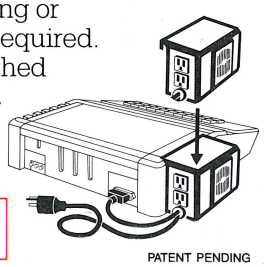
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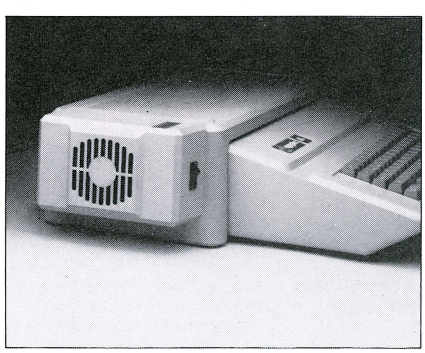
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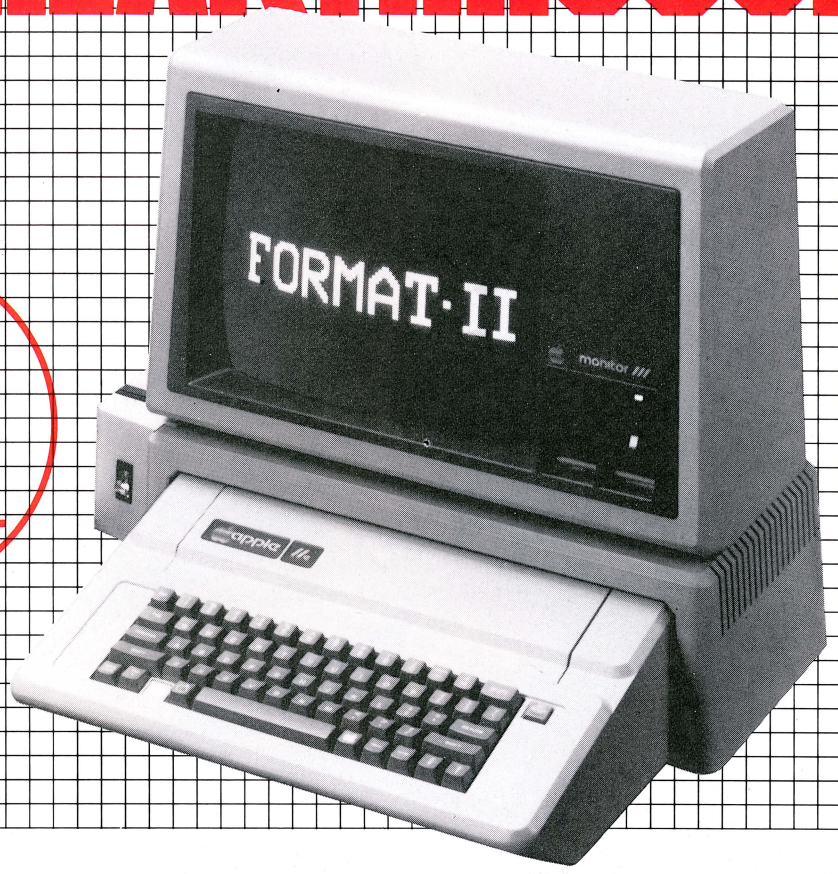
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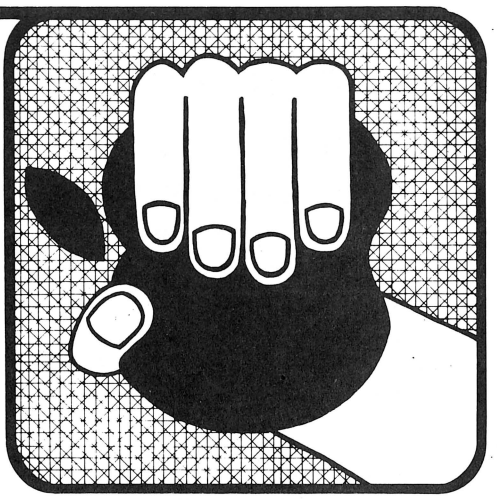
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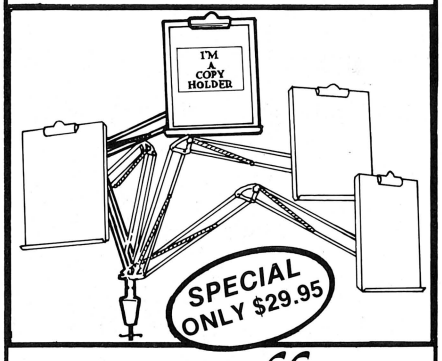
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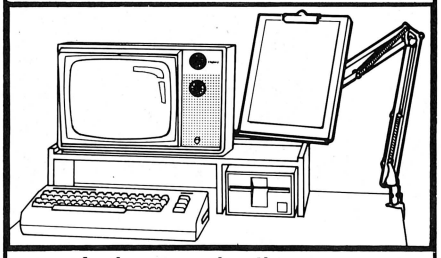
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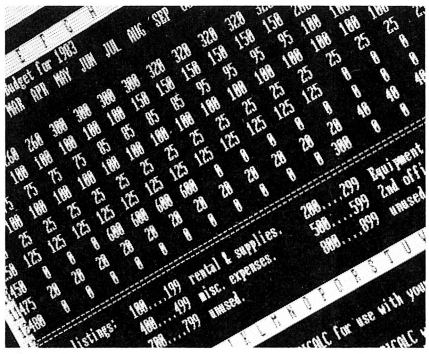
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(800) 426-7412

1/2-inch IBM/ANSI/ECMA compatible tape subsystems for personal computers from IDT; 9-track NRZ1 (800 cpi) and/or PE (1600 cpi) tape subsystems for Apple II and ///, and other computers. Three different transports are available, supporting from 20K bytes to 160K bytes transfer at tape speeds from 12.5 ips to 100 ips. All transports support 10.5 inch reels and may be coupled via intelligent controllers. Prices range from $4,995 to $9,175 depending on the tape transport selected.
Innovative Data Technology
4060 Morena Blvd.
San Diego, CA 92117
(619) 270-3990

Wizard EBI-Serial 64K buffer is for Epson MX or FX serial printers. The buffer enables the computer to dump its print data, nonstop, into the buffer and proceed to the next task. Includes a baud rate switch for settings from 50 to 9600. Easily installed into the existing socket inside the Epson MX or FX printer. Minimum buffer size is 8K, easily upgraded to 16K, 32K, or 64K with additional RAM chips. $216.00 for the 16K version.
Wesper Microsystems
14321 New Myford Road
Tustin, CA 92680
(714) 730-6250

Buffer Box II and III are parallel and serial I/O devices, respectively, with up to 128K RAM capacity (1 Megabyte and more virtual storage capacity). Features in use storage readout, copy function, count and copy function (up to 255 copies), auto RAM test, bypass of FIFO operations, pause control, remote pause, reset/erase/RAM tests, continuous paper feed mode, sheet feed/letterhead paper feed mode, data, text, and graphics compression.
From Microtek at your local dealer.

Argosy Micro Drive is a half-height (1 5/8-inch' tall) 100% Apple compatible drive. Features storage of up to 164,000 characters, and under 6 ms track to track movement speed. Constant speed control with direct drive - no belts. Motor is always up to speed for instant data access. Precise adjustable speed control from outside the case. Use your Apple controller card or theirs. One year warranty. One drive $375, with controller $450. Two drives in one case with controller $780.
Argus Peripherals, Inc.
99 East Magnolia Blvd., Suite 303
Burbank, CA 91502
(213) 846-1545

Image cassette-type tape drive is a 10 megabyte backup for 5.25-inch Winchester disk drives used with Apple computers. Provides fast archive/restore of data on hard disk systems, on a file-organized basis for selective backup/restore by file or disk. Can record or transfer at either 30 or 90 inches per second. Backup time is 12 minutes at 30 ips and 4 minutes at 90 ips. Transfer rate is 24 Kbytes per second at 30 ips and 72 Kbytes per second at 90 ips. $1,095 for the tape drive and $295 for the controller interface.
Mountain Computer, Inc.

Space Saver Hard Disk is a half-high Winchester disk system available in a fixed version and as a removable cartridge system. The fixed system is $995 without controller. The cartridge system is $1,325, without controller. The Space Saver is 2.25" high, 5.5" wide and 9.5" deep, and weighs just five pounds. The Space Saver provides Dynamic Volume Allocation (DVA) capability for the Apple II or /// computers. The user can define the maximum volume size when creating a volume, but no disk space is actually consumed until a file is physically written onto the disk.
Mountain Computer, Inc.

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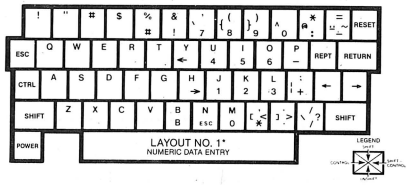
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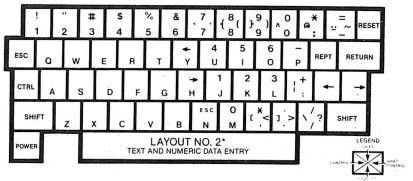
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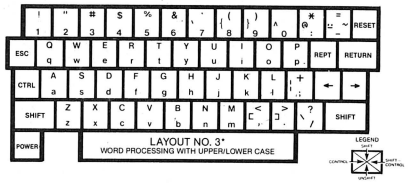
300 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6650

ECC Widget board is a four-chip interface card that allows the use of a Shugart SA-400 5 ¼-inch floppy disk drive with an Apple floppy disk controller. The board installs on the back of the drive and connects to both drive and controller. Use of the Widget card requires that several technical modifications be made to the disk drive (five cuts and five jumps). Documentation included gives a step by step description of the drive modifications, including several diagrams and picture. $10.00 plus $1 per order shipping.
Economy Computer Concepts
P.O. Box 2047
N. Babylon, NY 11703
(516) 587-6947

KeyTran electronically alters the layout of the Apple II and II Plus keyboard to provide a 10-key numeric keypad with special function keys for VisiCalc users, and an ASCII keyboard with true shift key operation for Upper/Lower case text entry. Three alternate keyboard layouts for numeric data entry, mixed text and numeric data entry, and text entry for word processing applications. Compatible with all software, 80-column cards, and lower case adapters. Selection and use of a KeyTran layout can be accomplished at any time while in any program. It comes with a 20 page owner's manual, a reference card, and a 90 day warranty $89.95 plus $2.50 shipping and handling.
Price Performance Products, Inc.
1928 N. Kenmore Avenue
Chicago, IL 60614
(312) 929-0568







BMC display monitor features a P31 picture tube that gives a 12 inch diagonal green display with a bold 80 x 24 character format. Each unit is given a careful underscan adjustment at the factory so even the corners are clear and sharp. Connects quickly and simply to most popular computers with no interface or modifications needed. Requires composite video signal with negative sync. Weighs only 13.9 lbs, requires 120 VAC, 60 Hz or 230 VAC, 50Hz.
BMC USA Inc.
16830 South Avalon Blvd.
Carson, CA 90746
(213) 515-6005

Touch sensitive CRT faceplate permits the detection of the touch of a human finger on the display through sensing of impedance changes resulting from the touch of a finger. Provides X and Y coordinates of the point in an 8-bit numeric output (0 through 255) for each of the two dimensions. A keyboard can be displayed on a video monitor to enable a person to "type" directly on the screen. Alternatively, a person can draw the shapes of letters of letters directly on the screen and have them be recognized by the computer.
Interaction Systems, Inc.
24 Munroe St.
Newtonville, MA 02160
(617) 964-7000

SSM Apple ModemCard features 110/300 baud half and full duplex communications for the Apple II. Features auto answer/auto dial, Touch Tone and pulse dialing, and audio monitoring to provide increased flexibility for use with many systems, including PBX. Plugs directly into any Apple slot (except zero) and requires no additional external devices $299.
SSM Microcomputer Products, Inc.
2190 Paragon Drive
San Jose, Ca 95131
(408) 946-7400

AMS 5000 Megabyter Hard Disk System adds up to 20 megabytes of on-line data storage for the Apple II. Using Winchester technology, the AMS 5000 can be used for standard DOS, Pascal and CP/M based operating systems. It is compatible with Disk II and SVA 8-inch floppy drives, as well as a micro programmed controller that plugs into any slot, and eliminates the need for additional hardware.
Sorrento Valley Associates, Inc.
11722 Sorrento Valley Road
San Diego, CA 92121
(714) 452-0101

Versa serial interface functions only with those features necessary to operate a serial printer; operates with the RS-232C protocol. Other configurations can also be accommodated at installation time. Switchable baud rates of 300, 600, 1200, 1800, 2400, 4800, 9600 and 19,200. In addition to baud rate, the interface is equipped with switches for automatic line feed, screen display and line length. Complete with ribbon cable and 8 female pins and a 16 pin dip header socket on the other end $79.95.
Versa Computing, Inc.
3541 Od Conego Road, Suite 104
Newbury Park, CA 91320
(805) 498-1956

Telex-Plug gives word processors and computers access to TWX and Telex. It connects any computer or word processor with the Western Union telex network, as well as other common carriers, so that users may send and receive messages directly through their word processor or computer. Automatically senses incoming messages and stores or routes them to a printer - $1,495.
Teleface Corp
GPO Box 2238
New York, NY 10116
(212) 477-6802

KoalaPad touch tablet is a friendly graphics pad. Manufacturer says more flexible than joysticks, and easier to use than a keyboard. Compatible with most software. A graphics program called Micro-Illustrator provides a way to create colorful, high resolution graphics at the touch of a finger. Koala pad costs $125.00 with software.
Koala Technologies Corporation
4962 El Camino Real
Los Altos, CA 94022
(800) 227-6703; (800) 632-7979 (CA)

MultiSpool, a dynamic six-port switching device networks any combination of computers and printers; provides the spooling

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function within that network. With 60K of buffer memory, controlled by 4K of memory management firmware, MultiSpool can orchestrate up to five computers or five printers simultaneously. It mixes four serial and two Centronics-compatible parallel ports It also handles X-on, X-off protocols and DTR. Configure each port to accommodate either a computer or printer; and define the discipline of that port. - $995.00 (less if you don't need all six ports).
Digital Laboratories, Inc.
600 Pleasant Street
Watertown, MA 02172
(617) 924-1680

Starbuck Model 8232 is a general purpose real-world interface for data acquisition control and measurement. Connects to any computer or terminal via RS-232 serial port. 8 analog, 8 digital inputs; 8 opto-isolated outputs. All ports are fully protected to withstand abuse. Offers 8 bit accuracy, an on-board 20000 point buffer, triggered acquisition, chaining. ASCII strings control it. Manual details interfaces for common sensors - $540.00 complete.
Starbuck Data Company
P.O. Box 24
Newton, MA 02162
(617) 237-7695

Key Tronic keyboard Model KB-200 is a detachable, low-profile keyboard, plug-compatible with the existing keyboard socket of the Apple II. It also features reliable microprocessor electronics, solid-state capacitance switches, and positive tactile feedback. Eleven function keys streamline multiple key operations. Features full shifting capability, numeric pad, 10 foot cable with keys in familiar typewriter locations $298.00
Key Tronic
PO Box 14687
Spokane, WA 99214
(800) 262-6006

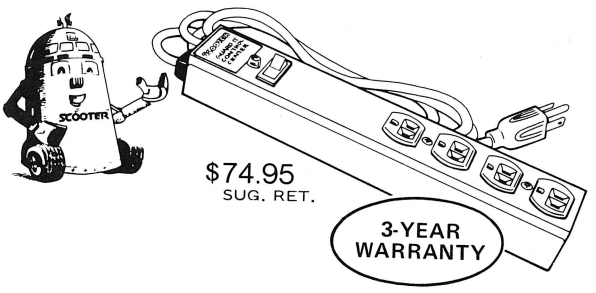
Model 85 aScope personal computer controlled, fully programmable digital oscilloscope combines with the **aSource** Arbitrary Waveform Generator and the **aGen** Programmable Function Generator to produce a closed-loop waveform stimulus/acquisition system. Waveform Editor builds complex waveforms by defining them mathematically or constructing from previously stored waveform segments. The waveforms have 12-bit resolution and record lengths up to 4096. The aGen is a programmable 0.5 Hz to 5MHz function generator for all classic waveforms - sine, square, triangle, ramp and pulse. Continuous triggered, gated and n-burst modes, along with variable symmetry, amplitude and frequency modulation. aScope completes the loop with a dual channel programmable 50MHz digital memory oscilloscope with standard operating software that includes waveform disk storage and retrieval, hard copy output, waveform digital voltmeter and waveform averaging. The cost of these instruments (including an Apple, monitor and disk drive) is less than $4,000.
Northwest Instrument Systems, Inc.
PO Box 1309
Beaverton, OR 07075
(800) 547-4445; (503) 297-1434 (OR)

ISAAC/Apple laboratory computer system has a new high-speed data acquisition utility and a program for formatting graphs. Menu-driven software packages for thermocouple data logging, chromatography data handling, and software for communications to host or other personal computers. The modular Model 41A starts as low as $4,000 including the Apple //e. You can then add expansion modules - A/D, D/A, Binary I/O and more - as you grow.
Cyborg Corportion
55 Chapen Street
Newton, MA 02158
(617) 964-9020 (MA); (800) 343-4494

UDS modems allow you access to the world. Top of the line is the microprocessor based 212 A/D which communicates at 0-300 or 1200 bps, stores and automatically dials up to five 30-digit numbers. Complete prompting menu, fully automatic test capabilities. $745. The $145 103 LP offers simultaneous two-way communications at 0-300 bps without an AC power cord. This unit gets operating power from the telephone line. All are fully FCC certified for direct connection to the telephone system.
Universal Data Systems
5000 Bradford Drive
Huntsville, AL 35805
(205) 837-8100

Percom Data Hard Disk Drive interfaces with present and future systems. If you do change computers, you can still keep your most important investment - your hard disk

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drive. Interface software leaves no performance holes for you to fall into. This 5 ¼-inch Winchester drive is available as 5 ($1595), 10 ($1995), 15 ($2495), or 20 Megabytes ($2995).
Percom Data Corporation
(800) 527-1222; (214) 340-7081

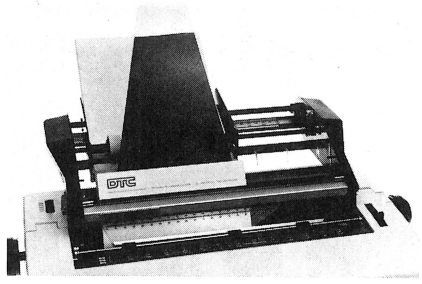
Digitizing Tablet operates in point, stream, incremental, or switch stream modes and measures up to 200 points per second. Firmware for self-diagnostics, metric menuing, host override of switch-settable functions, and inboard audible tone. User specifies output data in absolute measurement or the number of user-defined minimum increments down to 0.001" (0.1025 mm). Metric or English measurements are also switch-selectable. Interfaces include RS 232C, parallel or IEEE-488. Optional features include 1, 4 or 16 button cursors, axis rotation and scaling. Sizes are 12 x 12" $675.00; and 20 x 20" $1275.00.
Numonics
418 Pierce Street
Lansdale, PA 19446
(215) 923-0183

MEGAFLEX diskette does what Apple's can't: read and write diskettes from other computers. Software-controlled industry standard IBM 3740 or System 34 type formats allow reformatting software to read and write Apple, Altos, Radio Shack, Osborne, and IBM PC diskettes. All hardware functions are software-controlled. MEGAFLEX can match new drive capabilities without hardware changes. Drive-dependent ROMs have been eliminated. Compatible with BASIC, CP/M, Pascal, VisiCalc, SOS and DOS-emulation on the Apple ///, Apple II, Franklin Ace and Basis. All language features and operating system commands (LOAD, BRUN, etc.) are standard. Apple software will run without modification.
Megabyter, a Division of SVA
11722 Sorrento Valley Road
San Diego, CA
(619) 452-0101

Pascal Super System supports the simulation of fast access disk drive units for storage and retrieval of standard Apple Pascal files with the added speed of the 6809 Stellation Mill. The system contains a Legend 128KDE RAM card, Stellation Two 6809 Mill, and Super1: software. The software is designed as a Pascal Disk Emulator with patch routines to run a 128K emulated disk drive with a 6809 processor card. The 6809 or 128KDE may also be used separately. Both cards plug into any I/O slot on the Apple II motherboard except Slots 3 and 6.
Legend Industries, Ltd.
2220 Scott Lake Road
Pontiac, MI 48054
-or-
Stellation Two
P.O. Box 2342
Santa Barbara, CA 93120

Printers/Plotters

DTC EZ Mate Sheet Feeder fits daisywheel printers utilizing the Brother print mechanism. Requires no software or hardware modifications; installs and removes easily. Requires no electrical connection; driven by the printer platen. Reverses the paper for graphic and columnar printing and facilitates insertion of envelopes or individual sheets without unloading the feeder. Capacity 150 sheets; can also be reloaded during the printing cycle. Variable width sheets and form lengths to 14 inches are easily handled. - $795.00.
Data Terminals and Communications
590 Division Street
Campbell, CA 95008
(408) 378-1112



Alphacom 81 (photo) is a low-cost 80-column, 80 cps thermal printer with graphics capabilities. Combines a single-chip microprocessor with the Olivetti THM-125 dot matrix print mechanism. Packaged in a lightweight, impact-resistant housing that covers the thermal paper roll. Includes friction feed and the capability for bit-mapped graphics. Features upper/lower case letters, wraparound facility for printing text lines longer than 80 characters $169.95. The **Alphacom 42** high-peformance 40-column printer, similar to the model 81, is only $119.95.
Alphacom, Inc.
2323 South Bascom Avenue
Campbell, CA 95008
(408) 559-8000



Smith Corona TP-II is a letter-quality printer with both RS232 Serial and Centronics parallel interface ports to make it compatible with virtually all personal, home and small business computers. It offers significant user benefits, including easy setting of operating characteristics. It can print out computer program listings with an ASCII 10/12 pitch printwheel $895.00.
Smith-Corona
65 Locust Avenue
New Canaan, CT 06840
(203) 972-1471

Star Micronics has released a new **daisy wheel printer** for $499. The 18 character-per-second print speed is slow in comparison to daisy wheel printers sold to businesses in the $2000 price range, but this print speed is on a par with recent under-$1000 daisy wheel printers. They also have a dot matrix impact printer, the Gemini 10, for $399 and an 80-column thermal printer for $199. For more details contact.
Star Micronics, Inc.
1120 Empire Central Place, Suite 216
Dallas, TX 75247
(214) 631-8560

Strobe Model 260 graphics plotter is an automatic six pen version of the Model 200. The 260 plots graphs and charts utilizing up to six different colors with automatic pen changes. Software enables the user to preselect colors before initiating the plot. Pen change routine is automatically invoked during plotting to change pens. Software allows the user to generate high resolution bar charts, pie charts and line graphs with 500 steps per inch in both the X and Y directions. Alphanumerics are also included for labeling the charts or creating pages of text. Includes an "intelligent" RS-232 interface and software - $995.
Strobe, Inc.
897-5A Independence Avenue
Mountain View, CA 94043
(415) 969-5130

The **ComRiter CR-II** daisy-wheel printer features a 5K buffer to reproduce original and multiple copies of documents stored in its memory. The buffer can store up to 3 pages of data. Uses a Diablo 630 SPI protocol, which is available in most word-processing software. Prints at an average speed of 12 characters per second, bidirectional and logic seeking. The print wheel is an ASCII standard cassette type with 96 petals per wheel. The ribbon is a standard cassette type. Two interfaces are available: Centronics parallel and RS-232C serial. Optional features include tractor feed, color print ribbons, a cut-sheet feeder, and interchangeable print wheels compatible with the ComRex CR-I ComRiter daisy wheel printer. Under $700.
Comrex International, Inc.
3701 Skypark Drive
Torrance, CA 90505
(213) 373-0280

The **DTX 380Z daisy wheel printer** features a 48K character buffer memory, allowing the computer to load the printer memory within a few seconds, then be used for further applications while the 380Z prints at up to 32 characters per second. Can connect to Apple and other computers.

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Data Terminals and Communications
590 Division Street
Campbell, CA 95008
(408) 378-1112

The **Pkaso ID12-Color printer interface** is available for the IDS Color Prism printer and the Apple II or ///. Features a full "snapshot" dump of any text or graphics screen image, 16-level grey scale printing, user-created or software-defined printing characters, and SuperRes graphics using the full dot resolution of the printer. Also included are: Hi-Res and Lo-Res screen prints, commands to swap and rearrange the color set, commands to change printing colors within word processor text, and commands to create and print with definable sets of color. Compatible with BASIC, Pascal, DOS 3.3 and CP/M. Complete with cable and instructional diskette $195.00 (Apple II) $225 (Apple ///).
Interactive Structures Inc.
146 Montgomery Avenue
Bala Cynwyd, PA 19004
(215) 667-1713

Amplot II is a six-color plotter compatible with most personal computers and features high pen speed, automatic pen retrieval and .002-inch resolution. It receives ASCII commands, and built-in software permits additional alpha character commands. Eight-bit parallel and RS-232C operation is standard. Plots on a 10 x 14-inch bed; supplied with 6 fiber tip pens for plotting on ordinary paper or film. - $1,290.
Amdek Corporation
2201 Lively Blvd.
Elk Grove Village, IL 60007
(312) 364-1180

The **Banana** dot-matrix printer features a 10-inch carriage, 80 columns, graphics capability, 10 or 5 characters per inch, draft-quality print, tractor feed, parallel or serial interface, self-inking ribbon cassette, 10 pounds in weight. - **$249.95**.
Leading Edge Products, Inc.
225 Turnpike Street
Canton, MA 02021
(800) 343-6833; (617) 828-8150 (MA)

The new **Juki model 6100** letter quality daisy wheel printer supports word processing and graphic functions, prints 18 CPS, uses a simple drop-in daisy wheel. Features 10/12/15 pitch, proportional spacing, utilizes standard IBM Selectric ribbons, has 2K buffer memory (expandable to 8K), parallel interface, and both tractor feed and serial interface are available as options. It's extremely reliable and quiet.
Juki Industries of America, Inc.
421 North Midland Avenue
Saddle Brook, NJ 07662
(201) 796-8800 (NJ); (213) 320-9001 (CA)

The **TTX-1014 daisywheel printer** has a low-profile and narrow "footprint" to fit on any desktop. Comes with standard features such as bidirectional printing, pin and friction feed, full-size form capability. Interchangeable, 100-character, ASCII printwheel, built-in serial and parallel interface, up to 140 words per minute (about 28 characters per second), software controllable pitch, line spacing and baud rates. $649.00 complete.
Teletex Communication Corporation
3420 East Third Avenue
Foster City, CA 94404
(415) 341-1300

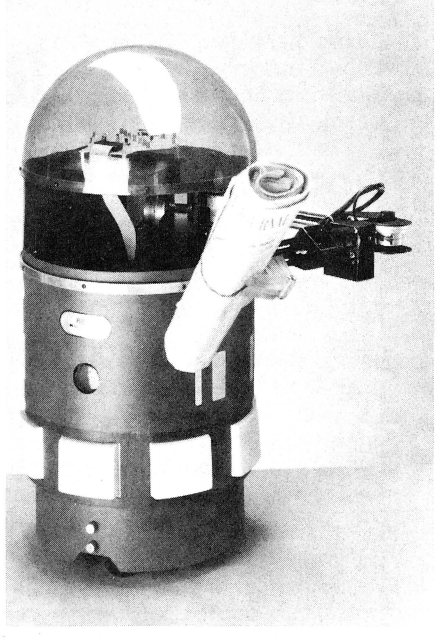
Bausch & Lomb DMP-41 floor standing plotter with C/D size format features comprehensive front panel controls and sophisticated firmware tailored to the needs of the surveyor, drafter, oceanographer, etc. Generates superior architectural elevations, contour maps, circuit-board layouts and assembly drawings quickly and accurately on bond, vellum or synthetic media. RS-232C interfacing is standard, with alternate protocols available. Minutely defined step size and high-resolution logic combined with robust drives and optimized pen ballistics.
Bausch & Lomb
Houston Instrument Division
9500 Cameron Road
Austin, TX 78753
(800) 531-5205; (512) 835-0900 (TX)

Printek printer features 227 columns; will handle paper 16 inches wide and up to 6 copies. Features near letter-quality, 45 cps (model 910) and 80 cps (model 920), true descenders, proportional spacing, underlining, 2 standard fonts, 2 optional fonts, 4 vertical spacings, 8 character sizes. Also available are 200 and 340 cps models with 160-260 lines per minute typical speed, 7 foreign character sets, downloadable for special sets, two 8K buffers to keep the speed up. Fully dot-addressable, 144 x 144 or 72 x 72 dots per inch resolution. One year print head warranty 2500 hours MTBF. Model 910 $1,595.00, 920 $2,395.00.
Printek, Inc.
Benton Harbor, MI 49022
(616) 925-3200

STX-80 printer is a compact, quiet under $200 printer. Prints 60 cps and is ready to run with most popular personal computers. Prints a full 80 columns of crisp, attractive characters with true descenders, foreign language characters and special symbols. Offers both finely detailed dot-addressable graphics and block graphics. 180 day warranty (90 days on the print element).
Star Micronics, Inc.
1120 Empire Central Place, Suite 216
Dallas, TX 75247
(214) 631-8560

Miscellaneous

New robot arm for the RB5X Intelligent Robot has five axes of motion, folds completely inside the robot when not in use. Can be controlled software or programmed using a separate teaching pendant, which attaches by cable to the robot and detaches once the arm learns a particular task. Arm can lift and carry up to 12 ounces, and can also be programmed to reach around and turn the robot off. A **vacuum attachment** will be available later in 1983.
RB Robot Corporation
14618 West 6th Avenue, Suite 201
Golden, CO 80401
(303) 279-5525



Black Box has three different Terminal/Modem/Line Sharing Interfaces (TLSI) with two, four or eight ports. TLSI can connect up to 8 terminals to one modem, line or port, thereby sharing a costly communications link. These devices are active modem sharing units that electrically isolate attached terminals. Terminals connected to the TLSI operate with a modem eliminator or line driver as if each device were dedicated, with no sharing taking place. Operates with built-in contention. It sequentially scans the RTS lead of each terminal. Once it detects a signal, it switches and dedicates the Send Data, Receive Data, CTS and Carrier Detect to the requesting terminal while isolating all other connected terminals. Data transmissions may be synchronous or asynchronous, with speeds up to 9600 bps. The two-port model is $295, the four-port model is $425 and the eight-port model is $750. Units may be cascaded to provide additional expansion potential.
Black Box Catalog

P.O. Box 12800
Pittsburgh, PA 15241
(412) 746-2910

Megasoft and **The Optimizer** multitasking system for the Apple II permit as many as 16 programs or tasks to be executed at one time. Virtual Memory Operating System can place within reach of your system megabytes of virtual memory. Utilizes an Intel 8748 microprocessor with an additional 64K of RAM. Features powerful instructions that include extensions to Applesoft BASIC. They include many of the most useful commands found in FORTRAN, COBOL, PL/1, ADA, Pascal, and LOGO. Dramatically increases transparent core memory - far beyond what is possible for the 256K IBM/PC (up to 451 megabytes - yes megabytes! Limited only by the number of hard or soft disks that you attach). Substantially increases speed of program exeuction, 3 to 10 times; decreases file access time, 6 to 10 times. The package includes a User's Manual, Virtual Memory Operating System Manual, Memory Management 64K Microprocessor, 3 diskettes containing a system library, VOS, Language system and programs. A one-year replacement warranty is provided on all products with a 60-day risk-free return policy.
Quantum Leap Int'l Technologies, Inc.
One Corporate Center
Arlington, VA 22206
(703) 548-5308; (703) 683-0308 (Hotline)

Pascal Super Emulator is used in conjunction with the Apple Pascal 1.1 operating system and Legend 64KC, 128KDE and new 1 Mega-Byte S cards. The package allows you to utilize multiple Legend RAM cards up to a maximum of four, with capability of combining the total RAM into one drive. Four 128K cards can yield up to 1024 blocks of storage as one large drive. Comes complete with disk and manual at your local dealer.
Legend Industries, Ltd.
2220 Scott Lake Road
Pontiac, MI 48054
(313) 674-0953

CSI-1200 Electric Appliance Controller features a serial RS-232 interface that allows computer control of up to 256 lights, wall switches, and appliances. Compatible with any computer with a serial interface. Operates with BSR X10 remote modules to help save energy and provide added security $169.
Circuit Science Inc.
3 Four Townsend West
Nashua, NH 03063
(603) 880-4066

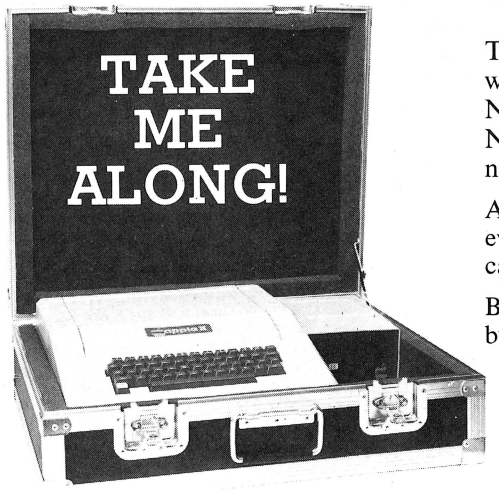
The Isobar provides the most complete computer spike and transient protection. Features 3-way protection, noise suppression for RFI plus isolated filter banks. Individual filter banks isolate each load from other loads minimizing data errors of any kind. MOV surge suppressors arrest both common mode and differential mode surges. L/C filter network rejects radio frequency noise at any amplitude. Torroidal coils for greatest efficiency in an all-metal housing. Model IBAR 8-15 with 8 outlets and 15 ft. cord $97.95, IBAR 3-6 with 3 outlets and 6 ft. cord $54.95, IBAR 4-6 with 4 outlets and 6 Ft. cord $79.95.
Indus-Tool
325 W. Huron
Chicago, IL 60610
(312) 642-6871

Super Fan II's Zener Ray transient voltage suppressor and power filter squelches spikes up to 6,000 amps - even those caused by lightning - while responding up to 100 times faster than Apple II's built-in suppressor. In addition, Super Fan II removes heat buildup at a remarkable 17 cubic feet of air per minute. Runs quietly. Features a lighted on/off computer switch and two accessory plugs at your fingertips. Warranted for two years; clips to your Apple II, //e or monitor stand.
R.H. Electronics, Inc.
566 Irelan Street
Buellton, CA 93427
(805) 688-2047

Grizzly uninterruptible power system is claimed to be "as tough as the animal it was named after". Plugs directly into any standard outlet; plug what needs protection into it, flip The Grizzly on and proceed with your normal routine. In the event of a powerline problem such as a brownout or blackout, The Grizzly will take over instantly, delivering power at full load for up to twenty minutes. Simultaneously, its sonar alarm will signal you to close out files and shut down or gives you the option of allowing line power to return. It also removes overvoltage "spikes" or "glitches" from electrical circuits. Maintenance-free, warranteed for one year.
Electronic Protection Devices, Inc.
P.O. Box 673
Waltham, MA 02254
(617) 891-6602 (MA); (800) 343-1813

Interactive Videodisc System includes a fully assembled desk-top enclosure, housing: an Apple II motherboard with 64K, single floppy disk drive and controller card (256K), IIAT touch sensitive color monitor (13-inch), Pioneer laser videodisc player, IIAT video/touch interface circuitry, Audio amplifier switchbox, and a course authoring language. $4,995.00 complete.
IIAT
2121 Wisconsin Avenue, NW
Washington, DC 20007
(202) 965-7410

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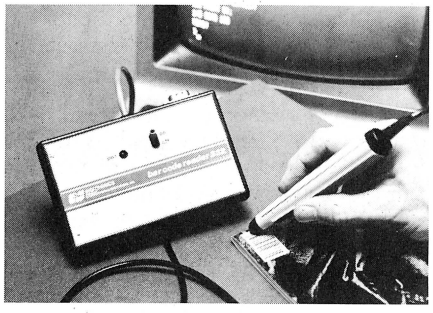
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tion from loss of data files, lost keyboard input, and questionable integrity of stored information due to power failure. Operation is completely automatic; just attach your own 12V battery, or purchase theirs. Thunder 'Tector is $295.00. Gel battery pack is available with cables - 1 amp computer $65.00, 2 amp computer $111.00. Broad selection of power ranges available for larger computers.
Thunderhawk Manufacturing
P.O. Box 573
Jacksonville, TX 75766
(214) 586-6256

Bar Code Reader is a low cost compact unit, with a ruby wand for scanning a Bar Code on labels, tags, etc. Microprocessor based unit translates the bar code into digital data, verifies the code's readability and then transmits the data to a computer via RS-232 port. Possible applications include shipping or receiving, inventory control, production control, sales, security, POS terminals, etc. Reads Codes, 39, UPC, 2 of 5, CODA BAR, etc. Scans codes up to 30 characters long and verifies with an audible tone.
Digitronics
53 John Street
Cumberland, RI 02864
(401) 724-8500



Acorn 68000 is an attached processor for the Apple II. It is a 68000 microcomputer with a 16 MHz clock, 131K of RAM memory and 32K of ROM memory. It also has two RS232C serial ports that operate up to 9.6Kbps. The Apple interface operates at one million bps. Provides seven levels of vectored interrupts, a real time clock and timer, and a separate case and power supply. Using only one slot in the Apple, it features invisible operation with Applesoft or Pascal. Compatible with compilers and 6502 Assemblers. Includes a 68000 Assembly Language Development System 1495.00. Manual separately for $10.00.
Acorn Systems Inc.
4455 Torrance Blvd. #108
Torrance, CA 90503
(213) 371-6307

SOFTWARE

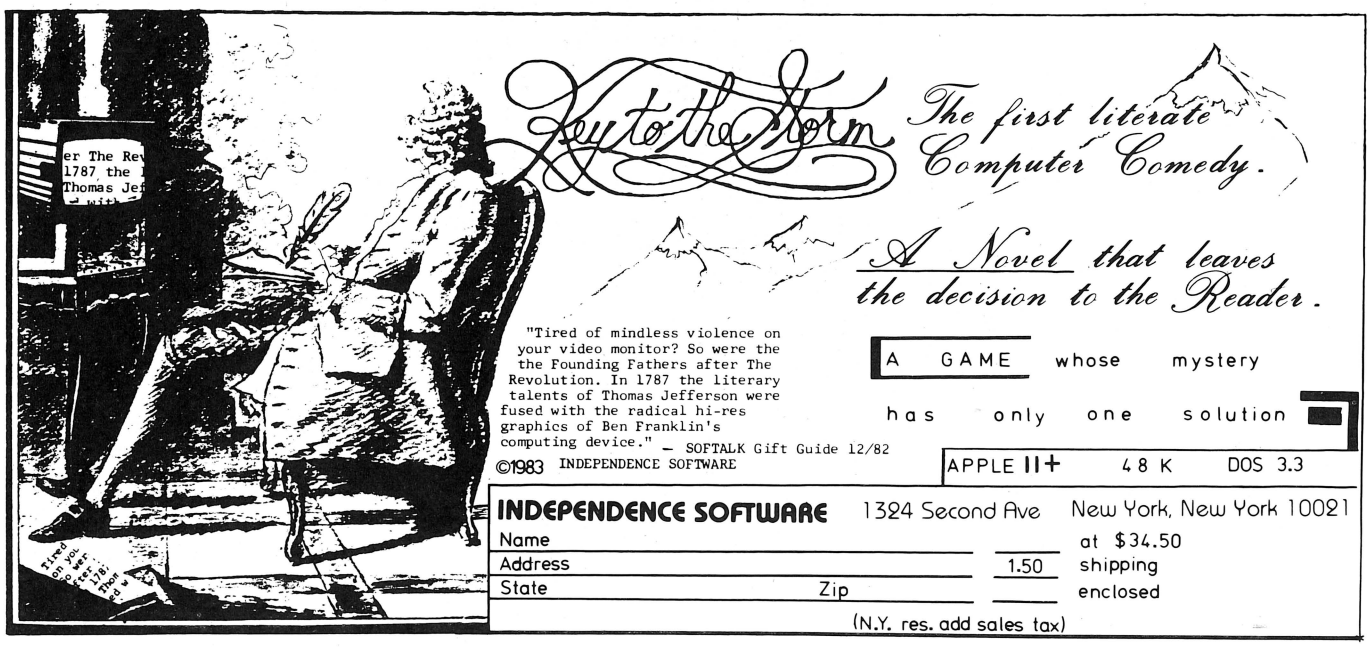
Business (General)

HVAC Design Load Calculation calculates cooling and heating loads for commercial and industrial buildings. Written in Applesoft BASIC for the Apple II with DOS 3.3; uses the CLTD (cooling load temperature difference) and the CLF (cooling load factor). Required input is numbers from Table No. 3.29 from the ASHRARE Manual for shadow length for selected latitude, month, hours and exposure. Provides calculations for an entire building or up to thirty rooms on a room-by-room basis $179.95.
Single Source Solution
2637 Pleasant Hill Road
Pleasant Hill, CA 94523

Hi-Res Versatile Calculator for the Apple II (any type) or Apple /// computer, turns it into an RPN scientific calculator that also operates in four bases. More than 50 functions. Useful tool for programmers, engineers, and educators. Outstanding display including visible 4-register stack with oversized numbers. Looks just like a calculator on your monitor or TV screen. Operates in decimal, hex, octal, binary. Features trig, logs, statistics, logical operations ASCII tables, ten internal storage registers and more. Includes 114 page User's Manual with 50 page Tutorial, internal Text Reference Guide, and 10 minute Demo Program $59.95 plus $2.00 shipping.
Tackaberry Software
Box 2857-F
Ormond Beach, FL 32074
(904) 677-2054

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Winston-Salem, NC 27106
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1000 North Avenue
Waukegan, IL 60085
(312) 223-5077

Qbase provides professional and business users with a complete, low cost, easy to use personal database and report writing package, also including a mailing label print program. Includes automatic checklists, extensive data entry checking and an embedded calculator. Checking features can compare to master lists, trap invalid alphabetic sequences, enforce entry of mandatory data, specify yes or no replies and ensure that alphabetic and numeric values lie within specified ranges. Qbase offers a "free form" full screen design mode for users to set up their system. Embedded calculator allows the user to insert results within the appropriate field using only two keystrokes. Provides sorts on three fields and allows searching with both AND and OR criteria $189.00.
Applied Software Technology
170 Knowles Drive
Los Gatos, CA 95030
(408) 370-2662

The Data Bank is a versatile, multi-function data base management system. Menu driven with interactive pre-selection. A step-by-step manual is easy to understand and features a tutorial with sample files. The program is unlocked, allowing the user freedom to customize the program plus the dependability of multiple backups. Uses standard DOS 3.3 files and handles large files with ease. Features a form generator; global math functions; multi-level searches and sorts plus "fast find" concept which locates records in a matter of seconds - $170. Requires an Apple II Plus or Apple //e with Applesoft, 48K and at least one disk drive.
Flowersoft
564 Tara
Manteca, CA 95336

The **ATOM Reports** system (Automated Telephone Office Management) is a computer-controlled telephone management system (TMS) for use on a personal business computer, the **Apple** ///. Companies with a $1,500 monthly telepone bill may generate savings currently enjoyed by larger corporatons with expensive systems. The system controls telephone usage by manipulating the call detail records stored on the Apple ///'s disc. ATOM applies prices to all the calls and then generates any one of twelve reports for system analysis and accounting. Know, for example, who and where your people are calling, the time of day, duration of call and cost. Managers can determine geographic patterns of calls, if additional WATS lines are needed, or even who is calling Dial-A-Joke. (Or Dial-a Prayer, if business is bad.) Accurate telephone expense budgets may be billed to a particular client. Stores 60,000 call records or 200,000 records with ProFile. Also prices out the major common carriers including Sprint, MCI, Western Union, etc. The pricing data base cotains 42,000 area code and exchange combinations. ATOM reports software retail price is $4,500. The Apple ///, dot matrix printer, display monitor and an additional disc drive are under $4,500. Businesses with a telephone line capacity above 200 lines might require an Apple ProFile, a 5 megabyte storage unit at $2,500. The cost of the ATOM call collector system is $1,995.
ATOM, Inc.
25 Roxbury Road
Scarsdale, NY 10583



NAMOR Mailing List Program handles name and address list management tasks. Five menu-driven screens; features include special new-name enter, review and correct section; a multilevel sort on any or all of the 10 elements; merge capability for combining lists while maintaining sort order; full easy-to-use update capability; extensive search/select capability for printing or separating sub-list; match-search to locate duplicates; tag feature for marking entries; special code line handling features; and extensive formatting of the label or direct-

ory printout. A separate formatting program allows the list files to be used with the popular word processors. Requires 8080/8085/Z80 CP/M (version 2.2) or MP/M system with 56K; program requires 45K (machine code).
Shape, Inc.
122 Spanish Villge, Suite 615
Dallas, TX 75248
(214) 644-6599

Communications

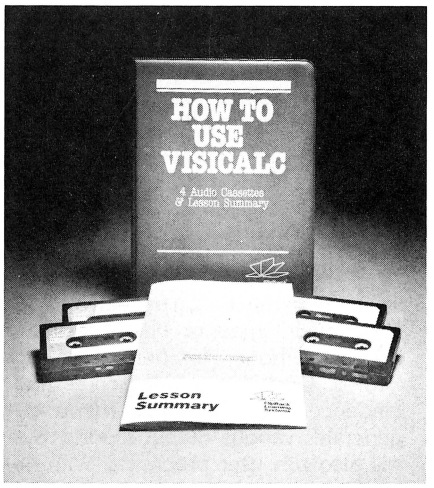
Softerm is a terminal emulation program that operates on the Apple II and //e; provides an exact look-alike for 20 popular CRT terminals used to access applications on host computers and timesharing systems. Terminal emulations include the IBM 3101 Model 20, Honeywell VIP7205, TeleVideo 910 and 925, Hazeltine 1400, 1410, 1500, and 1520, Teletype Model 33 KSR, ADDS Regent 20, 25, 40, and 60, DEC VT102 and VT52, Data General D200, Datapoint 3601, Lear Siegler ADM-3A and ADM-5. Other features include up to 9600 bits per second operations, user-defined keyboard macros, automatic dialing from a user-generated built-in phone book, intelligent file transfer protocol with error checking and automatic retransmission, disk utilities, and menu-driven setup and operation featuring formatted data entry and editing. Terminal emulation program includes a 300 page user's guide $150.00.
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Educational

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Math Alert! is a refresher course in arithmetic; specially designed for adults and preadults. Quick but thorough coverage of numbers, addition, subtraction, division, fractions, decimals, and percentages. Applications in checkbook balancing, interest, discounting, and depreciation. Requires Apple II, 48K, DOS 3.3 - $19.95.
Micro Program Designs
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Wilmington, DE 19808
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How to Use VisiCalc is an audio cassette tutorial that "talks" the learner step-by-step through the development of a complex VisiCalc model. Starts with basics; how to set up a spreadsheet with labels, values and formulas. Moves to more advanced concepts, such as replicate, choose, lookup and net present value. Along the way, the learner plays "what if" in cash flow budgeting. Accompanied by a fully-indexed Lesson Summary.
FlipTrack Learning Systems
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(312) 790-1117



Math Facts Level 1 is a self-paced instructional program for children aged 4 to 7. Utilizes colorful drawings and large color numbers and letters to teach fundamental concepts of math. Sixteen units cover numbers from 1 to 20, number placement, number words, addition and subtraction both with and without symbols. Also features a sound-off option for silent use in the classroom. Available on disk (DOS 3.2 or 3.3) for the Apple II (any type) for $25.00.
T.H.E.S.I.S.
P.O. Box 147-M
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Einstein Corporation
11340 W. Olympic Blvd.
Los Angeles, CA 90064
(213) 477-6733

Quantitative Comparisons for the Apple II reviews the principles of mathematics from beginning arithmetic through elementary algebra and plane geometry. Especially designed to help students prepare for the type of math problems commonly found on the Scholastic Aptitude Test (SAT) and similar tests. The course includes seven lessons and a final test. $26.50.
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How to Operate the Apple //e includes three spoken voice cassettes and a fully indexed Operator's Guide. The tutorial takes the first-time computer user step by step through the procedures needed to use each special key and essential command, load and run programs, save programs and data, copy programs or diskettes, protect programs, modify them, etc. No technical knowledge is assumed. Using Apple's own System Master 3.3 diskette, Sample Programs diskette, and "Apple Presents... Apple" diskette as the sources of all demonstration programs and utilities taught, the learner is free to concentrate on the screen and keyboard.
FlipTrack Learning Systems
P.O. Box 711
Glen Ellyn, IL 60137
(312) 790-1117

Teacher's Record Book keeps track of information most often needed by teachers about their students: Name, Student ID Number, Phone Number, Status, Exam Scores, Quiz/Homework Scores and Attendance. The system is menu driven; generates various output reports. System will also run user programs. With 48K a configuration of 60 students each with 4 exams, 13 quizes/homeworks and 34 attendance records is possible. Will run on less than 48K, but with reduction in size of class, number of exams, quizzes, etc. Includes program diskette, backup program diskette, data diskette and manual. Requires Apple II or //e with 1 or 2 disk drives and an optional printer.
GLOW Software Systems
7001 Amherst Drive
Little Rock, AR 72205
(501) 664-9469

Encephalon interactively simulates neurologic patients using high resolution graphics displays. Allows medical students to practice neurologic examination and diagnosis on simulations constructed from findings of actual or hypothetical patients. Presents the history, and allows interactive simulated examination. The user may venture a diagnosis, after which the simulator presents the correct diagnosis with a brief discussion of the case. Records of the diagnoses made by each user may be kept for evaluation purposes. High resolution graphics, sound, color. Requires Apple II or //e, Integer BASIC, 1 disk drive, game paddles or joystick. $39.00.
Andent, Inc.
1000 North Avenue
Waukegan, IL 60085
(312) 223-5077

VisiCalc Training Videotape is for executives with personal computers who want to learn VisiCalc easily. Used at work or at home, the tape can be repeated and problem areas reviewed at the touch of a button. 90-minute videotape leads the student through several business applications. Partial Table of Contents includes How to Load VisiCalc, Labels, values, formulae, headings, sum function, storage function, financial example, protection of files, etc. Formats include VHS, Beta (both $195) and 3/4-inch ($235).
Legalvision Inc.
156 Bank Street Suite 2A
New York, NY 10014
(212) 242-0783

Alphabet Beasts & Co. is an ABC & 123 program to make learning letters and numbers fun; very simple to operate. For the ABC's, just press any letter key and a mythical beast appears along with a funny rhyming poem. Then, the "magic pencil" prints the letter on the screen in the Zaner-Bloser alphabet. For numbers, a blank picture first appears and the "pencil" prints out the number as a word - letter by letter. Then a fire-breathing dragon flies onto the screen, huffs, puffs and makes a happy dragon appear on the screen - posed in the shape of the number! Take a break with "Creature Feature" where children can mix up heads, bodies and legs of a dragon, alien, genie and a boy with 256 different combinations $29.95. Requires an Apple II or IIe, Applesoft and DOS 3.3.
Software Productions
2357 Southway Drive
P.O. Box 21341
Columbus, OH 43221

Kids: Read in 90 Days is based on Sidney Ledson's Revolutionary Reading Game - a tested and proven method used by thousands of parents. Program allows the user to teach children ages three & up to read in 90 days -$95.00. Available on 16-sector disk for the Apple II with 48K.
The Zivy Company
6035 N. Maplewood Avenue
Chicago, IL 60659

Statistics and Probability Demonstrations and Tutorials uses color graphics, practical tutorial problems, and simple simulations. Used in conjunction with lectures and standard statistics textbooks, these programs are useful both for classroom demonstrations and for study by individual students. Features interactive demonstrations; live simulations demonstrations; interactive access to a variety of computations to illustrate statistical analyses. Focus on computational details or models, methods, results, etc. Hidden control options give the instructor flexibility during classroom demonstrations. Requires an Apple II or //e with 48K and DOS 3.3. Chi-Square Analysis of Contingency Tables $75.00; Discrete Probability - Part I, Shapes of Well-Known Distributions $75.00; Part II, Simulations, Limit Theorems and Distribution

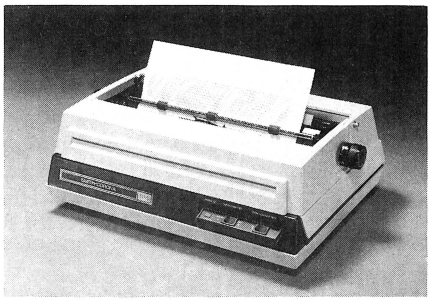
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The International Management Institute, Inc.
34 Maple Street
Summit, NJ 07901
(201) 522-1213

Financial

Money Tool now offers the Apple II (any type) owner an easy-to-use money management program for the home or small business that creates a budgeting system and tracks expenses against that budget. Organized as three separate, but interactive operations. Transaction element permits entry of expenses and deposits. Summary report operation creates reports based on recorded transactions. Budget element develops budgets for comparison against the summary reports as a measure of financial performance. Transactions can be posted in 60 categories, any of which may be renamed. Comes with a self-instructional, 66-page manual that describes program operations in detail and includes many illustrative examples. Requires an Apple II with 48K and DOS 3.3 with an 80-column printer $59.95.
Howard W. Sams & Co., Inc.
4300 West 62nd Street
Indianapolis, IN 46268
(317) 298-5400

Money Manager System allows the homeowner to better manage expenses and cash flow. Handles mundane chores (like balancing the checkbook) and creates reports and graphs to give a better understanding of personal finance. Produces financial summaries and reports to aid in tax form preparation. Supports user-definable accounts, split transactions, multiple checkbooks, etc. Manual includes descriptions of all the files used in the system, so you can expand Money Manager by adding more reports, graphs, etc. The system can rebuild all the user accounts and most other files in the event of a system failure (power failure, computer failure, etc.). Requires CP/M and 56K of memory $125.00.
Woolf Software Systems
23842 Archwood Street
Canoga Park, CA 91307
(213) 703-8112 or (213) 999-3135



Sensible Solution has three new accounting packages for use on single and multi-user small business computers. All three packages are fully relational; a single entry is automatically posted to related journals and ledgers in one step. Programs are provided with The Sensible Solution programming language source code, so systems houses and end users can quickly change any of the programs' functions or report formats. Sensible Solution DBMS and Programming Language $695, Bookkeeper $495, Bookkeeper Plus $595, and Management $895.
O'Hanlon Computer Systems, Inc.
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(206) 454-2261

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Data Express
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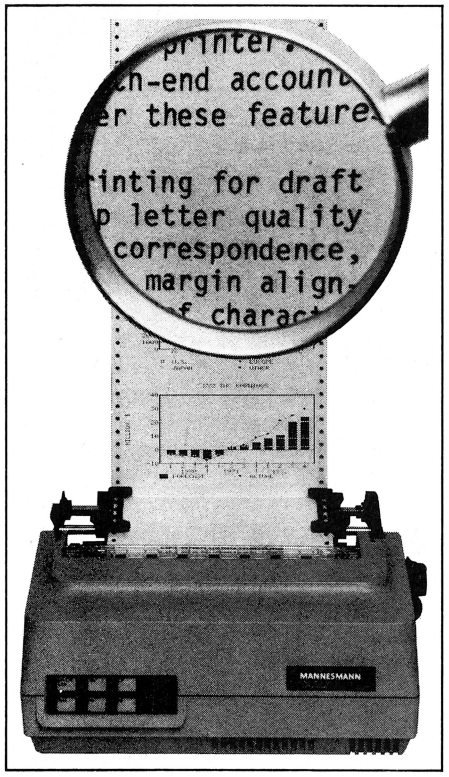
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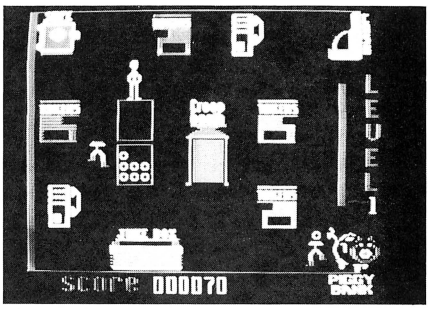
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Single Source Solution
2637 Pleasant Hill Road
Pleasant Hill, CA 94523

Spare Change depicts the comically quarrelsome relationship between the owner of an arcade (you) and your impatient partners, the Zerks. Since the delivery of a miraculous, new videogame machine, you have taken to filling the machine's coin bin with tokens the moment the last customer leaves, in order to watch it play more than a dozen video comedy routines. The Zerks, however, want to go home. Through the keyboard or joystick, you can distract the two Zerks and gain ground. Requires an Apple II (any type) with 48K memory and DOS 3.3 $34.95.
Broderbund Software
San Rafael, CA



New Hi-Res learning games for children available from Sierra On-Line: The **Learning With Leeper** character serves as a guide to games like *Dog Count*, *Balloon Pop* (shape matching), *Leap Frog* (where the child helps a lost frog negotiate his way through a maze, and *Screen Painting*. **Bop-A-Bet**, an action game, is designed to help children learn to recognize and alphabetize both upper and lower case letters and can be played either with a keyboard or a joystick. **Dragon's Keep** and **Troll's Tale** are two adventure games, with controlled vocabulary for second and third grade levels, respectively.
Sierra On-Line, Inc.
36575 Mudge Ranch Road
Coarsegold, CA 93614
(209) 683-6858

The Game Disk includes Rocket Intercept: a fast paced game where you defend your space bases from 100 attacking rocket ships. Laser Bomb has two space ships blasting and bombing a well-defended city. Death House: you and a friend are in a room with a ricocheting bullet. This is truly a game of speed, skill, and guts. Demos Lander: explosive, fast action game. Blackblock: a thinker's game. Clock 3: make your Apple into a clock stopwatch. $20.00
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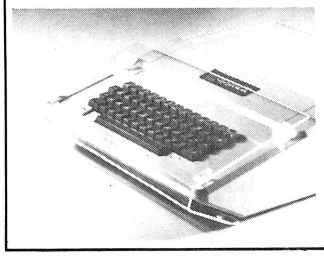
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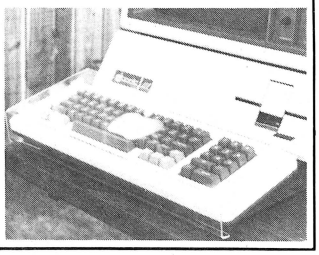
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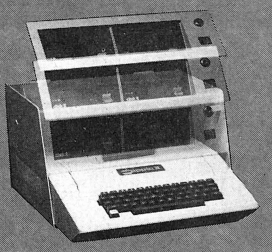
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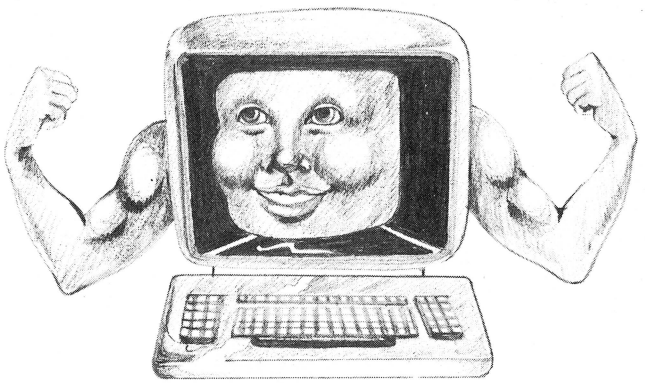
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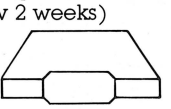
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215 First Street
Cambridge, MA 02142

Monster Mash is an arcade-style game for the Apple II and /// computers. It's your job to keep the monsters in the graveyard, using your Monster Masher and quick moves. The game offers many different levels of skill and control. Requires minimum 48K Apple and DOS $29.95.
The Software Farm
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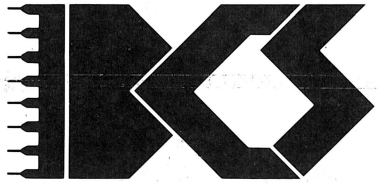
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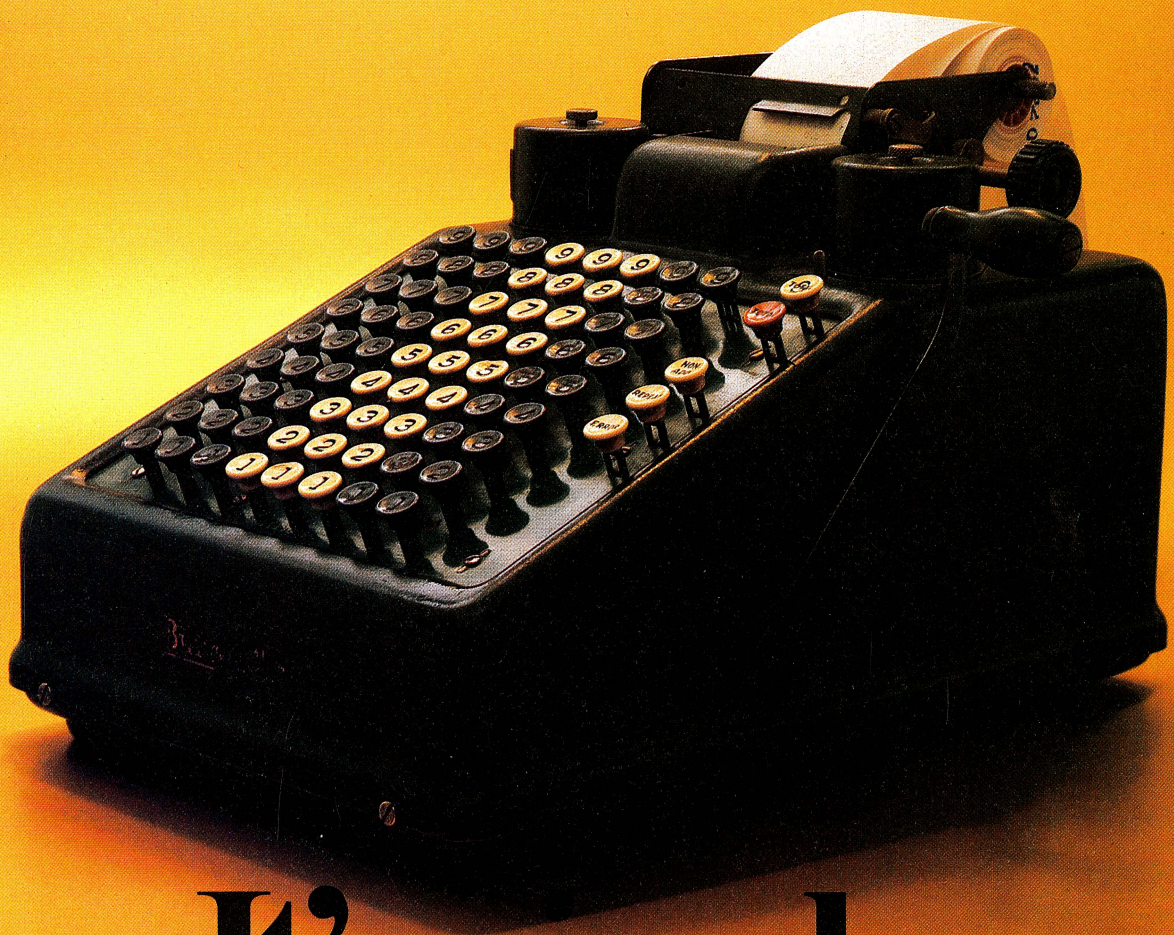


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both caps and lower case; The Patternmaster; Bitmap Wizard, which provides a set of 5 differently shaped viewports so that you may capture segments of pictures and save them in sets on disk; Window King lets you define rectangular windows. Powerful graphic control language lets you use all the elements prepared using the other 4 modules. Written in Assembly language and Applesoft BASIC on a non-copy protected disk $79.95.
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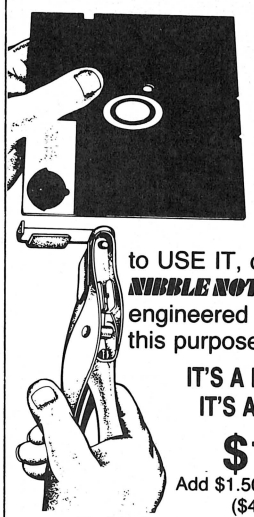
Arcade Machine Utility Pak II for users of the popular Arcade Machine graphics utility allows the user to delete the auto-boot Title (page) so that the created game can play instantly. It also permits the user to save the created game in a non-protected format; allows linking of several games in one disk, so that the background changes with each level. Helps the user package the games created into a more-impressive format. Requires Apple II with 48K. $60.00.
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Languages (Programming)

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Einstein Corporation
11340 W. Olympic Blvd.
Los Angeles, CA 90064
(213) 477-6733

Programmer's Power Tools II and /// extend the BASIC language, giving the capability of writing sophisticated programs without having to sacrifice the simplicity and flexibility of BASIC. Easy sorts and searches, format numbers on the screen and printer, and build user-friendly input routines. Includes exclusive features for the //e, including the ability to convert strings to upper case, or call in a "smart" printing routine that can tell what kind of an Apple it is running on and adjust itself accordingly. Both PPT II ($59.95) and PPT /// ($79.95) are sold on unprotected disks and are designed to be incorporated into your programs. The complete manual includes quick reference sections, commented listings of demonstration programs, and customization notes.
CE Software
801-73rd Street
Des Moines, IA 50312
(515) 224-1995

XASM-80 cross assembler is a software package which allows 8080 software development on a non-CP/M equipped Apple II computer system. The package consists of an editor and assembler. The editor enables the user to create 8080 assembler source programs (files) and text files. Files may be either saved on disk or used as input to the assembler which generates a program listing and the object code. Handles 16K of text, 4K object code, 600 symbols and up to 9,999 statements. Requires an Apple II Plus, at least 48K of RAM and DOS 3.3. Complete with documentation and disk $45.00.
Allen Systems
2151 Fairfax Road
Columbus, OH 43221
(614) 488-7122

Music

4-Track Editor allows the user to write music faster and more accurately with or without extensive keyboard knowledge. Compose directly with the computer or work from a written score. The composition can then be edited, compiled, and played back to hear the results. It can be used to eliminate wrong notes, add new notes, rewrite part or all of the piece and smooth out rhythmic irregularities. It can generate a printout of the composition in a special format for fast editing. System requirements include an Apple II (any type) or Apple compatible computer; a Soundchaser computer music system; one disk drive with controller; audio and video monitors. $195.00.
Passport Designs, Inc.
116 North Cabrillo Hwy
Half Moon Bay, CA 94019
(415) 726-0280

Personal

Coupon Organizer will handle coupon collections: Qualifiers, Trades, Mail Coupons, Store Locations, Labels, Clearing Houses, and Expiration dates. Since some of the biggest problems in coupon collecting are their organization, sorting, storage, and selection. After entering all your coupons into the computer, you only need one minute to print out a list of those which you will need to take with you to the store. $39.00.
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Response Time is a program that checks your reaction/response time and levels of intoxication. Tests and records your reactions to a random signal (beep); gives you a response score which can be compared to other's scores or your own past performances. It is a verifiable test for levels of disability, fatigue, intoxication, and dependability. It can be used to test the sobriety of friends at parties, customers at bars, patients after anethesia, etc. The program may be copied for backup purposes and listed/modified for custom programming. $39.00.
Andent, Inc.
1000 North Avenue
Waukegan, IL 60085
(312) 223-5077

Flightplan Version 5.2 computes aircraft flightplans at either the private or commercial aviation levels. Headings and distances are computed using the turn radius of the aircraft when passing a turn point (straight point-to-point headings are also available). Computes fuel burned and remaining at each turn point; can use forecast wind to provide corrected headings and speeds; provides "real world" times at turn point and will compute an estimated time of arrival based on a known takeoff time, or an estimated time of departure for a desired arrival time. User can save flight plans for future use, either before or after computing. Flight plans can be recalled and printed, or recomputed (using different options) and then printed $99.50.
Single Source Solution
2637 Pleasant Hill Road
Pleasant Hill, CA 94523

Utilities

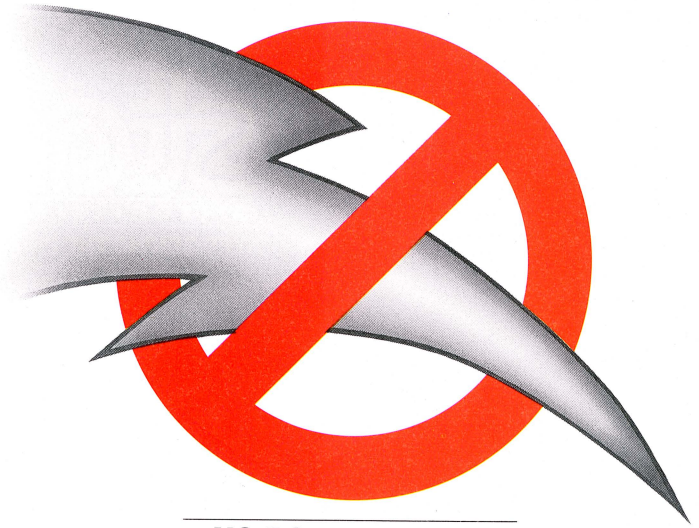
MENU/POWER simplifies CP/M commands and utilities. Demystifies CP/M, doing the housekeeping. No more PIP, STAT and other undecipherable commands, or alphabet soup file names to deal with. MENU/POWER numbers all the disk files. You pick the file number and CP/M is fed the file names. Some of the commands are ERASE, SPACE, TEST, RECOVER, COPY, SORT, RENAME, RUN, COMPARE, TYPE, SIZE, PROTECT, UNPROTECT, PASSWORD, CODE, etc. The last two protect private files from prying eyes. $149.00.
Computing!
2519D Greenwich
San Francisco, CA 94123
(415) 567-1634

CLIP (Command Line Interpretive Program) makes CP/M more efficient. Replaces CP/M's command processor with a user friendly "shell" containing over 50 commands. Features built-in text editor; automatic file searching; make your own commands; built-in calculator. Supports I/O Redirection and Pipes $49.95. **Software Tools Package** is just $25.00 with the purchase of CLIP. These programs will enhance and complement CLIP. Includes binary file comparison, search for a pattern in file; convert to upper case; extract columns from a file, pad lines with spaces, extract words from a file, etc., $25.00. A **Data Encryption Program** with a twelve-character password encrypts a file such that no one may read it but you; $25.00. Designed for the Z80 running CP/M on Apple, and other computers.
Thoughtware, Inc.
P.O. Box 41436
Tucson, AZ 85717
(800) 821-6010; (602) 327-4305 (AZ)

Apple-Cillin II checks the performance of Apple II computer systems. Contains 21 menu-driven utilities including tests for RAM memory, ROM memory, Language Cards, Memory Cards, Disk System, Drive Speed, Keyboard, Printer, CPU, Peripherals, Tape ports, Monitors and more. These tests will either identify a specific problem area or give your system a clean bill of health. Test results can be logged to a printer for a permanent record. Works with any 48K system equipped with one or more disk drives $49.95.
XPS, Inc.
323 York Road
Carlisle, PA 17013
(800) 233-7512; (717) 243-5373 (PA)

Word Processing

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BOOKS/CATALOGS

Secrets of Better BASIC reveals sophisticated programming tricks and techniques used by professional software authors for writing faster and more effective BASIC programs. Offers faster and more effective programs for testing and debugging programs, more efficient use of memory, string-handling, using loops and subroutines, and creating disk files. Five appendices include ASCII codes and equivalents, numerical systems and conversions, some BASIC functions, sample disk and memory tests, and some useful software. Paperback 7 x 10", 320 pages, ISBN: 0-8104-6254-0, $14.95.
Hayden Book Company, Inc.

Using Microcomputers in Business is an essential background reference for any purchaser of a microcomputer system or software for a small business. Describes the advantages and disadvantages of computerization and enables the potential user to make intelligent purchasing decisions. Explains business applications from the fundamentals of microcomputer systems to the fine points of word processors, accounting programs, data bases, and disk drives. New chapters focus on the value of electronic spreadsheet programs and microcomputer networking. Second Edition, paperback 6 x 9", 192 pages ISBN: 0-8104-6257-8, $12.95.
Hayden Book Company, Inc.
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(201) 843-0550

The ***PC Clearinghouse Software Directory*** lists more than 21,000 software packages, identifies 2,912 software publishers, and 200 microcomputer manufacturers, with valuable cross-references to hardware, operating systems, application packages, programming languages, and prices. Subtitled the "yellow pages to the world of microcomputers", the 840-page directory is available nationally in selected Walden Books, ComputerLand stores, Sears Business Systems Centers, and numerous other independent computer and book stores for $29.95.
PC Clearinghouse, Inc.
11781 Lee Jackson Highway
Fairfax, VA 22033
(800) 368-4422; (703) 352-0721

Ribbons For Computer Printers, a 16-page catalog. 1983 edition features a total of 288 ribbons. Photographs and descriptions make it easy for the user or distributor to identify the correct ribbon for their printer. Catalog is free and includes an updated price list.
Aspen Ribbons, Inc.
1700 N. 55th Street
Boulder, CO 80301-2796
(303) 444-4054

PLUMB — Probing the World of Personal Telecommunications is a newsletter to help computer users explore the many services available when the computer is connected with a modem and a telephone. Contains information of interest to computer users at all levels of expertise. Telecommunications is a common denominator, allowing owners of all types of machines to communicate, share ideas and "homegrown" software, and obtain a wide range of sophisticated services. PLUMB features electronic mail; software sales and exchange; dating services and adult bulletin boards; financial and investment information; merchandise sales; online games; bulletin boards, etc. PLUMB sells for $20 for the five issues published in 1983.
Riverside Data Inc.,
P.O. Box 300
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(502) 228-3820

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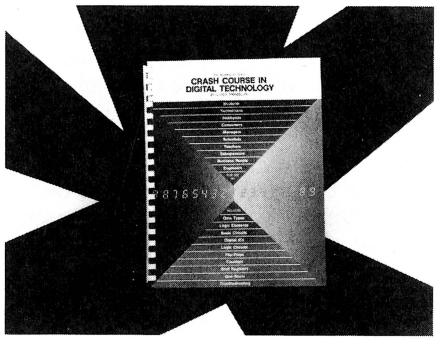


Guardian Angel*, with LED power status indicator, automatically safeguards data from blackouts, brownouts for just $595.

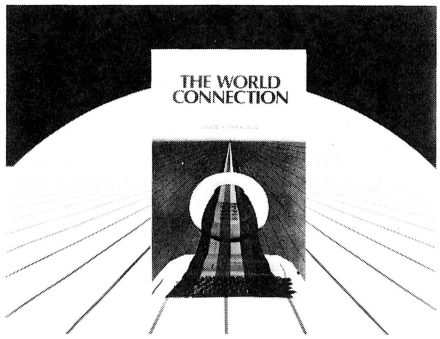
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The World Connection explores modems, dial-up information services, and computer bulletin board systems. It is aimed at both the novice and the advanced computerist. Technical concepts and applications are explained in simple terms. This book covers dial-up information systems like The Source and CompuServe, electronic bulletin-board systems, and system requirements including discussions of modems and software. Photos, cartoons, and illustrations help make the material interesting as well as informative. Appendices include a glossary, lists of bulletin board system numbers, and addresses of software and hardware suppliers. Also offers hints for the first-time buyer choosing an information service or a bulletin-board system. A forecast of what's ahead in telecommunications rounds out the volume's coverage.
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The Dental Computer Newsletter is a monthly newsletter for dentists, physicians, and office management people who have interests in office computers. For a $15 annual membership fee (overseas subscriptions are $23 U.S.), you get the latest information on computers for the office, software/hardware reviews, and practical tips on computerizing and training staff. As a DCN member you have access to members worldwide where you can get advice, opinions, and experiences. DCN maintains a hotline. If you join mid-year, you will be supplied with the year's back issues. DCN also offers Membership/equipment lists ($5) and commercial software and DCN software exchange lists ($4).
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Waukegan, IL 60085
(312) 223-5077

The SpecialWare Directory lists instructional, administrative, professional, and evaluation/testing materials for special education. Contains complete information on microcomputer courseware and software specifically for special education, and listings of regular education products that have proved successful in adaptation for special education needs. Cross-indexed for easy use. Curriculum skill areas, educational levels, hardware compatibility, and warranty and preview policies are indicated for each listing $10.00.
LINC
1875 Morse Road, Suite 215
Columbus, OH 43229
(614) 263-2123

My Computer Dictionary is a children's dictionary of computer terms, with several illustrations per page. Although most books with similar titles are for young children, this one is for children who can read. The 47 illustrations include photographs, drawings, flowcharts and brief programs. Most of the definitions are simple and straightforward. Helps the student understand computer texts that have no glossary, or an inadequate one. 32 pages, paperback, 1981 $3.00.
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Minneapolis, MN 55431

Katie and The Computer is a computer-age storybook for kids. Teaches young children how a microcomputer works. Katie ends up inside her dad's new micro. She meets Colonel Byte and the other characters who make a computer work. Her journey follows the path of a computer command; her experiences are technically accurate yet easily understandable, right down to her encounters with a program bug. Additional material is included to help you relate the story to actual working parts of the computer. With color illustrations.
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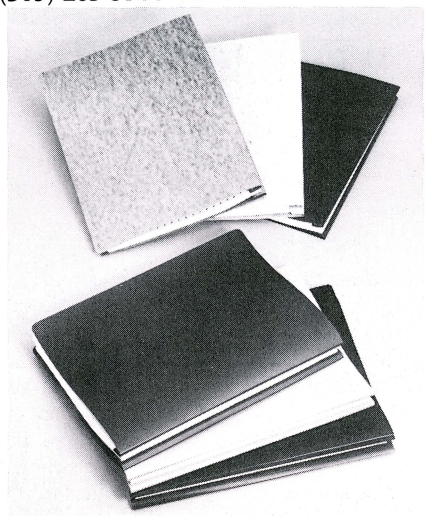
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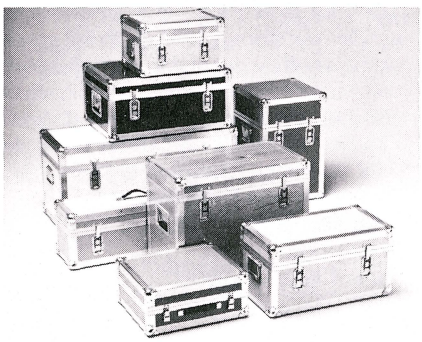
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MULTI-TECH

Multi-Tech Systems, Inc.
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(612) 631/3550

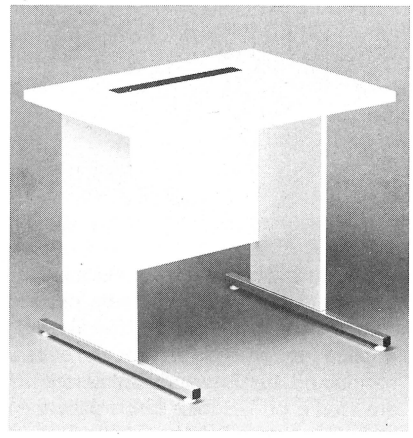


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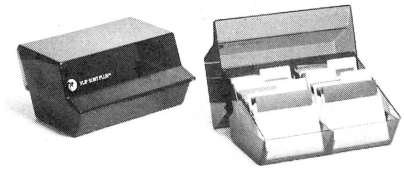
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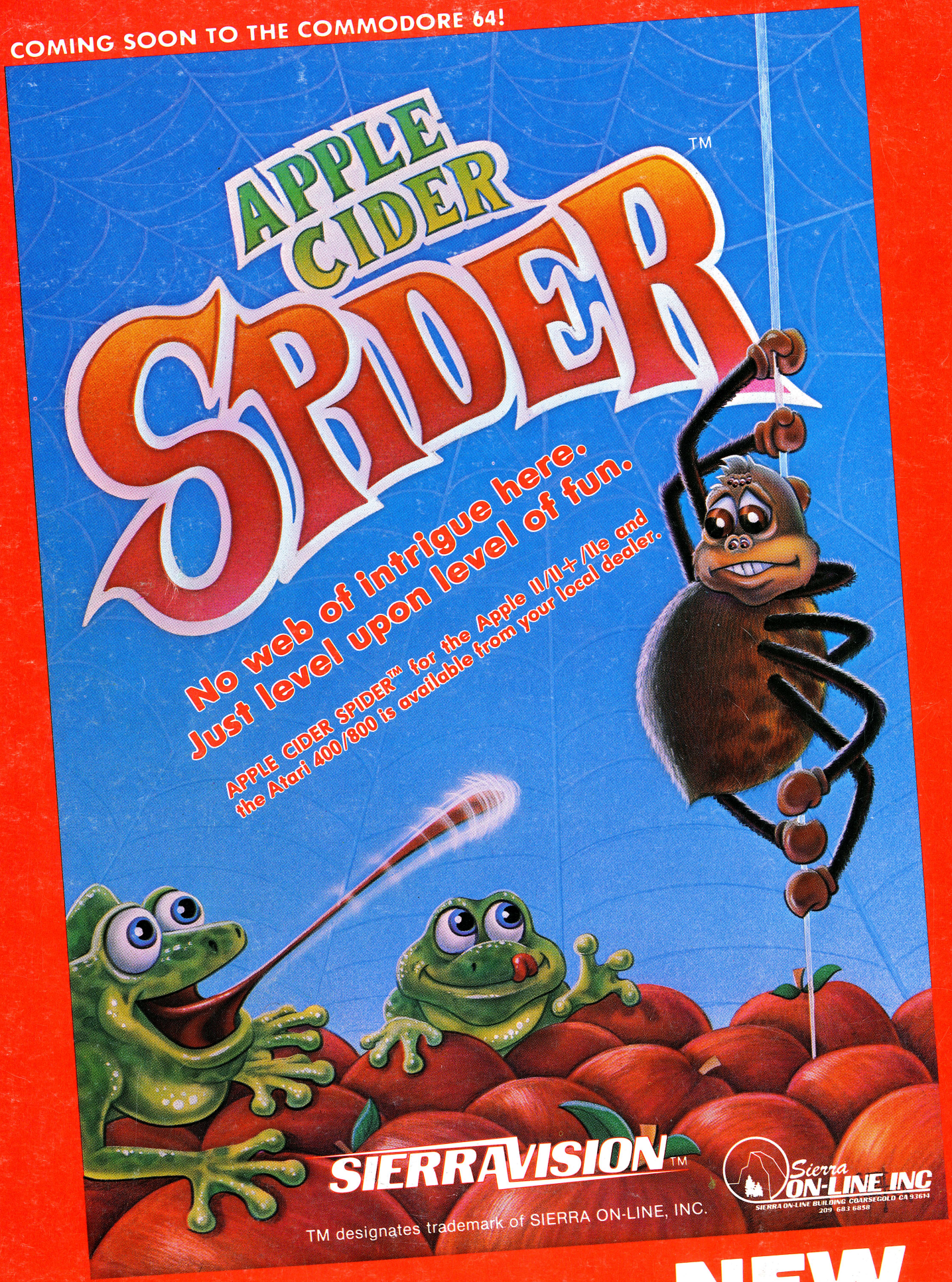
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