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Apple Orchard

The Premier Magazine for Apple Computer Users ™

VOLUME 4 NUMBER 2 MARCH 1983 $3.25



THE PROWRITER COMETH.

(And It Cometh On Like Gangbusters.)



Evolution.

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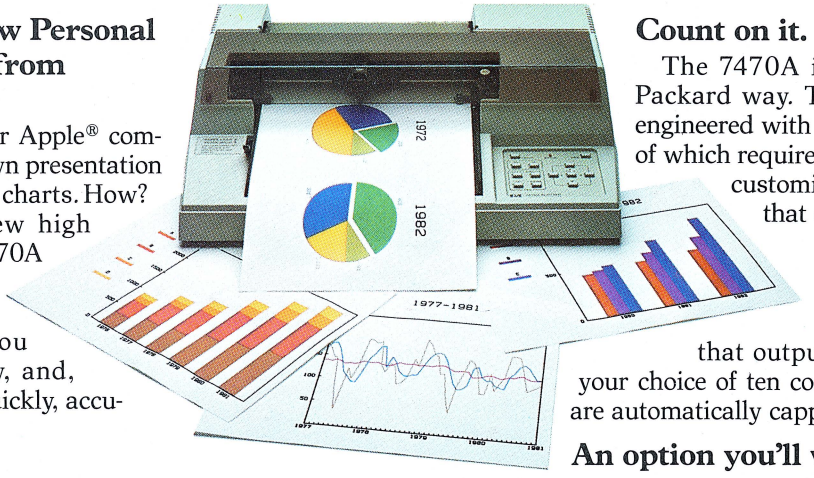
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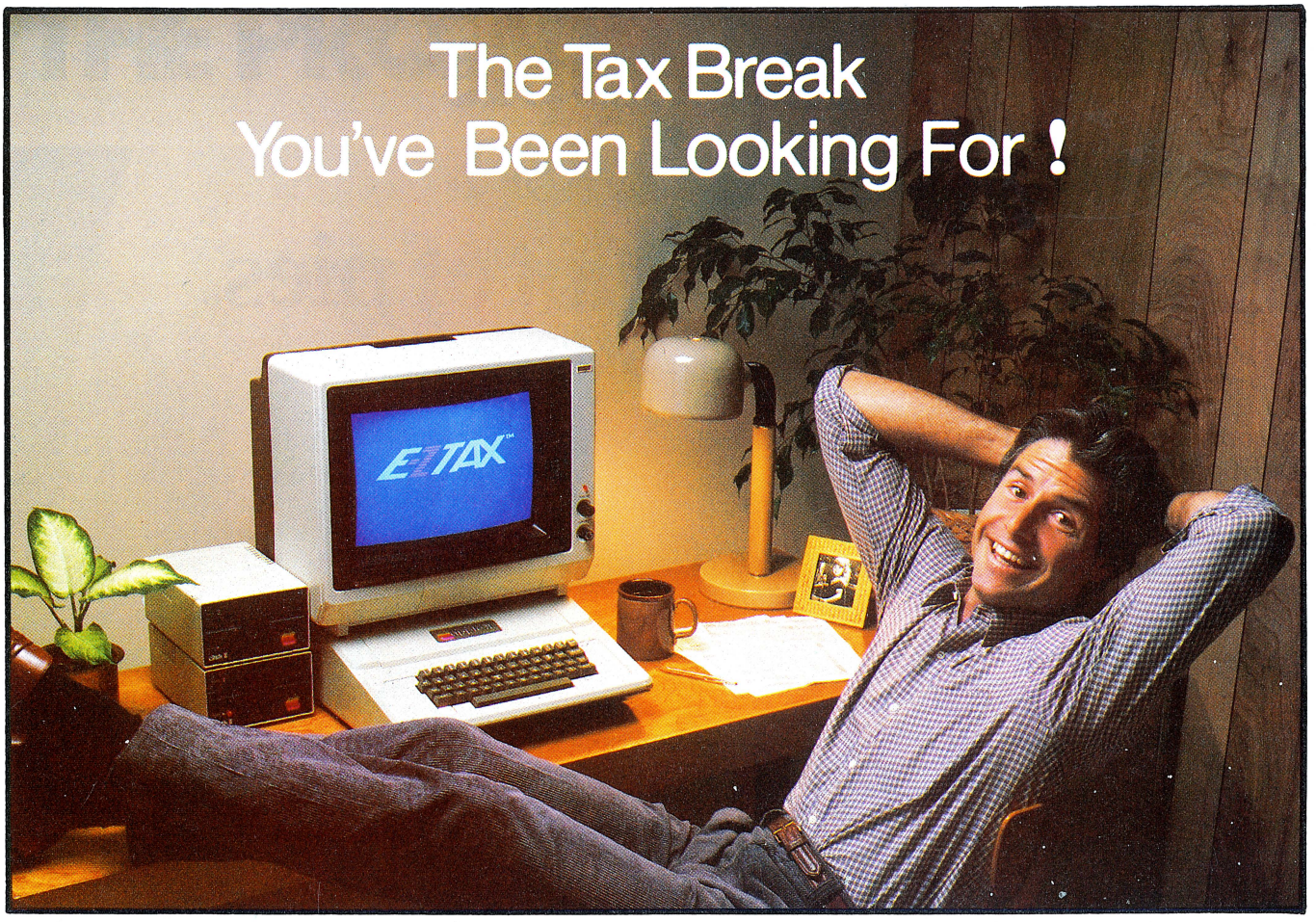
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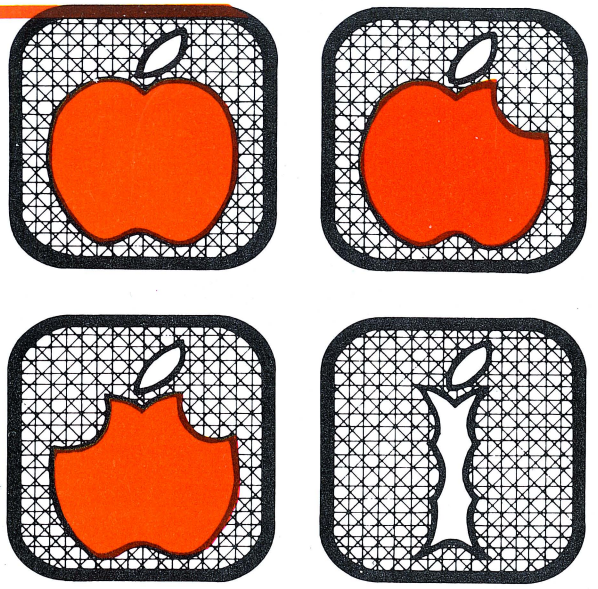
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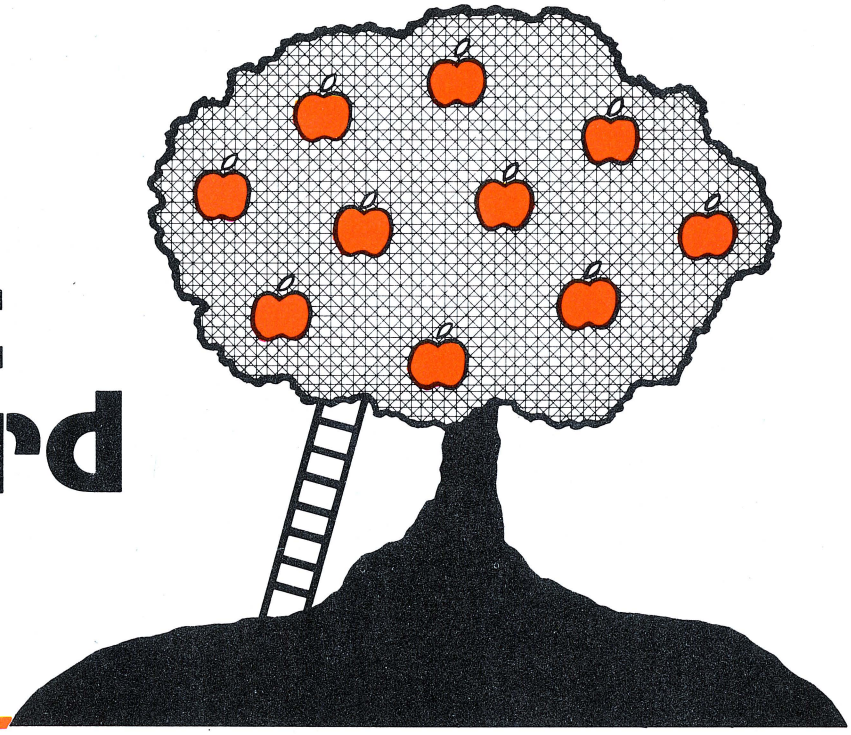
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Apple Orchard



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APPLE ORCHARD (ISSN 0277-1950) is published nine times a year by the International Apple Core, Inc., 908 George Street, Santa Clara CA 95050. Second Class Postage paid at Santa Clara, CA and additional offices.

Subscription Rates: $19.50 for nine issues in the U. S.; $27.00 (US funds) in Canada, Mexico, and APO/FPO addresses; and $36.00 (US funds) for addresses elsewhere.

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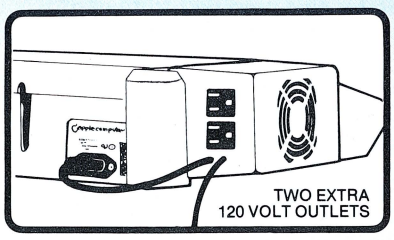
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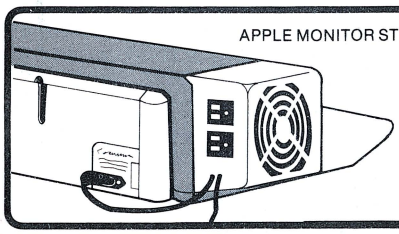
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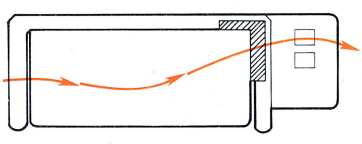
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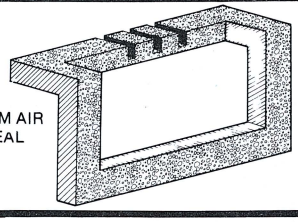
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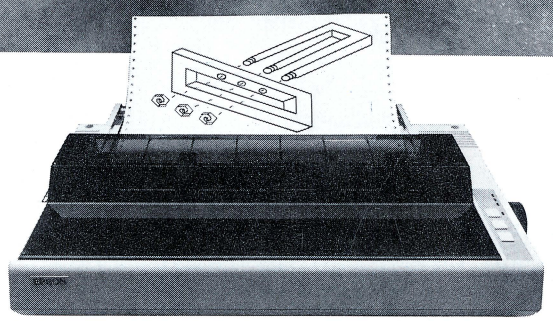
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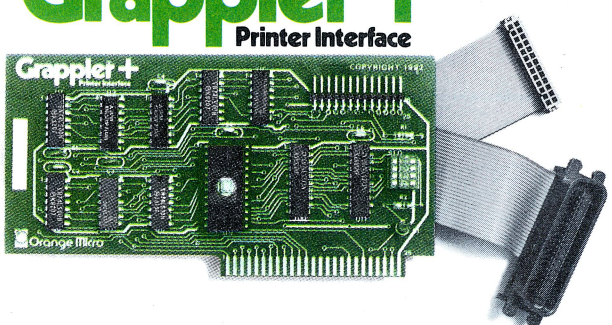
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ACTUAL APPLE II PRINTOUT USING GRAPPLER AND EPSON MX100.

With The Grappler™ + Printer Interface



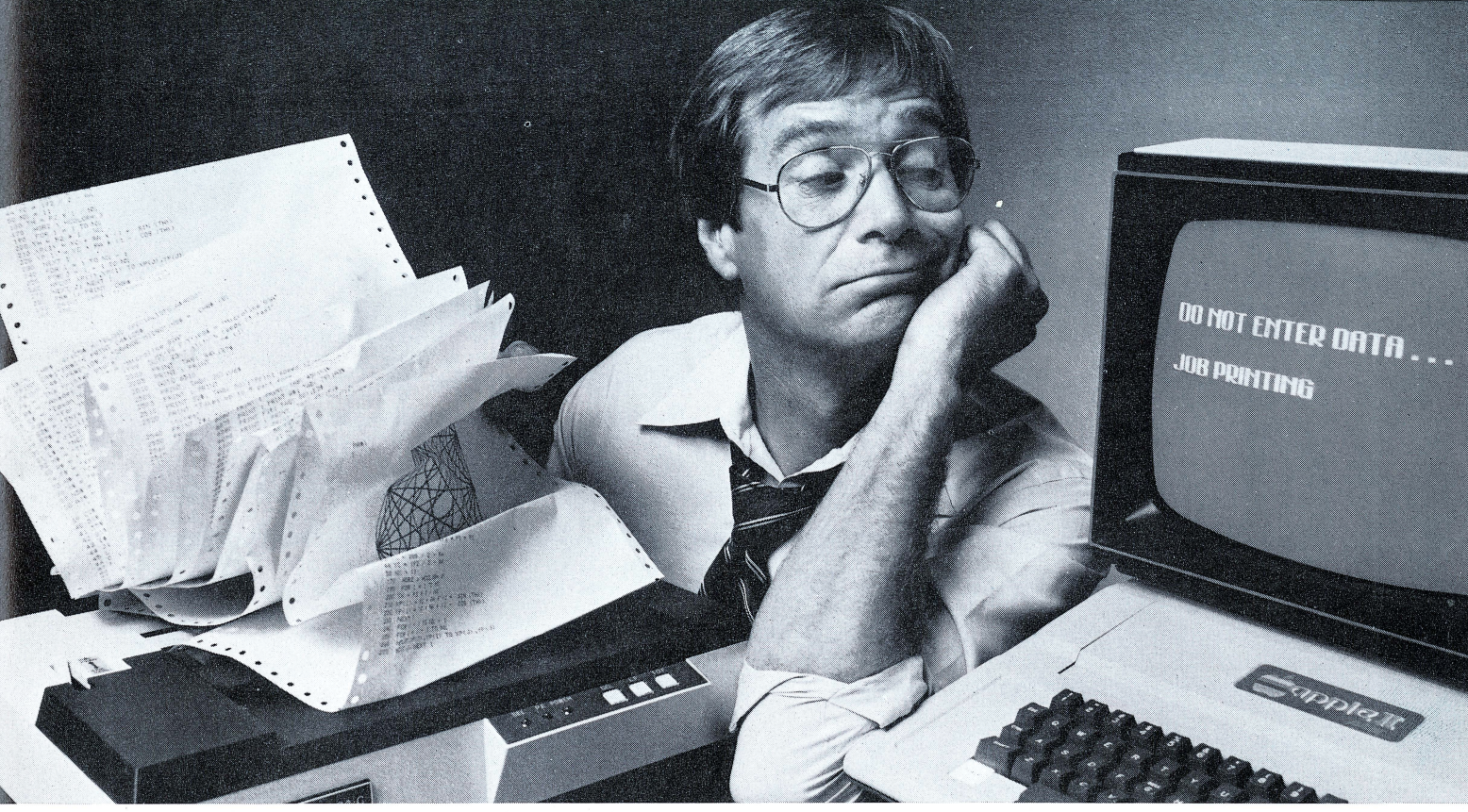
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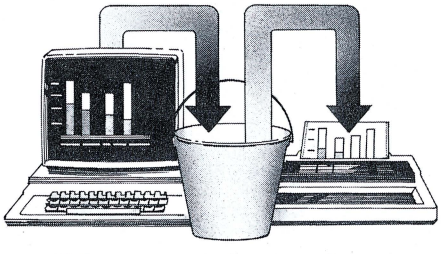
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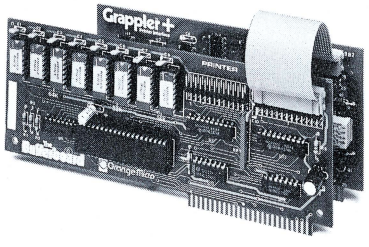
If your printer uses your Apple® more than you do, you need The Bufferboard.™

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The Bufferboard—designed exclusively for the Apple Computer.

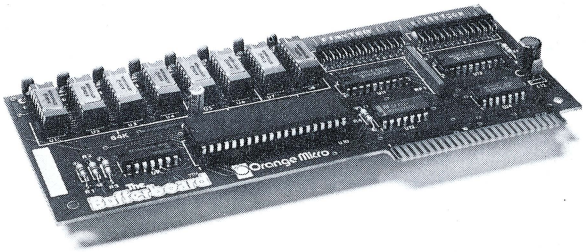
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The Bufferboard is made by Orange Micro, Inc.; the same people who brought you the popular Grappler + printer interface. Both the Grappler + and The Bufferboard are now available at your local Apple dealer.

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TEXTFILE

If you're surprised that this issue of **Apple Orchard** is coming only one month after the previous one, we hope it's a pleasant surprise. As we said last month, **Apple Orchard** is now being published on a nine-issues per year basis. We'll skip only May, July, and January. That'll help us to continue being the publication with more valuable material, sooner.

We lead off this month with a first look at Lisa, on which Apple has pinned great hopes for the future. Lisa, styled the new "(Silicon) Valley Girl" by the San Jose *Mercury*, has indeed had everybody speculating about her attributes for many months. Well, she's everything folks thought she would be, and we'll have much more as the months go by.

Derek Southern tackles a seasonal problem, taxes, and if your temperature is rising at the thought of the Infernal Revenue Service, you can determine just how much with the aid of Strawberry Tree's temperature card, reviewed for us here by Neil Lipson.

We also hail the Return of Dr. Wo after an absence of some months. His lucid Pascal commentaries resume with an analysis of the File information Block. Bill Shepard, meanwhile, sheds his Pascal hat for a discussion of Protocol Converters. This is the next Great Frontier of personal computering: linking the little devils together, and even connecting to mainframes.

As promised, the third installment of Will Harvey's series on graphics and animation is herein, along with an updated Assembly listing of the routines. We'd like to hear from you about your experiences in this field.

For the educator, we have a class grade-ranking program from Joyce Conklin, a veteran of the Bunsen Burner wars. Joyce is one of the pioneer Apple-using teachers, and here too, we're always on the lookout for material on the Apple in schools.

We're also pursuing the Apple in a hospital; a familiar beige box is involved in monitoring Barney Clark's artificial heart. No details were released at press time; we'll keep asking.

Alan Anderson is back with us as well, this time delving into the CONSOLE driver on the Apple ///. And Pat Parker looks at the delightful *Apple Backpack* book by Scott Kamins and Mitchell Waite.

We would also like to pass along an amplification to our //e article in the February issue: We identified Bruce Tognazzini as the author of the impressive //e Keyboard Tutorial. Bruce called us and asked that we mention that J. D. Eisenberg of Apple co-authored that tutorial. In another article, we mispelled author Penni Gallant's name. Sorri about that.

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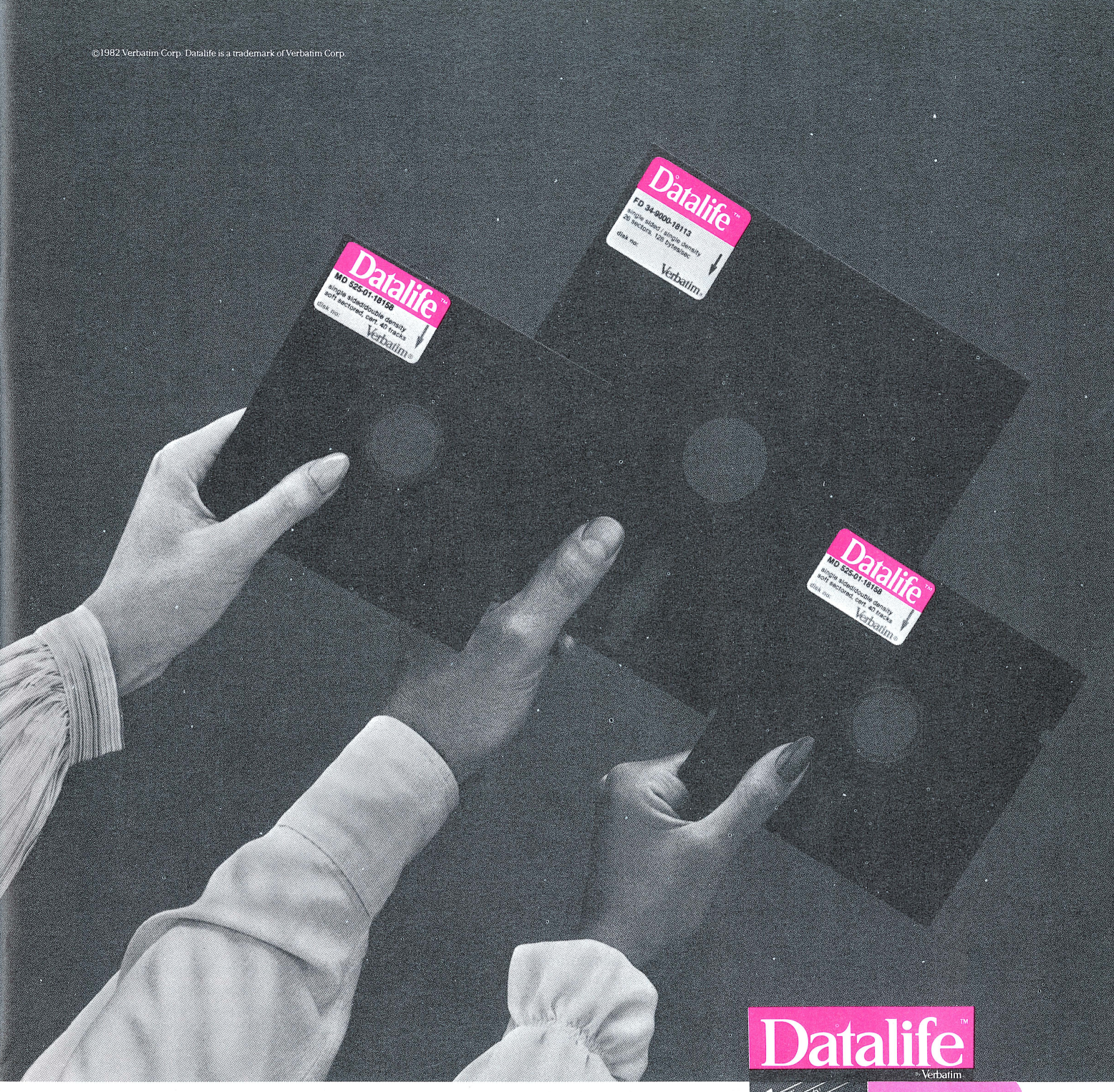
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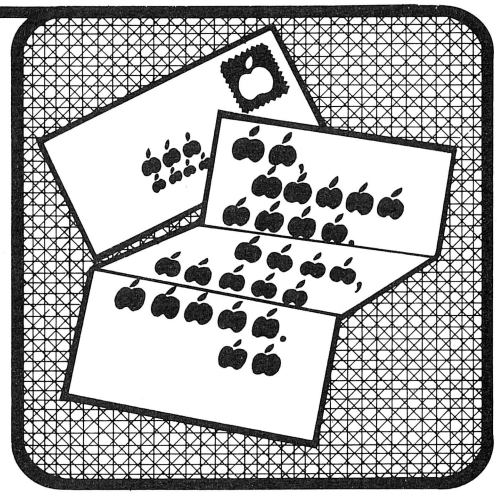
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Letters to the Editor



Sir:

I am writing this letter to convey several impressions and suggestions about the Orchard. I send these suggestions in response to your requests for feedback because I believe they would serve the IAC member clubs and perhaps result in greater interest from club members in the Orchard.

At a recent meeting of over 300 Washington Apple Pi members, I asked several questions about their familiarity with the Orchard. Less than 50 of the members present regularly read the Orchard either through subscription or newsstand purchase. About a dozen indicated they would drop their subscription at the next renewal. Some 40 of the members had purchased one copy and decided not to obtain it regularly. About 35 used to read it regularly but no longer do.

I realize that impressions and suggestions are very subjective and my views may not reflect those of others. I have discussed these thoughts with at least two other club presidents and know that I am not entirely alone in these notions.

1. Inclusion of Articles from Club Magazines:

As you may recall from our conversation in May at the annual meeting, I believe that there are many worthy articles to be found in local club newsletters. I applauded Jim Simpson's efforts to initiate "The Compiler" as a means of dispersing this wealth of ideas; however, it would seem that such articles would make excellent copy in the Orchard. I again encourage you to examine club magazines and select articles for inclusion in the Orchard. In addition to adding to the Orchard contents, this would help bring the IAC and the clubs together by connecting the IAC magazine with the IAC member clubs.

2. Identification of Club Membership:

I believe that member clubs would view the Orchard as more than "just another Apple publication" if contributors were identified as to their club membership. In the Sept./Oct. issue for example, I found not one author or columnist identified as to the club to which they belong.

3. Reviews and New Product Announcements:

I with to commend you for the increasing number of product reviews found in the Orchard. I believe that IAC club members are well served by unbiased descriptions of the positive and negative features of Apple products. I look forward to more such reviews in the future.

On the other hand, each issue of the Orchard devotes from 10 to 20 pages to new product announcements sent in by manufacturers. Personally, I find such announcements of little value. There are ample magazines around which inform consumers of new products. Does the IAC obtain advertising revenues from these pages? If not, I would urge you to de-emphasize such material.

4. Club News Column:

What is your reaction to an IAC club news column containing items of interest regarding member clubs? The column could contain a description of new projects undertaken and old problems solved. One club president contacted me for help in incorporating because he read in our WAP magazine that we had accomplished this feat. No doubt many clubs are doing such things which other would like to learn about.

I hope that the above items are of interest. It may be that you have considered some of these already. I would very much like to hear your thoughts regarding these comments and would like to share your responses with the WAP membership.

David Morganstein, President
Washington Apple Pi

In general, the relatively few "complaints" about Apple Orchard which we receive can be divided into three categories:

(1) "It's too technical; I'm not that advanced with the Apple."
(2) "It's not advanced enough for me; it's designed for the masses rather than for those who started the Apple era."
(3) "It wastes space on Club listings and IAC stuff which doesn't interest me."

The second category, unfortunately, includes many people who are active in the leading IAC member Clubs, which may explain part of your meeting survey results. As President of a large Club myself (the San Francisco Apple Core), I can, and have, replicated your findings.

You're quite correct in judging these results to be subjective; all of the opinions are based on the member or subscriber's own needs and level of achievement. Apple Orchard can't be all things to all people, even if the budget did allow for that many pages. We aim at the "medium Apple user", and try to balance the level of Type (1) and Type (2) complaints above.

Our primary goal is to encourage users, gently, to try new things; to explore, learn about, and use their computers. But we must be sensitive to the changing market. Apple Computer's own figures show that the "hobbyist" segment of the overall market is declining, and they are acting on that information. To the extent that the IAC represents a "hobbyist" market, it therefore becomes less deserving of widespread assistance from Apple Computer or any other institution, commercial or otherwise. Your own consulting activities and quasi-commercial plans for Washington Apple Pi show that you're reaching beyond the "hobbyists" toward the mass "user" market. If Apple Orchard is perceived as a "cult" publication, Apple Orchard and the IAC will suffer.

Apple Orchard exists as the IAC's primary funding mechanism, so we must pursue the larger market. A majority of

that market will never join a user group; that's the way some people are. Many who do join remain as members for a year or two at the most, dropping away or burning out as they learn the machine and feel they have no more to gain from membership.

But that should not preclude identification of an author's membership in a Club, and we do it by arrangement with individual authors. We even reproduce Club insignias, where we have them, and we're building that file. Some people want their Club identified, some don't mind, and some want no Club identification, because the Club isn't the biggest thing in their lives, or because they belong to more than one Club. Apple Orchard has no policy to downplay Club involvement; it's up to the author. Thanks to your reminder, we have, and will continue to, note Club affiliations.

Articles from local Club newsletters have been and are published in Apple Orchard; we get most of the newsletters (some still come to the old Daly City address, would you believe?), and sift regularly. One apparent trend is reprinting of good material from one newsletter to another, which is mute testimony to the fact that the hardest job in any Club is that of Newsletter Editor, not President. (Sorry to say that, but I've held 'em both.) Everybody wants a better newsletter, but contributions come with lower frequency than desired.

From the beginning, Apple Orchard was conceived not as "competition" for Club newsletters, but as a way of helping the Club Editors, by offering a payment "carrot" to potential contributors (not the Editors) if an article were picked up. This has been successful, as for example with Terry Tufts of NIAUG, Jim Hopper of Apple-Dayton, Mike Kramer of HAAUG, Gene Wilson of the SFAC, and Bernie Urban of your Club. Quite often, an article from a newsletter has appeared or will appear in Apple Orchard in a revised, expanded form based on the author's desire to take advantage of our greater space, which leads to the question, "When is a reprint not a reprint?" It's not a direct reprint, but is an article triggered by our call about a possible reprint. Our author payment schedule treats newsletter articles on a par with "original" contributions, which encourages submittal to Club newsletters. Further, calls to writers and Editors have resulted in leads to other articles. We will to continue to sift and to encourage.

"Forbidden Fruit", Apple Orchard's New Products section, was conceived to provide the most comprehensive, most thorough listing of new products for the Apple in any magazine, and Mark Crosby does a thorough job, going beyond

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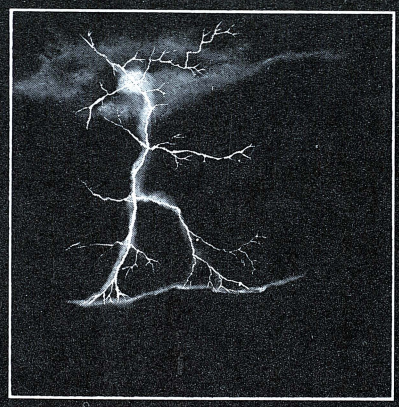
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press release rewriting. We do not receive advertising revenue from it, nor are we in any way tying advertising to editorial consideration as a quid pro quo. New Products columns are among the most popular features in any magazine; I believe that to de-emphasize it because "others do it" would only reduce our overall value as a magazine.

"Club News" has not been prominent in Apple Orchard for three reasons: (1) Apple Orchard is not intended as the international Newsletter of the IAC; we have concentrated on people using the computer rather than Club and IAC activities. (2) Who would be the reporters? Most local Club newsletter editors spend enough time and effort getting material for their own publications let alone having enough time left over to provide reports for a magazine. The likely result is that most of the space would be devoted to less than a dozen active Clubs, including yours and mine. (3) Club news, even IAC information is considered the largest single waste of space by many of our readers who seem to be saying, "We want meat, not politics." (See Complaint ±3, above.)

But there should be a publication for IAC and Club materials and the sharing of mutually useful information. In fact, a new publication, to be called the "IAC Express", was proposed as such a vehicle at the October 1982 IAC Board Meeting; the Board did not approve it. What was approved was a compilation of newsletter articles, to be assembled by a volunteer. One issue was prepared, and we have heard no more. Check with IAC Board Chairman Bernie Urban, a member of your Club, for the full story; I never got all the details. There's no question that the "Bulletin", which Bernie put together until he ran out of time, is missed. Dave, all of the points you brought up are valid questions; I hope that this letter answers most of them. Apple Orchard will continue to reflect our collective perceptions of the need for information, and the changing composition of the Apple user audience.

Thank you for your interest.

Another View. . .

Sir:

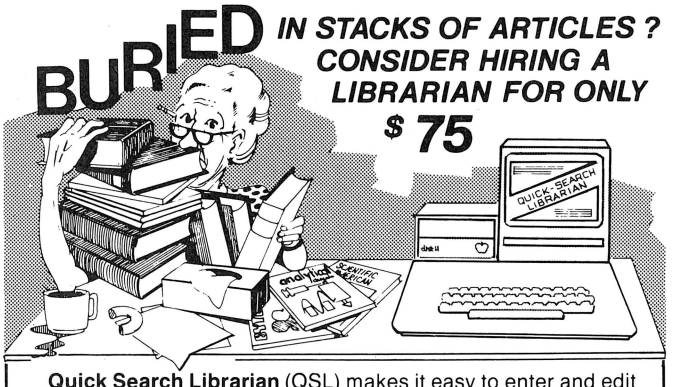
As owner of an Apple II since 1978, I have perhaps a long view of some things within the Apple world.

A long time ago there were just Apple clubs. They were local groups, usually formed around and sponsored by a local computer retailer. We members got together and swapped our created programs and fixes, bemoaned this and cheered that, and waited for Disk II! Some of these clubs felt the need to present some facade of legitimacy by selecting a president. It was usually late in the evening when the host would casually write on the blackboard, "If you can read this and you don't want to be president, move to the rear." Usually some poor idiot was half dozing up front. He or she became elected president by the fact that everyone else moved to the rear!

Some of these clubs prospered while others withered and died. Some that prospered soon began calling themselves "Apple user groups" and tried to make cute names and acronyms for themselves like the *Apple User Group Und Still There-Augusta* (AUGUST-A) of Georgia. Several were somewhat more successful than the above, and survive to this day. The early groups published photocopied "newsletters" typed on a volunteer's typewriter (Apple word processing programs consisted of zippo). They were usually one sheet of paper and consisted of announcements of the next meeting and a list of the membership.

Eventually, some UGs grew to the point where they could publish magazines. The more successful ones soon went to the slick, professionally typeset and printed sheets mailed to tens of thousands.

As the installed base (I love that phrase of the industry!) grew, problems arose. As with any new industry, along with the great and good came the bad and ugly: Piracy reared its ugly head. Clubs and groups responded to the trumpets and were either for or against. I remember one



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meeting at a large group where a young member offered to the membership the chance to copy a program he wrote. It was the first most of us had heard of nibble copiers. At last we legits could back up expensive programs. But some of the powers-that-were screamed and yelled and waved their hands and threatened to walk out if anyone copied the free program. That was the last meeting of that group I attended. I let my membership lapse and I don't even know it it still exists.

But I digress. It seemed that because some clubs became fronts for wholesale game copying, members of the growing fraternity of software authors, publishers and club presidents felt that it was time to form a federation of clubs and stamp out evil. Thus (in an admitted nutshell) was the International Apple Core born. It needed officers, therefore a president was elected by that fraternity.

All well and good. The IAC did begin to do many good things for clubs and user groups. While I have not seen their beginner club package, the description sounds very upbeat and encouraging. Undoubtedly many clubs need and use materials such as the IAC sends out.

Additionally, the **Apple Orchard** has grown and matured. Soon it will increase frequency of publication and we will all benefit.

With the growing, the IAC, not content with a functional set of volunteer officers, decided it needed a board of directors and a concomitant chairman of the board. This presumably left the president's chair open and available to some worthy who had worked his or her butt off. Great. It's good to reward volunteers for their labors.

However, I just couldn't stop laughing when I recently read that the IAC had created the post of Executive Director and that the person who is the ED would continue to have the same responsibilities as before when he was merely President. As a member of a couple of clubs who are members of the IAC, I think I have the right to know just what responsibilities go with these hifalutin titles. In other organizations to which I belong, the ED is a hired employee of the society and works 9 to 5 five days a week. Now explain to me, an admitted non-franchisee whose clubs send the IAC money, just what the ED is supposed to do and why he couldn't do it as President? Or why, if he had so much to do, an assistant wasn't named? But an Executive Director? Come off it IAC. Apple computers and the whole Apple mystique are too much fun to create self-serving in-group positions and titles.

Tod Wicks
Palo Alto, CA

Mr. Morganstein, meet Mr. Wicks. Mr. Wicks, Mr. Morganstein.



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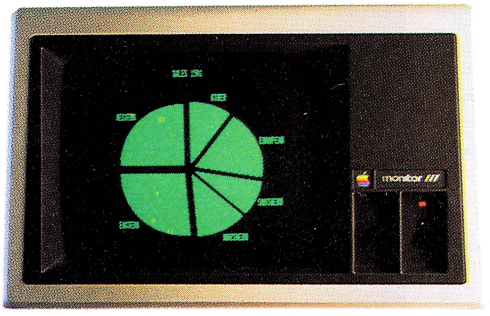
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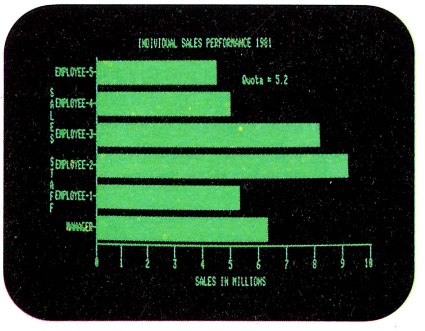
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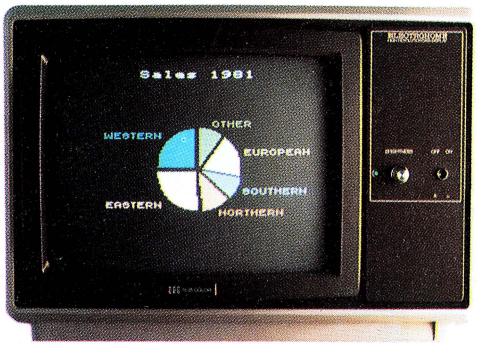
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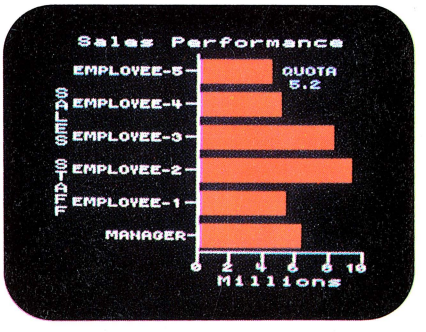
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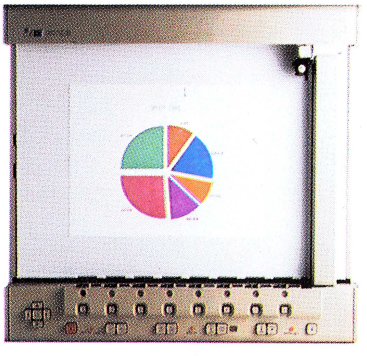


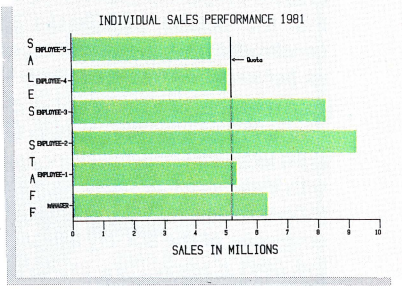


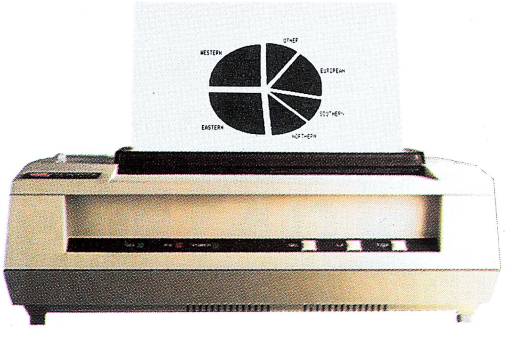


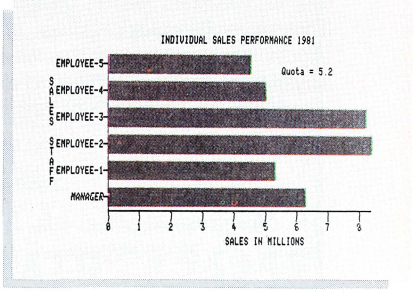
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Graph Types			
Line	Yes	Yes	Yes
Vertical Bar	Yes	Yes	Yes
Horizontal Bar	Yes	No	No
Side-by-side Bar	Up to 4	2	4
Pie	Yes	Yes	Yes
Partial Pie	Yes	No	No
Scattergram	Yes	Yes	No
Curve Fitting	5 Kinds	1	None
Data Points (Max.)	3500+	645	36
Plotter Compatible	Virtually Any	None	H-P7470A Only
Compatible File Types	Pascal BASIC VisiCalc	BASIC VisiCalc	pfs VisiCalc
Math Functions	Yes	Yes	No
Available Colors	6	4	4

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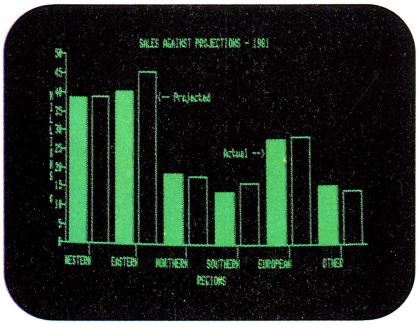


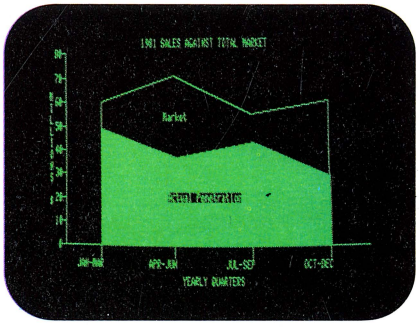


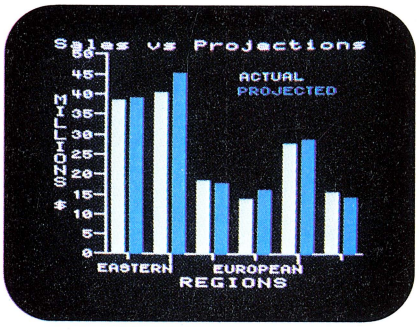


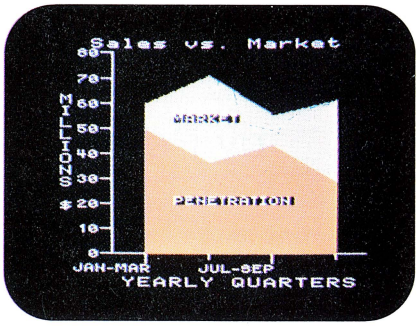
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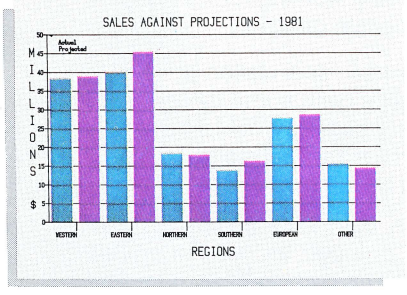
graphics are alike. pictures to prove it.

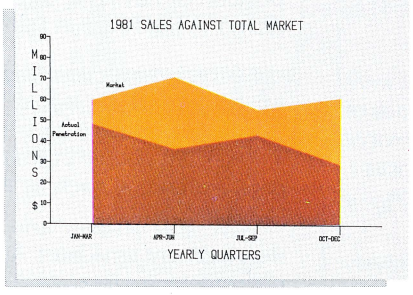


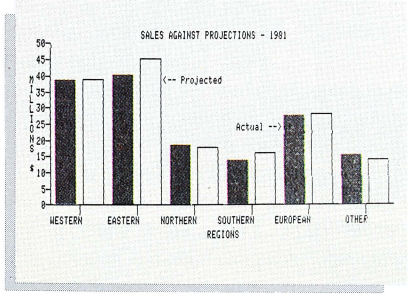


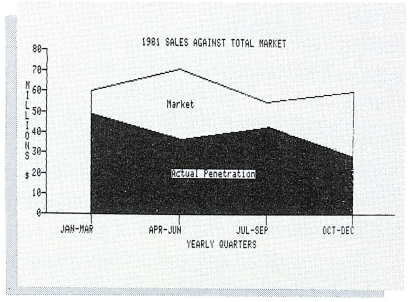












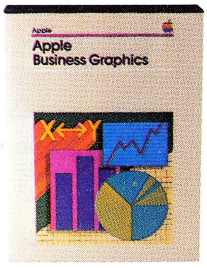
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Lisa Makes the Scene

by Peter C. Weiglin

Lisa is here.

What a relief.

Because it's good to have the machine out in the open, even though it's a letdown for practitioners of Silly Putty Valley's favorite sport, amateur espionage and speculation.

For more than two years, maybe three, quiet rumblings were emanating from Cupertino, the Big One is coming. Shades of the Manhattan Project. Apple was developing a large personal computer, a 16-bit 68000 microprocessor model. No, it was a small 68000-based computer. No, it was a 32-bit machine . . ., well, you get the idea.

At that time, Apple's new projects were almost exclusively designated by feminine code names. Gradually, the code name "Lisa" began to be heard; that was to be the Big One, it seemed. A revolutionary machine; one with an entirely new design philosophy.

As it turns out, readers of **Apple Orchard** back in Winter 1981 had the best insight into that design philosophy. Go back and read the article "Datagramming", by John Couch, Apple's Vice President, Software; the views of a true insider (*We take care to spell that word correctly. —PCW*).

Lisa is the project and province of an entirely separate division in Apple Computer, Personal Office Systems (POS). The division responsible for Apple IIs and ///s, Personal Computer Systems (PCS), was not directly involved. What most folks didn't know was that Mr. Couch was, and is, the head of POS. Indeed, the very existence of the POS division wasn't acknowledged at first. But John Couch and his crew were working on Something Big. Clue from 1981: "I'm now in the position of having a hardware team working for me, so we'll drive the hardware in the appropriate direction."

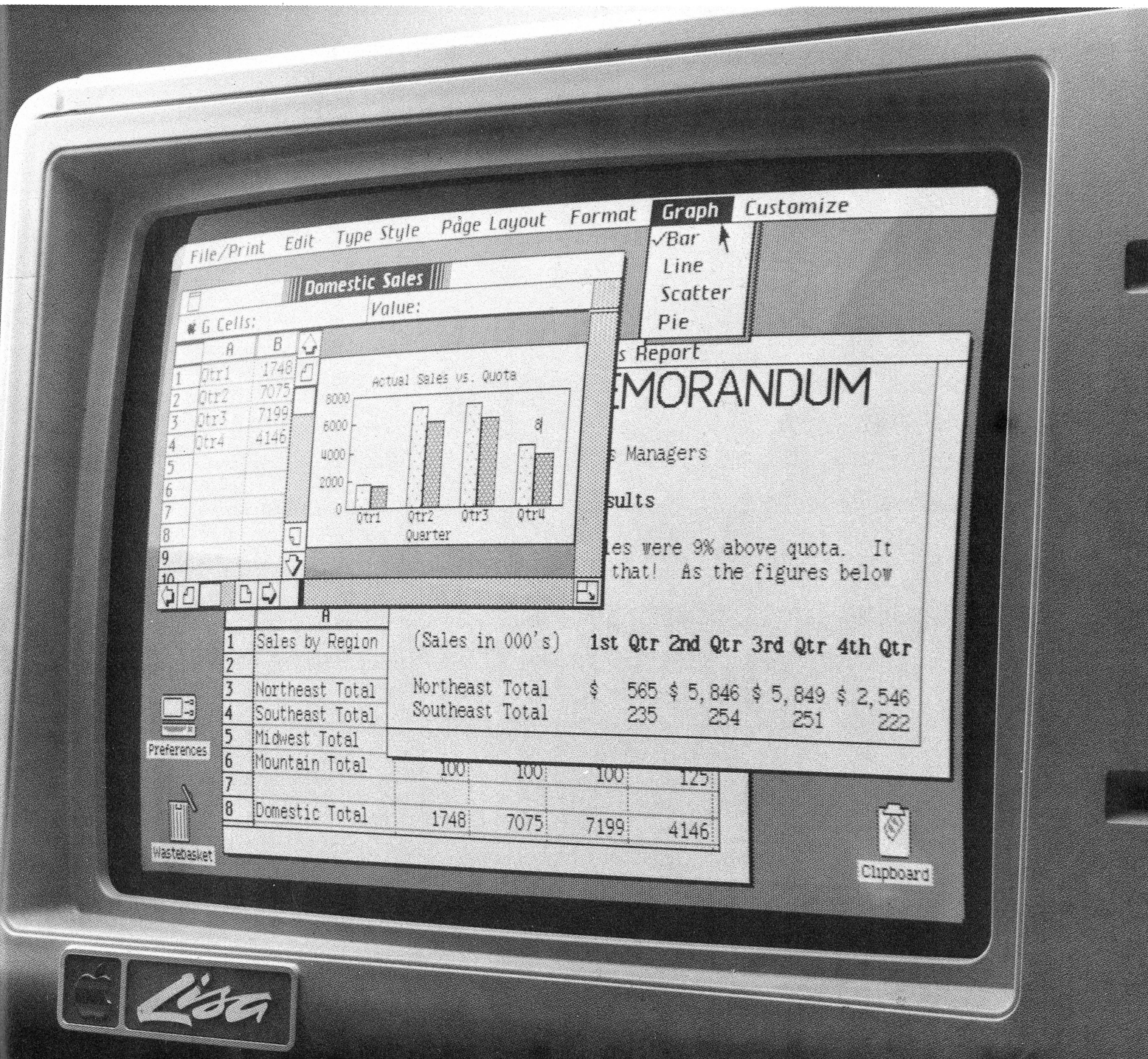
As the Introduction Day drew near, speculation grew as to what the machine would be called (with some diehards still asking, "and does it have a ten-key pad?"). Would it be "Apple 4"? Ask ten people claiming to have the real story, and you'd get 12 answers, each as wrong as the next.

Well, $50 million and more than 200 person-years of development time later, Apple Computer, Inc. announced the new machine a few weeks ago; it's named (surprise) Lisa! And it is a revolutionary machine, just as John Couch said it would be. It's priced (barely) under $10,000, including a ProFile hard disk, and is aimed at the office environment. Although it's a desktop model, at 52 lbs., it's a bit bulky for the average living room.

Which is a shame, because the outstanding feature of Lisa is not the hardware, nor the software, but the *combination* of hardware and software into a smoothly working system. The user doesn't have to adopt computer conventions or know a programming language to use Lisa; in fact, the user doesn't even have to *type*, except to enter data. The Lisa screen displays pictures (icons) of file cabinets, folders, clipboard, etc.

	Apple II	Apple ///	Lisa
Standard Memory	64K	128K	1mb
Screen Display (dots)	280 x 190	560 x 190	720 x 364
Screen Display (char.)	40 x 24	80 x 24	132 x 40
Color	Yes	Yes	No
Disk Drive Cap'y.	140,000	140,000	860,000
Microprocessor	6502	6502B	68000
Weight	12 lbs.	26 lbs.	52 lbs.

Table 1: A Few Comparisons




Profits
Lisa
ProFile

— even a trash can for deleted information. Instead of Control C and Escape A, one rolls a small box called a "mouse" around on the desktop. The screen cursor follows the mouse's path and when the icon for the desired function is reached, a push of the mousebutton starts the action.

"Conventional computers created obstacles for those who wanted to make their jobs more efficient," says Mr. Couch. "We used progress in microtechnology plus advances in software technology to remove many of those obstacles and to make a computer that really is simple to use."

In short, Lisa lowers the "entry level" of computer literacy required to review, analyze and theorize, interactively and individually. What that means is that business executives (many of whom believe that typing and computer operation functions are for staffers, not executives) will have a machine that provides an easy way to directly and personadly interpret data whach now must be "processed" by varying levels of staff personnel, each of whom has the opportunity to "filter" that information somewhat.

The people least likely to welcome Lisa are those who have been the data gatekeepers, or high priests; those who have derived power from their control of the management information flow process. We can confidently predict upheaval in many corporate structures. And if you don't think that's revolutionary, think again.

Six integrated software packages, which are part of the basic system, cover the office functions:

1. LisaCalc, the spreadsheet with 255 rows × 255 columns.

2. LisaWrite, the word processor with the ultimate "what you see is what you get"; bold face, italics, and varying type styles and sizes are visible on the screen *exactly* as you would see them on paper.

3. LisaGraph, a business graphics system that can plot up to seven data sets on a single graph, using data transferred from the other programs.

4. LisaDraw, which uses the mouse as a "superturtle" to create graphics. Black and white only; no color. But *very* Hi-Res.

5. LisaList, a data base with maximum list size of 600,000 characters, and multiple-key search and sort functions.

6. LisaProject, a powerful scheduling/critical path program which also handles resource allocation/task analysis.

These packages are designed to interchange data easily. L'Calc data can easily be transferred to L'Graph or to L'Write, for example. L'Draw can further amplify the graphic representation of such information. The whole system works with simple entry commands or the mouse. Apple proudly claims a training time of only 30 minutes before the user is off and running.

Listen again to John Couch, in the Winter 1981 **Apple Orchard** article: "I want to be able to interactively define a pie chart, then take that pie chart and throw it into my word processor without swapping diskettes or reading multiple files, or having to be very knowledgeable about the operating system. I want to take that pie chart, mentally cut it out of the screen, and drop it into the word processor. Yes, that means mixing data structures for screen graphics with data structures for typed information... That implies more software, which implies more memory to run these types of [specification] languages efficiently."

Lisa has 1 megabyte of read/write memory. To give you an idea of the software's complexity, an unofficial estimate is that the program code for LisaCalc, for example, takes up 300,000 bytes of that megabyte.

The floppy disk drives have a formatted 860,000-byte capacity each. These use the Model 871 drive mechanisms, as noted in the descriptions of Unifile and Duofile in the February issue of **Apple Orchard**. Two drives and the 5-megabyte ProFile provide the data storage for the basic Lisa system. They are included in the $9995 price.

Apple has also developed LisaTerminal, a telecommunications terminal emulation program which lets Lisa function as a teletype terminal, DEC VT100 or VT52, or an IBM-compatible terminal. Due out later this year is the AppleNet, a local area networking device. Two serial ports, one parallel port, and three peripheral slots provide the interface connections.

Does Lisa operate only on its own software? No. BASIC, Pascal and COBOL can be run on Lisa, allowing independent software vendors to provide programs tailored to specific needs. An Applications Development Toolkit is scheduled for introduction later in 1983. Lisa will also support other operating systems, including the CP/M family, and Xenix.

Service and support for Lisa will be carried out through a toll-free telephone line (LisaLine?), AppleCare carry-in service, and the joint Apple/RCA on-site maintenance arrangement. Or, Apple will train in-house maintenance personnel for large firms wishing to do their own maintenance. That represents a considerable difference from the sales/serviced approach used by Apple for its smaller machines; Lisa is definitely not a "retail" item.

Hmmm . . . wonder if there's a small version of Lisa under development? Apple isn't saying anything. In fact, it's *too* quiet over there. Here we go again!

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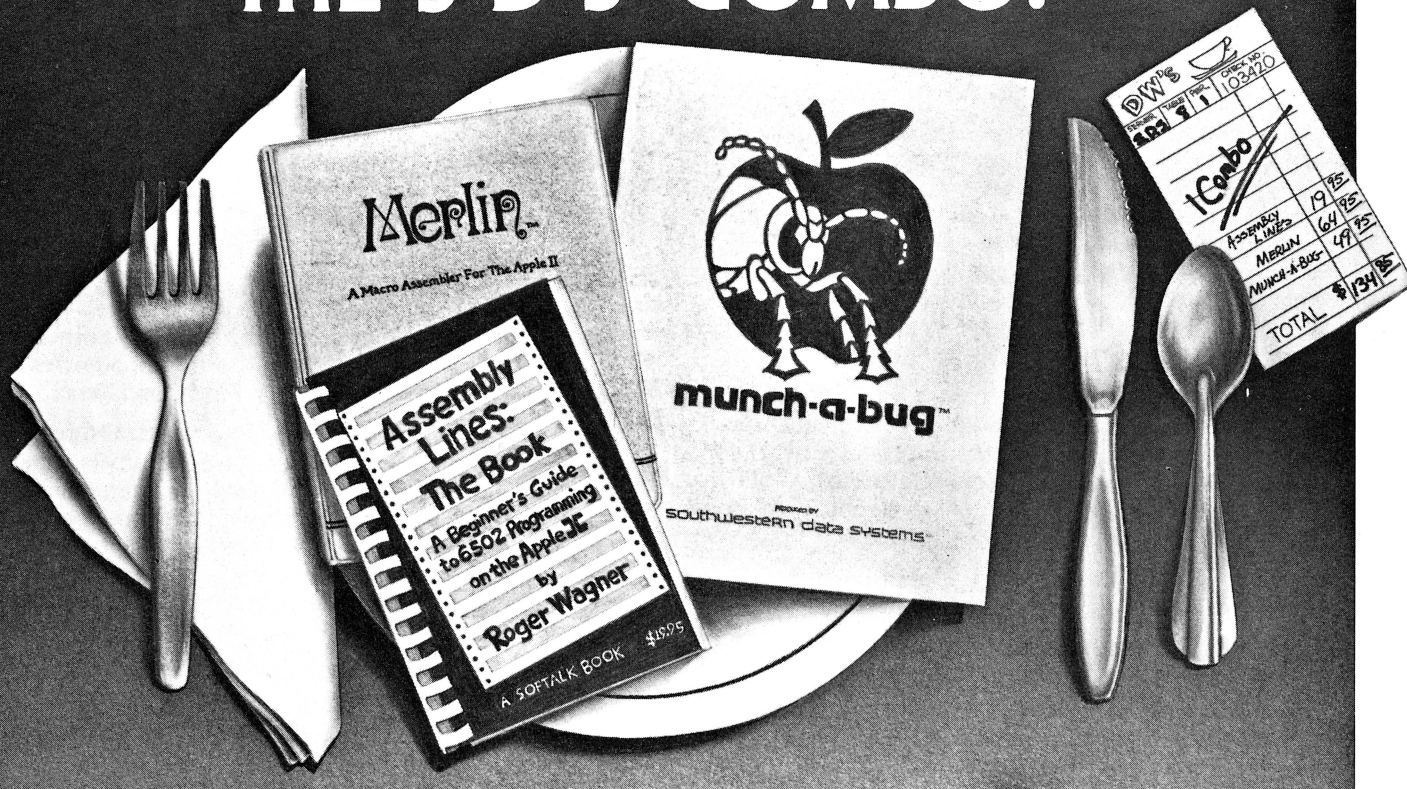
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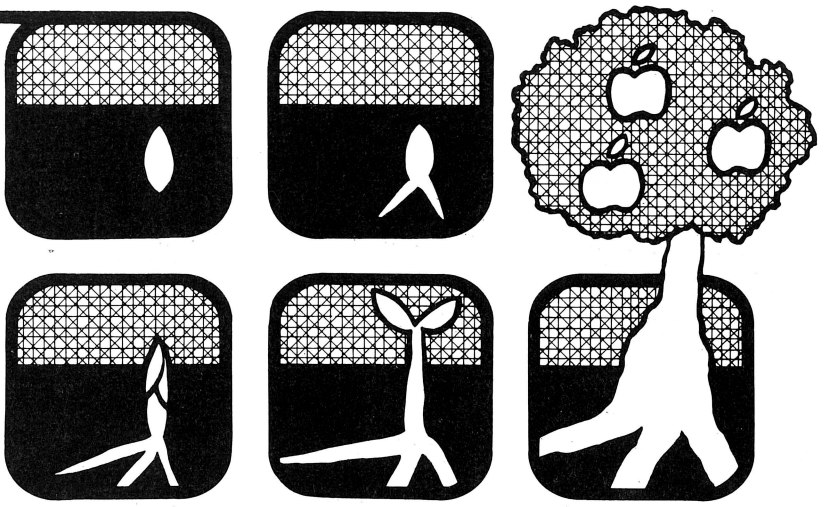
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Planting a seed...





The Touchstone Passes

A touchstone is defined as a criterion, a standard. Such was the Apple II personal computer. That machine has now passed into history, as Apple Computer has ceased production in favor of the new //e model.

The Apple II wasn't a perfect machine. God knows it wasn't perfect. The keyboard was . . . er, unique; no lower case, not all characters present, RESET too accessible, etc.

And the machine had "only" eight slots. 40-column display. Heat problems. No interrupts. A poor interface setup which required you to take the top off (and everything off the top first) too often. And, of course, "only" eight-bit processing.

Amazing. Today's "only" was yesterday's "Gee Whiz", and yesterday was as little as two years ago.

What that imperfect machine did, though, was to make history. We'll pass quickly over comparisons to light bulbs, Model T Fords, cotton gins, and moveable type. We should point out, though, that the touchstone inventions in history have been largely concentrated in three areas: those that improved mobility, those that improved information processing, and those that reduced the amount of human effort required to perform a task. Name me one other than the Apple II which had an impact on *all three* areas. (Yes, mobility too; if data can be processed by an individual at a remote station, and transferred by 'phone, many trips become unnecessary. Saves fuel and time.)

No, the Apple II wasn't the first computer, but the Apple II was the first large-scale production machine to bring the good things that a computer can do to the level of the individual human being. Interactively. Individually. Immediately. And the innards are accessible to the extent that creativity has virtually no limitations.

Listen for a minute to the redoubtable Don Lancaster of "Cookbook" fame, writing in the introduction of his excellent book *Enhancing Your Apple, Vol. I*: "The Apple II is far and away the single most powerful tool **ever** put in the hands of many individuals on an uncontrolled and unregulated basis. The new personal freedoms and the potential opportunities that result from this are almost beyond belief. . . . The Apple II is far more significant and it will have a vastly greater impact than such short term frivolities as the automobile and television — and, possibly, even more than the printed word itself . . . Future historians will recognize the Apple II as the DC-3 of the microcomputer revolution."

As we pass into the world of //es, ///s, Lisas, and whatever comes next, let's remember that the Apple II is far from obsolete. Although Apple has discontinued production of the II, it will be with us for a long time yet. The fact that the design lives on outside of Apple Computer has caused some interesting legal complications, but the influence of the Apple II will be felt for decades.

But it's an interesting commentary on human nature that we're never satisfied. While most of us get warm feelings when we look at a good ol' DC-3, we'd rather actually *fly* in a DC-9 or 767. (For example, this publication is produced with the aid of ///s, not IIs.)

The touchstone passes, yet it remains with us. And to those whose lives it has changed, the Apple II is timeless.



A Review of Some Taxing Programs

by Derek Southern

The bad news — it's too late for 1982 Tax Planning.

The good news — there will be plenty more years to practice (the IRS is here to stay), so why not use your Apple to help solve tax problems? The objective of this review is to share my comments on some of the popular tax programs we all see advertised. I have found that they are NOT all equal.

People who write tax articles always have disclaimers, and I am no exception! This article seeks merely to comment upon several software packages rather than to give tax advice. Neither the Publisher nor the Author is rendering any service other than providing this commentary. You will also find similar disclaimers on all the tax packages reviewed.

Therefore, a major requirement in the use of any of these programs is *caution*. When you use a tax program you must understand the tax laws and regulations, and what they are doing to you. (*This disclaimer is made with the cheerful acknowledgement that* nobody *really* understands *the tax laws. —PCW.*) The programs will not teach you. You will also need to organize your data; some programs require detail, others want totals only. Some advance manual (paper collection) preparation will always be necessary.

Introduction

There are two different types of "Tax Programs"; namely tax *planners* and tax *calculators*. If you want to review the effect of different tax planning strategies, a *planner* is for you. If you need to know exactly how much your refund is, or otherwise, then a *calculator* is the answer.

The IRS normally issues the official new tax forms toward the end of the calendar year, so the companies in the tax software business have a very short period in which to update their programs before the new season is upon them. This has made it impossible to review any programs that specifically apply to the 1982 tax returns while meeting the print deadline for this magazine (and any later issue will not be timely). Fortunately the program changes are mostly mandated by changes in regulations and form layout, not by changes in logic. So, comments based on 1981 versions should be a good guide to the 1982 versions. Any changes I am aware of will be noted.

All the programs reviewed require a similarly equipped Apple II or II Plus: 1 or 2 disk drives and 48K. A printer is obligatory if you want a permanent copy for evidence at a later date. An Apple /// in emulation mode is OK.

Tax Planners

Personal Tax Planner
from Aardvark Software Inc.
783 North Water Street
Milwaukee WI 53202

Personal Tax Planner is written in Pascal, but you do not need any knowledge of the language to use the program. A number of tax exercises can be stored either on the program disk or on the provided data disk. Both disks can be copied using COPYA (on DOS 3.3 master) which avoids the need for the (expensive) Pascal Language System. The data entries are well error trapped, and editing is really easy.

After booting the program disk you enter a menu screen from which your choices are:

new:	enter new tax-payer data
old:	load an existing file from the data disk
same:	return to the data menu and continue working with the tax-payer data that is already in memory
directory:	review the names of files on the data disk, or remove unwanted files.

You next select Alternatives or Projections, and specify the number of each that are required, to a maximum of five.

The brief instruction manual is almost redundant because each data entry is on a separate "page" and is supported by its individual "help page" reached with '/' or '**?**'. If you don't read the manual you only discover this by accident! The "help" is either a listing of possible choices, or a reference to an official IRS publication so that you can enter data which conforms to the Tax Regulations.

An input Reference Guide lists the 65 data entries which can be S)elected. Using S) you can move around these entries at will. All the edit commands are always on screen in a special prompt box. Very friendly.

Warning: you must read the page titles and understand their significance. If you plunge ahead recklessly the resultant analysis will be pure science fiction, and your tax planning will not be optimized! (Don't say you weren't warned).

Within these constraints this program is a joy to use. With projections, for example, you can set P)% for compounded % growth rates (estimates of future salary increases for instance), or X)% for simple interest rates, or I) for fixed sum increases. The effect of different investment strategies can be explored quickly, and the results of each alternative can be printed out in a user specified sequence. The screen view option is limited to 2 evaluations unless you have an 80 column board installed in Slot #3.

Changes in tax laws affecting future years are incorporated as far as they were known at the time the program was written, but major changes such as TEFRA (1982) make it vital to purchase the annual updates. Projections for any five year period can be made; you simply specify the first (base) year. Analyses for years beyond 1984 assume the 1984 laws and tax-rates continue unchanged.

Financial planners will find this a very useful program for evaluating clients' future tax liabilities under a wide range of alternatives. Anyone who takes personal tax-planning seriously will find this a worthwhile investment because the answers to "what if?" questions are so easily and quickly obtained.

Calculation times were respectably fast: 30 seconds for two alternatives and 40 seconds for five.

Tax Calculating Programs

Companies advertising in late November were contacted, but, for reasons noted above, none had the 1982 Tax Year versions ready. Copies of 1981 programs were offered (and accepted) for review, but not all reached me in time. Datamost's Federal Tax Beater, (the name is changing for the 1982 season) and Microlab's Tax Manager were fully reviewed, while Howardsoft's Tax Preparer was quickly explored just before the deadline. A five-diskette, comprehensive professional package called Micro-Tax, from Microcomputer Taxsystems came late and since it requires a hard disk with CP/M (I have neither) was not reviewed. Also not reviewed was E-Z Tax, a new one for 1982 tax returns.

Tax Break - Annual
(Federal Tax Beater in 1981)
Distributed this year by Jack Lennard
Lennard Business Services, 7 Moonrise Ct,
Newport Beach CA 92660

Jack Lennard, the author, told me that he will be distributing the 1982 program himself. Moreover the name will be changed to Tax Break-Annual. There will also be a Tax Break-Planner available which will include the latest revisions of tax law and will be a real competitor for Aardvark's program. A new upgrade policy will be promoted; watch for details in the press.

The 1981 version was written for the majority of "normal" tax-payers, which means that the number of schedules and forms it handles is limited. The input stage allows for lump-sum distribution data, capital gain/loss data and information for income averaging alternatives to be evaluated. The output is limited to Form 1040 and Schedule A, plus a tax alternative evaluation summary and an evaluation of the Schedule A input. This will be enough for most "normal" tax-payers because the program is claimed to perform more than 120 iterations of possible tax returns to determine the minimum bottom line tax. All in 90 seconds, by the way.

The time was accurate, and the test data for a hypothetical tax-payer certainly equalled the best tax refund I could calculate by hand, but many times faster. The Schedule A evaluation warned that certain deductions were above the normal range for a tax-payer in that income bracket. This warning enables you to confirm that your entries are not in error and should help avoid audits. In the test case, the interest paid on a California house purchased in the past few years was enough to trigger this comment! But if your deduction is properly supported (as this taxpayer's was) then the full claim should be made.

The program has nice touches, such as an optional printer check before you run the full output. Error checking and editing is quite friendly; the user must accept each screen of data as correct before being allowed to move on. Remember to save the data in a file once it is all entered, (Option 3 of the start menu).

The Tax Manager by Taso (1981 tax returns)
From Micro Lab, 2310 Skokie Valley Road
Highland Park, IL 60035

The program consists of three modules which almost fill both sides of a disk. You are prompted to turn the disk as required. Data is saved on a normally INIT'd disk which remains in the second disk drive. As the programs offer more forms and schedules the need for a second drive becomes acute. Both this and Tax Preparer would be less than sociable with a single drive.

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Booting leads to a main menu with 5 options:

- Tax guide
- Tax check-list
- Tax preparation
- Change disk/printer set-up
- End

First check your system configuration. It will be saved and will only need changing if your system changes.

The "tax guide" is a useful feature if you are unsure about which forms and schedules should be completed (but should you then be using the program?). A series of Y/N answers results in a recommended list of schedules and forms applicable to your case; write this down as the list is not stored for reference.

The "tax check-list" is a data-base of key words which is supposed to help the tax payer answer certain questions about deductability of items. It can be a problem to guess the right key-word so my personal preference is to research the IRS Publication 17 (FREE), plus one or more of the commercial guides which emphasize just what is, or is not, a legal deduction.

Finally we reach "tax preparation". The manual reminds you to collect all the needed records, then, start entering the data. Individual forms may be chosen one at a time, or in a sequence to be followed automatically.

Entries are either "simple" or "compound". A compound entry opens out a simple line entry into several pages of supporting information. The data is summed, or otherwise manipulated, and the answer is entered back into the appropriate line. This is a useful feature as it provides a detailed listing and reduces the chance of arithmetical error. Data editing is easy via seven command keys, but the instructions for these lurk around Page 6 of the feature section, an area usually devoted to advertising hype . . . so do read the whole manual. It is actually very brief, there is no index but a table of contents is detailed enough for most purposes.

As data is added page by page the calculation progresses, but is *not* automatically saved to disk. Use the S)ave option from time-to time!

Another useful feature is the ability to store a sequence of forms for automatic display. This saves time by avoiding frequent returns to the main menu. You can also select forms (C, D, E, F, 4797 etc.) by choosing the relevant line from Form 1040, but you may then repeat a form later when it arrives in the auto-sequence. All of that is easily corrected.

Since the data on each page is manipulated as you progess down the form, the tax consequences are immediately visible when you reach the bottom line. The forms can be printed, but the user must specify which forms are required. It would be great if a prompt appeared reminding you that your initial questionnaire indicated the need for other forms. Better yet, why not have the needed forms presented in a logical sequence for our data entry? This linkage would be useful in the case where a tax preparer interviews a client and the responses can be saved; it might provide the preparer with a good defense when the IRS decides that the preparer is negligent and assesses a stiff penalty. Did you know the IRS has increased the preparer's penalties this year?

The printed copy is very clear, but each compound entry occupies an individual page so the final bundle can be quite thick. But, you will have an exceedingly well documented return, and that is probably a relief in later years if you are invited to attend an audit!

Tax Preparer by Howardsoft
from Howard Software Services
8008 Garard Ave., Suite 310
La Jolla CA 92037

"Make it easy on yourself", the instruction manual says. "In order to avoid hours of later frustration, please take the time to read the entire manual". This advice is on Page 1-1, and it is prophetic!

This is a comprehensive package which allows a tax-payer to prepare, edit and print a wide selection of the IRS tax forms and schedules. It is, however, a very slow and cumbersome process. You should note the 'road map' in Appendix B. If you choose the forms out of sequence it will cost you in time and nervous energy. A data-disk is essential, so the manufacturer provides one — but you must format it, and if you forget you will lose your data!

The main menu has 24 choices, and you must select each form, complete it, return, select the next one, and so on. Data entry is idiot proof, almost too much so! The letter 'T' must be typed to enter any data, and only after the 'beep' can you go ahead. Once entered, the data cannot be edited without scrolling to the end of the form, answering N to the Y/N question about accepting the data, then rescrolling to your previous entry. This is not friendly, nor is it fast.

You will be entertained by the frequent rests that the program takes; "just refreshing myself", you are informed. (Applesoft string "garbage collection", more likely.) Each pause seemed to be for 45-60 seconds, and even occured during printing!

The test data was calculated correctly, but the program did not help me select the optimum tax payment. I had to compare two different runs, one using tax tables, the other Schedule G. This requires rescrolling down the whole 1040 page and changing the tax calculation choice and then repeating the calculation. S-L-O-W-W.

Conclusions

There was only one game in town for 1981 tax-planning, the Aardvark Personal Tax Plan. The package includes an opinion from the respected accounting firm Touche Ross & Co. that the program does what it claims to. But they put the responsibility onto the user for understanding Tax Law and inputing good data. I liked this program, but you need to know how to obtain the aggregated data before it will be useful. It worked quickly and editing was easy; *viva* Pascal!

The Tax-Beater program will be a good buy for many of us ordinary tax-payers, and the new version, which will include a taxplanner, will be potent competition for Aardvark if the programming is of the same high standard as Tax-Beater.

For those with complex tax problems, such as tax preparers, the Tax Manager would be a good choice. The power to set up the auto-sequence will be a nice time-saver, and I liked the way it was possible to move from one form to another so easily.

One more thing: don't forget that the *cost of a program used for tax preparation is a deduction.* You might also include your home accounting package if you flag tax items. A final comment: *keep good records whatever else you do.* They can save time and money at a later date.

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BLAISE AWAY!
FIBs Don't Lie

by Dr. Wo

Recently, I attended a semi-annual meeting of UG.UG, the international UCSD Pascal user's group. There are a number of useful bits of information and ideas I picked up, and I thought I would pass some along to you.

What Is UG.UG?

UG.UG (say "Use Us") is a society of users of the UCSD Pascal system, or p-System, including owners and users of Apple Pascal. Its membership is international and numbered about 1500 in June 1982.

The UG.UG membership is quite varied ranging from hobbyists and inquisitive users of UCSD Pascal, to professional software developers. The professionals are active in applications and system software. The hobbyists, or less-than-full-time professionals, include many of the Apple users; they are interested in a myriad of ideas and activities. The U.S. membership is scattered about geographically, but the biggest concentrations appear on the West Coast, Texas, and the Washington-Boston corridor.

Annual dues for UG.UG are $20. The dues support four major activities: semi-annual general meetings, a newsletter, a library and special interest groups.

Activities of UG.UG

UG.UG holds 2 general meetings per year, rotated around the country, featuring keynote speeches by members of the Pascal community, tutorials, panel discussions and special interest group meetings. The meetings are very friendly and there is a good sharing of information among the members; I picked up several valuable tips and insights at the last meeting. The next general meeting will be held April 22-24, 1983 in San Diego, the one after on Oct. 14-16 in Washington, D.C.. Registration is usually $35 for members.

A highlight of the general meetings is the SIG meetings. There is a variety of active, machine-independent SIGs including Communications, Technical Information, Pascal Language Standards, Publications and so on. And, there are active SIGs concentrated on the major computer manufacturers: Apple, IBM, Sage, and DEC. The Apple SIG is one of the most active and has benefitted from good, strong leadership in the past. There is a large pool of knowledge available to Apple Pascalers here.

A direct benefit of UG.UG membership is the newsletter. The newsletter is of high quality, including reports of UG.UG activities, SIG meetings, technical articles, bug reports, product announcements, meeting announcements, etc. Unfortunately, the newsletter has been published erratically and has not appeared as frequently as it could.

Another direct benefit of membership is the library. As of September 1982, the library comprised 17 volumes on standard 8 inch disks. (For benefit of Apple owners, the library is also available on Apple 5 ¼-inch disks.) Contents include tools, utilities, communications software, data base programs, screen handlers, games, text file handlers, source code for version I.3 of the system, etc.

UG.UG also operates a bulletin board on MicroNet called MUG.UG. You can get an ID for this board for free if you are a UG.UG member. Your time on the board is billed to your regular MicroNet account.

Like many another user's group which operates with volunteer help and a limited budget, UG.UG does have some problems. We mentioned the irregularity of the newsletter. Another problem is how best to serve the general membership, which tends to be quite varied in its interests and experiences. The officers of UG.UG are aware of these problems and are working hard to improve the services and communications to the members. (I'm perhaps a bit biased in this, since I am an officer of the organization.)

On the whole, I think UG.UG offers good value and a wealth of information and knowledge to its members. You can contact UG.UG for more informataon by writing to:

Secretary
UG.UG
P.O. Box 1148
La Jolla, Ca. 92038

With A Little Help

One thing I was able to do at the last UG.UG meeting was satisfy a curiosity about file information blocks, or FIBs. With a little help from some UG.UG friends and the UG.UG library, I was able to convert my newly gained knowledge into a nifty unit for decoding the status of a file during execution.

Consider the process of reading a file from within a program. At compile time we declare an appropriate file variable and include code to open the file, read records, and close the file. Listing 1 provides an example:

```
VAR
 f:   TEXT;
 line:   STRING;

BEGIN
 { open the fine for reading }
 reset( f, 'myfile.text' );
 { read from the file }
 WHILE NOT eof(f) DO BEGIN
 { read a line }
 readln(f, line);
 { write it to the screen}
 writeln(line);
END;
 { close the file }
 close(f);
END;
```

Listing 1

At execution time the system "attaches" the internal file variable, f, to the disk file mentioned in the reset statement and keeps track of the file reading process. Since Pascal files are organized as logical blocks of 512 bytes, this involves keeping track of which block is the current block, which byte within it is to be read next, when and where to fetch the next block, etc.

How does the system do this? Where does it keep track of whether a file is open, where the file is located, which block and byte are current and so on? The answer is the file information block, or FIB. Ah, but what is the FIB and where does it come from?

The What and Where of the FIB

The FIB is the data structure the system uses to keep track of file I/O. Each declaration of a file variable causes the compiler to allocate space for a file information block variable for that file. In other words, the FIB for a file variable *is* the internal file variable. The information stored in a FIB, which is declared as a record, contains all the information the system needs to perform I/O via the attached disk file.

The declarations for a FIB are listed in the implementation section of the unit "file-info" accompanying this article. They were extracted from the system global declarations for version II.O of the UCSD Pascal system (or version 1.0 of Apple Pascal). These global declarations are published in the UG.UG library, Volume 8 and are copyright by SofTech Microsystems, Inc. Although there are some differences between the system globals for version II.O and II.1, they are not germane to our discussion, and they do not affect the functioning of the routines discussed below.

A FIB is a variant record. Let's try and develop some ideas about what the fields mean:

fwindow:
This is the file "window" or file pointer that points to the current record in the file. This is what we normally have access to when doing record I/O.

feof,feoln:
The values of these variables are returned by calls to the intrinsic functions eof(f) and eoln(f).

fstate:
This field tells whether the file is a standard Pascal file, or an interactive file and if it is interactive, whether a character has been read or not.

frecsize:
This field tells how big a record in the file is, in bytes, and is used in conjunction with frepcnt to keep track of I/O.

fisopen:
This field tells whether or not the file is open, i.e., whether it has been attached to an external file or device. Only if the file is open are the remaining fields valid.

fisblkd:
This field tells whether the file is attached to a file on a blocked, i.e. disk, volume.

funitnum:
This is the unit number containing the external file to which the file is attached.

fvid:
This is the name of the volume containing the external file to which the file is attached.

frepcnt:
This is the repeat count, the number of times a record may be read before a new block must be fetched.

fnxtblk:
This is the number of the next block to be read.

maxblk:
This is the number of the last block in the file.

fmodified:
This field is used to keep track of whether the file has been updated since opening.

fheader:
This is a copy of the directory entry for the external file.

fsofbuf:
This flag tells whether there is a buffer associated with the file. Recall that untyped file variables do not have such a buffer. Only if this field equals true are the remaining fields valid.

fnxtbyte:
This is the number of the next buffer byte to be read.

fmaxbyte:
This tells the number of valid bytes within the buffer.

fbufchngd:
This tells whether the buffer has been modified.

fbuffer:
This is the 512 byte buffer.

Getting the Truth from a FIB

Let f be a file variable of some type. According to the above, f is a FIB by another name. How then do we extract information about f from the FIB record? For example, how could we find out whether the file is open and if it is, what disk file it is attached to?

According to the above, it seems we should be able simply to access the fields of the FIB, f, directly. For example, to find out whether the file is open, it seems we could simply inspect the fisopen field of f. If we were to try this, however, we would find it doesn't work. The compiler would flag it as a syntax error on the grounds that f is not a record.

Is this a contradiction? Is f a FIB record, or isn't it? Well, it is, but the compiler just won't let us get at it in the usual ways. Fortunately, there is a way to get around the compiler. We move the data in f to another FIB record, then access the new data! The trick is as follows:

```
VAR
 f: any_file_type;
 fibber: fib
moveleft(f, fibber, size of(fibber ));
```

The moveleft ships the information in f over to the variable fibber which is declared to be of type "fib". The variable fibber can be accessed like any normal record variable, and the information obtained from it will tell us about the current state of the file f. Note that f can be a file variable of any type whatsoever. This trick code is used in the procedure "fill-fib" in the implementation section of our unit "file-info".

UNIT file-info

We now have all the tools we need to construct a library unit, "file-info", which returns information for file variables. The routines in the unit are described in the interface so we will not discuss them here.

Note that the actual file variables passed to the routines in the unit may be *of any type at all.* Therefore, the unit is a general purpose file information unit.

Note also that the implememtation of the unit depends on knowing the declarations for the type "fib" and the trick for moving information from a file variable into a fib variable described above. This is dangerous stuff. If the declarations for fibs are changed in a future release of Apple Pascal, the unit, and any programs which use it, may become worthless! CAVEAT EMPTOR!!

PROGRAM test_file_info

The program test_file_info is a small program to exercise file_info. It's menu is:

O(pen file
C(lose file
S(tatus of file
Q(uit

Selecting "O" calls the procedure f_reset to open a file f, F_reset calls f_open, in file_info, to test whether f is already open and if it is it closes it.

"C" closes the file f.

"S" is the meat of the program. It calls all of the procedures in file_info to give a status report on f.

"Q" quits, and so do I!

Blaise Away!

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```
{$S+}
UNIT file_info;
 {

    20 Nov 82

    This unit returns information on file variables. It accesses the
    file information block allocated by the compiler when a file is
    declared.

    The interface of this unit is based on the same unit supplied
    with version IV.1 of the UCSD p-System. It is source code
    compatible and functionally identical with that unit.

                        ***** COPYRIGHT NOTICE *****

    The implementation of this unit relies on the declarations for
    file information blocks in the global variables declarations of
    version II.0 of the UCSD p-System. The declarations are copyright
    Softech Microsystems, Inc., San Diego, CA. and are published in
    the USUS software library, Volume 8.


    Version II.0 is the same as version 1.0 of Apple Pascal. As far
    as the author has been able to test, this unit works correctly
    with version 1.1 of Apple Pascal.

    USUS is an organization of p-System users. For information about
    USUS and its library contact:

       USUS
       P.O. Box 1148
       La Jolla, CA 92038


    Tom (Dr. Wo) Wotelki, author
    814 D. St. N.E.
    Washnston, D.C. 20002
    (202) 547-0984

}

INTERFACE

 TYPE
  f_file_type = FILE;

  f_date_rec = PACKED RECORD
                 month: 0..12;
                 day  : 0..31;
                 year : 0..100;
                 END;

 FUNCTION f_open(var f: f_file_type): BOOLEAN;
  {

    This function returns TRUE if and only if f is open, i.e.
    attached to an external file or device.

    This function should be called before any of the other
    routines in the unit since much of the other information is
    actually meaningless if the file is closed.

    If f is closed, the other routines will return the default values
    specified below.

  }


FUNCTION f_length(var f: f_file_type): INTEGER;
 {

   Returns the length in blocks of the external file attached to f,
   provided f is attached to a file on a blocked (disk) volume.
   Otherwise it returns 0. Should be preceeded by a call to
   f_is_blocked.

 }


FUNCTION f_unit_number(var f: f_file_type): INTEGER;
 {

   Returns the unit number containing the external file to which f
   is attached. Otherwise, it returns 0.

 }



PROCEDURE f_volume(var f: f_file_type; var file_volume: STRING);
 {

   Returns the name of the volume containing the external file to
   which f is attached. If the volume name is undefined, it returns
   a volume id constructed from a unit number, e.g. #3:. If f is
   closed, it sets file_volume to a null string.


 }

PROCEDURE f_file_title(var f: f_file_type; var file_title: STRING);
 {

   Returns the name of the external file to which f is attached. If
   f is not open, or if the external file is a volume, it returns a
   null string.

 }

FUNCTION f_start(var f: f_file_type): INTEGER;
 {

   Returns the block number of the first block of the external file
   attached to f, provided f is on a blocked volume. Otherwise it
   returns 0. Should be preceeded by a call to f_is_blocked.
```

```
 }

FUNCTION f_is_blocked(var f: f_file_type): BOOLEAN;
 {

   Returns TRUE if and only if the external file to which f is
   attached is on a block structured (disk) unit.

 }

PROCEDURE f_date(var f: f_file_type; var file_date: f_date_rec);
 {

   Returns the date of last access to the external file attached to
   f. Otherwise, file_date is unchanged.

 }

IMPLEMENTATION

 {     ***** COPYRIGHT NOTICE ***** }
 { The folllowing data declarations are copyright
   by Softech Microsystems, Inc. }
 CONST
  maxdir  =  77;
  maxunit =  12;
  vidleng =   7;
  tidleng =  15;
  fblksize= 512;

 TYPE
  daterec = PACKED RECORD
              month:0..12;
              day:0..31;
              year:0..100;
              END;

  unitnum = 0..maxunit;

  vid = string[vidleng];
  tid = string[tidleng];

  filekind = ( untypedfile,
               xdskfile,
               codefile,
               textfile,
               infofile,
               datafile,
               graffile,
               fotofile,
               securedir );

dirrange = 0..maxdir;

direntry = PACKED RECORD
             dfirstblk: INTEGER;
             dlastblk: INTEGER;
             CASE dfkind: filekind OF
              securedir,
              untypedfile:
                 (filler1: 0..2048;
                  dvid: vid;
                  deovblk: INTEGER;
                  dnumfiles: dirrange;
                  dloadtime: INTEGER;
                  dlastboot: daterec);
             xdskfile,
             codefile,
             textfile,
             infofile,
             datafile,
             graffile,
             fotofile:
                (filler2: 0..1024;
                 status: BOOLEAN;
                 dtid: tid;
                 dlastbyte: 1..fblksize;
                 daccess: daterec);
             END;

windowp = ^window;
window = PACKED ARRAY[0..0] OF CHAR;

fib = RECORD
       fwindow: windowp;
       feof, feoln: BOOLEAN;
       fstate: ( fjandw, fneedchar, fgotchar );
       frecsize: INTEGER;
       CASE fisopen: BOOLEAN OF
        TRUE: (fisblkd: BOOLEAN;
               funit: unitnum;
               fvid: vid;
               frecnt,
               fnxtblk,
               fmaxblk: INTEGER;
               fmodified: BOOLEAN;
               fheader: direntry;
               CASE fsofbuf: BOOLEAN OF
                TRUE: (fnxtbyte, fmaxbyte: INTEGER;
                       fbufchngd: BOOLEAN;
                       fbuffer: PACKED ARRAY[0..fblksize] OF CHAR))
      END;


PROCEDURE fill_fib(var f: f_file_type; var fibber: fib);
BEGIN
 moveleft(f, fibber, sizeof(fibber));
END;
```

```
  FUNCTION f_open( var f: f_file_type): BOOLEAN);
  VAR
   fibber: fib;
  BEGIN
   fill_fib(f, fibber);
   f_open := fibber.f_is_open;
  END;

 FUNCTION f_length ( var f: f_file_type ): INTEGER );
 VAR
  fibber: fib;
 BEGIN
  IF NOT (f_open(f) AND f_is_blocked(f)) THEN f_length := 0
   ELSE BEGIN
    fill_fib(f, fibber);
    f_length := (fibber.fheader.dlastblk - fibber.fheader.dfirstblk);
    END;
 END;

 FUNCTION f_unit_number( var f: f_file_type): INTEGER );
 VAR
  fibber: fib;
 BEGIN
  IF NOT f_open(f) THEN f_unit_number := 0
   ELSE BEGIN
    fill_fib(f, fibber);
    f_unit_number := fibber.funit;
    END;
 END;

 PROCEDURE f_volume( var f: fib; var file_volume: STRING );
 CONST
  colon = ':';
 VAR
  fibber: fib;
 BEGIN
  IF NOT f_open(f) THEN file_volume := ''
   ELSE BEGIN
    fill_fib(f, fibber);
    IF (length(fibber.fvid) > 0) THEN file_volume := concat(fibber.fvid,colon)
     ELSE { volume name is not defined }
     IF (fibber.funit = 0) THEN file_volume := ''
     ELSE { convert unit number to vol id } BEGIN
      CASE fibber.funit OF
       1 : file_volume := '1';
       2 : file_volume := '2';
       3 : file_volume := '3';
       4 : file_volume := '4';
       5 : file_volume := '5';
       6 : file_volume := '6';
       7 : file_volume := '7';
       8 : file_volume := '8';
       9 : file_volume := '9';
       10: file_volume := '10';
       11: file_volume := '11';
       12: file_volume := '12';
       END;
      file_volume := concat('#', file_volume, colon);
      END;
    END;
 END;
```

```
  PROCEDURE f_file_title( var f: f_file_type; var file_title: STRING );
  VAR
   fibber: fib;
  BEGIN
   IF NOT f_open(f) THEN file_title :=''
    ELSE BEGIN
     fill_fib(f, fibber);
     WITH fibber.fheader DO
      IF dfkind IN [ securedir, untypedfile ] THEN file_title := ''
       ELSE file_title := dtid;
     END;
  END;

  FUNCTION f_start( var f: f_file_type ): INTEGER );

  VAR
   fibber: fib;
  BEGIN
   IF NOT (f_open(f) AND f_is_blocked(f)) THEN f_start :=0
    ELSE BEGIN
     fill_fib(f, fibber);
     f_start := fibber.fheader.dfirstblk;
     END;
  END;

  FUNCTION f_is_blocked ( var f: f_file_type ): BOOLEAN );
  VAR
   fibber: fib;
  BEGIN
   fill_fib(f, fibber);
   f_is_blocked := fibber.fisblkd;
  END;

  PROCEDURE f_date(var f: f_file_type; var file_date: f_date_rec);
  VAR
   fibber: fib;
  BEGIN
   IF f_open(f) AND f_is_blocked(f) THEN BEGIN
    fill_fib(f, fibber);
    WITH fibber.fheader DO
     IF NOT (dfkind IN [ untypedfile, securedir ])
      THEN file_date := daccess;
    END;
  END;

 BEGIN
 END.


{$S+}
PROGRAM test_file_info;
USES
 {$U FILE.INFO.CODE }
 file_info;
TYPE
 ffile = FILE;

 sc_char_set = SET OF CHAR;
```

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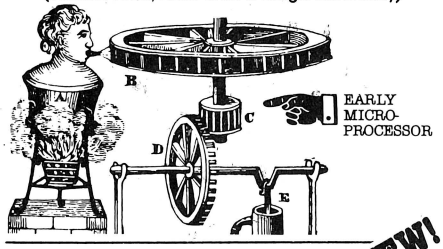
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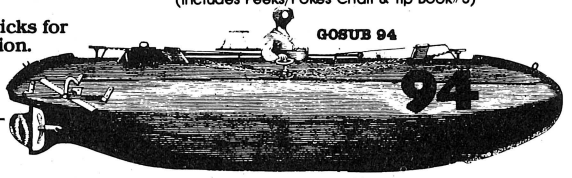
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MORE TOO: 21 Programs Total, a best-seller!

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```
10  FOR A = 1 TO 22: PRINT CHR$(ASC (MID$(
    "IJ—!IPX(T!ZPVS!TJTUFS@", A, 1))—A/A);
20  FOR B = 1 TO 4: C = PEEK(49200): NEXT B, A
```

DOS Boss

DISK COMMAND EDITOR
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BY TOM WEISHAAR

HIGH-SPEED DOS! Take a look—

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
BSAVE HI-RES IMAGE	12 sec.	6 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
BLOAD LANGUAGE CARD	13 sec.	4 sec.
TEXT FILES	(no change)	

BOOT PRONTO-DOS or any updated normal-3.3 disk. Create new ProntoDos disks with the normal INIT command. ProntoDos is compatible with ALL DOS COMMANDS and performs normally with almost ALL programs, including CopyA.

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```
VAR
 f: ffile;
 ch: CHAR;
 match_set: sc_char_set;

 PROCEDURE sc_clr_screen;
  { clear the screen, home the cursor. }
 BEGIN
  write(chr(12));
 END;

 FUNCTION sc_space_wait( flush: BOOLEAN): BOOLEAN;
  { Read from the keyboard until a space or the altmode character
    is typed. Return TRUE if and only if a space is NOT typed (still
    waiting for space). Clear the type ahead buffer if flush
    is TRUE. }
 CONST
  space = ' ';
  altmode = 27;
 VAR
  ch: CHAR;
 BEGIN
  IF flush THEN unitclear(1);
  write('Press <space> to continue ');
  REPEAT
   read(keyboard, ch);
  UNTIL (ch IN [ space, chr(altmode) ]);
  sc_space_wait := (ch = chr(altmode));
 END;

 PROCEDURE sc_setc_ch(VAR ch: CHAR; return_on_match: sc_char_set);
  { read from the keyboard until a character in return_on_match
    is typed. Capitalize all lower case letters. }
 BEGIN
  REPEAT
   read(keyboard, ch);
   IF (ch IN [ 'a'..'z' ]) THEN ch := chr(ord(ch) - ord(' '));
  UNTIL (ch IN return_on_match);
 END;

 PROCEDURE f_status(VAR f: ffile);
  { Return the "status" of f. }
 VAR
  vid, tid: STRING;
  date: f_date_rec;
 BEGIN
  sc_clr_screen;
  gotoxy(0,5);
  IF NOT f_open(f) THEN writeln('File is closed.')
   ELSE BEGIN
       writeln('File is open.');
       writeln;
       writeln('    unit number: ', f_unit_number(f));
       write('    blocked: ');
       IF f_is_blocked(f) THEN writeln('TRUE')
        ELSE writeln('FALSE');
       f_volume(f, vid);
       writeln('    volume: ', vid);
       f_file_title(f, tid);
       writeln('    title: ', tid);
       writeln('    length: ', f_length(f));
       writeln('    start block: ', f_start(f));
       IF f_is_blocked(f) THEN BEGIN
        f_date(f, date);
        WITH date DO BEGIN
         write('    month: ', month);
         write(' day: ', day);
         writeln(' year: ', year);
        END;
       END;
      END;
  writeln;
  IF sc_space_wait(TRUE) THEN { do nothing };
 END;


 PROCEDURE f_reset(VAR f: ffile);
  { Open f. If it's already open, close it first. }
 VAR
  fid: STRING;
 BEGIN
  sc_clr_screen;
  gotoxy(0,5);
  IF f_open(f) THEN close(f);
  write('File name? ');
  readln(fid);
  {$I-};
  reset(f, fid);
  {$I+};
 END;

 PROCEDURE main_menu;
 BEGIN
  sc_clr_screen;
  gotoxy(0,5);
  writeln('  O(pen file');
  writeln;
  writeln('  C(lose file');
  writeln;
  writeln('  S(tatus of file');
  writeln;
  writeln('  Q(uit');
  writeln;
  write('select --> ');
 END;

BEGIN
 match_set := ['O', 'C', 'S', 'Q' ];
 REPEAT
  main_menu;
  sc_setc_ch(ch, match_set);
  CASE ch OF
   'O': f_reset(f);
   'C': IF f_open(f) THEN close(f);
   'S': f_status(f);
   END;
 UNTIL (ch = 'Q');
 writeln('That's all folks!');
END.
```



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The Strawberry Tree Temperature Card

by Neil D. Lipson and Gary Lipson

Over the past year, a number of temperature cards have been created for computers to fulfill a need for scientific data management. All of the cards claim to record temperatures in a laboratory environment, some with more accuracy than others. Others provide you with a disk record or a printed copy of obtained data. Remaining packages include such features as temperature warning alarms, onboard timers, or full-fledged clocks. The number of temperature probes available with each card varies, but some cards make provisions for multiple card use. In this article, one such package, the Strawberry Tree Dual Thermometer, will be explored in depth and its features compared to the aforementioned attributes.

The package itself includes the temperature card, two ten-foot probes, two dummy probes (which maintain a constant temperature reading for testing purposes), an eighty-four page user manual, and a 5 ¼-inch soft sector diskette containing software written specifically for the card. The card features both a timer and a temporary clock. A built-in alarm working in conjunction with temperature readings monitors results. With additional Dual Thermometers, up to fourteen separate probes can be utilized within one Apple II.

The Strawberry Tree Dual Thermometer requires an Apple II Plus or Apple II with Applesoft and 48K RAM. One disk drive (DOS 3.2 and up) is necessary to run all software. The package is not compatible with DOS 3.1. The software can be used with all printers with little or no program modification. Allocations for a Mountain Hardware Apple Clock card have been made; however, it should work with any clock card with minor alterations. The thermometer will run with a language card installed. No Pascal software is available.

The probes may be used from −55 degrees C to 125 degrees C. The probes are accurate within 0.4 degrees C for temperatures in the range of −20 to 50 C and within 1.0 degrees C from −50 to −20 C and 50 to 100 C. This applies to all probes, including replacements. The probes may be extended up to 500 feet with no loss of accuracy. The sensing tip of the probe is aluminum and electrically isolated.

The clock within the temperature card is not a "clock" in the true sense of the word, but rather a device that will keep time after being set from within the program. The clock has no batteries to keep time while the computer is off. Once activated, the clock will retain not only the time, but the date as well.

An alarm, which is also included in the package, serves as a warning to let you know when the temperature of a probe moves out of a pre-set temperature range. This feature can be particularly useful when close supervision can not be maintained. The alarm, however, is not very loud and its range will not span past the specific room or work area. Many unique uses can be found for an alarm of this nature, but all practicality is lost if you are in a loud room or you are hard of hearing.

The thermometer package includes a detailed user manual. The manual, which is quite thorough in discussing the specifications and mechanical aspects of the card, is somewhat lacking when it describes the software. This makes it somewhat difficult for those writing your own software. The manual attempts to tell you what each program does and even gives you a list of what each variable contains. Unfortunately, this information could only be useful to a very good programmer, even then with some difficulty. Even though it is impractical, they suggest that you use their programs to set up the clock and temperature readings and then stop the program and use one of your own creation. This might be somewhat impractical, and would limit the potential possibilities of the card.

While using the clock or temperature card, many DOS commands are disabled. In fact, the only way to regain the use of these commands is to press the reset button, which in turn halts the dual thermometer program as well as the clock (unless you have a clock card of your own). Some of these commands include PR#6, INT, RUN (any Integer BASIC program), MAXFILES (it may be decreased without pressing RESET), HIMEM (it may be decreased without pressing RESET).

The Dual Thermometer card does not have the ability to check for the source of an interrupt because some of the programs cannot run with other hardware generating interrupts.

If the Dual Thermometer card is running in the background, the foreground program will run slower. This may become objectionable if temperatures exceed −20 degrees C. The only way to combat this problem is to stop the Dual Thermometer by pressing the reset key and to RUN the foreground Applesoft program again. Because of the extra time spent handling interrupts, the Dual Thermometer program may not run if the foreground program has time critical sections. Furthermore, if the foreground program uses the same memory locations utilized by the Dual Thermometer program, then it might not run.

It is likely that eventually lack of memory will become a problem. If RAM Applesoft is being used this will happen when you use several Dual Thermometer cards. You can get a

Language card or an Applesoft Firmware card (for Integer users) to expand the available memory by about 10K bytes.

Another way to save memory would be to remove REM statements from the Dual Thermometer programs (note: extra special care must be exerted when deleting REM statements as these lines are often referenced by GOTO or GOSUB statements). Still another way to save memory is to remove sections that you do not use. Again, exert extra special care, as many subroutines are used by several different sections of the program.

The software included provides many different ways to display data and results. It allows you to create your own "setup" screen. You can customize exactly what data the program will display and where on the screen it will appear. These designs can be saved for later use. The package also includes two pre-fabricated setups which include most of the options available to you.

The Strawberry Tree Dual Thermometer can be considered a well-developed package for the limited user. However, more complicated applications will cause widespread malfunctions in the software. The software is very compatible with the hardware, but it leaves you somewhat limited in the area of expandability. The manual is very comprehensive and often entails more than the average user would ever need concern themselves with. On the other hand, many specific details are presented within the text. The hardware lives up to its claims, although the clock could use some improvement. However, it is better than no clock. The probes appear sturdy in design and are easily adaptable for other uses without much difficulty. So if you wish to propel your small laboratory into the computer age, or you just want to know the temperature outside, this package just might be the answer to your prayers.

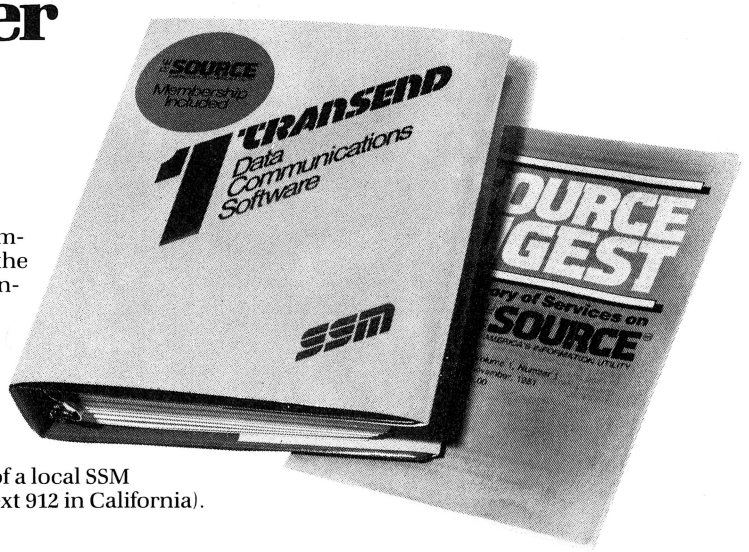
It should be pointed out, however, that in spite of the software problems, the card is well designed. Obviously the software can and will be improved in time, so you can rest assured that with the use of an update disk, the temperature card could significantly improve. As with any new hardware device like this one, it is essential to have an excellent hardware product, and if necessary improve the software at a later date. Take the original Apple II, for example. The original Applesoft was awful, and so was the original DOS 3.1, but with a new diskette, the computer acted like a new machine. Therefore I am not so concerned about the software limitations as by the time this article hits the stands, I am told there will be revisions not only to speed up the software, but to allow expanded uses of the card. (*In a separate letter, Strawberry Tree confirmed this. —PCW*)

It should be pointed out that this is really the only temperature card available for the Apple without having to spend enormous amounts of money for thermocouple devices. This alone makes it worthwhile if you need the capability.

There are some areas where the card could be of tremendous use, and it would be worthwhile to list some of them here. For example, it is excellent for energy conservation work, pharmacology and freeze drying, chemical analysis, weather forecasting, photography, and even in the kitchen. The probes and card will give smooth operation and with the software and hardware combination, the temperature readings are quite fast.

In general, I consider the card in a class of its own, and would recommend it to anyone that has an application similar to those mentioned in the above. The company has the consumer in mind and as software improvements are made, the operation of the card will improve accordingly.

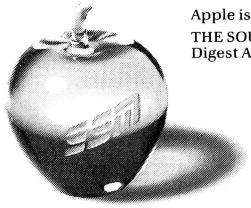
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Is This Year's Class Really Better?

by Joyce Conklin

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"Miss Conklin, what did I get on the test?"

"You got 23 out of a possible 30."

"What's that?"

Ah, the minor distractions which face a High School teacher. (If only the little . . . ahem . . . darling would calculate his own percentage, I could get on with taking roll and passing out the Back-to-School notices.)

Have you ever thought that in spite of all your effort, your students were actively resisting the application of the basic math that you thought they had learned in the 7th or 8th grade? If the percentage to be calculated is any more complex than 50%, it seems to be beyond the ken of some of them. But on the other hand, you want them to know exactly where they stand so that there are no sobbing complaints at grading time that, "You never told me I was getting a D—!"

I also wanted to know if this year's students were achieving at about the same level as previous years, or if I had neglected to cover some point in enough detail. That will sometimes show up in the statistical analysis of the grades on a test, so I designed the Statistical Analysis program to answer some of these questions. I maintain my gradebook on a VisiCalc ® template, so after each test (about every two weeks) I can print out the gradebook and post it on the bulletin board, neatly disguised by the use of student numbers instead of names. The printout from the template makes it very easy to enter in information required for the Statistical Analysis program. I use the TKC keypad, which speeds up the entry of the scores by allowing "touch entry".

The variables used in the program are as follows:

A and **TA** are parallel arrays which hold the tally of scores as they are entered. Array A will be sorted; array TA will remain unsorted for use in printing the tally.

SC is the array name which holds the scores in order from zero to the maximum obtained. This is really an array of "score names" such as 15, 67, 3 (Oh dear, how did that low score get in there?) etc.

F is the sum of the squares of the scores divided by the number of students being analyzed.

I, **J**, **J2**, **J3**, and **L** are all loop variables.

S is the square of each score.

S1 is the sum of the squares of the scores.

S2 is the square of the sum of the scores divided by the square of the number of students being analyzed.

X is the value of the individual score being entered.

CNTR is the subscript variable for the SCore array.

JUMP is the main variable used in the Shell Sort routine.

LOW is the lowest student score achieved; used in calculating the range.

MAX is the highest student score achieved; used in calculating the range as well as determining the upper limit of the sort routine.

RPT$ is the flag for use or non-use of the printer.

TL$** and **TT$ are used to enter a string which will be centered on the screen or paper output.

X$ is the actual input response.

Lines 500-590 produce the title page. If you are completely enamored of its appearance, you may change the number in Line 590 to something larger than 2000 so that you may gaze at it longer. On the other hand. . . .

The question in line 1220 and the answer in line 1230 allow you to select whether the results will be sent to the printer or just displayed on the screen. Line 1930 sets up output to Slot #1; change it if your printer interface is in another slot. Or, if you are

not using a printer at all, you may delete lines 1220, 1230, 1930, and 6020. If you have a short test or quiz, where the maximum score is 12 or less, you can see the entire distribution on the screen, but for tests which have a range upwards of 25 to 100, they will probably scroll by too fast for you to analyze.

I have dimensioned the arrays for a total of 400, as that is usually the upper limit of points for my students by the end of the semester. You could dimension it for whatever you need; I tried up to 900 for each of the three arrays and did not run out of memory on my 64K Apple.

Line 1280 protects the left half of the screen so that the message remains as the user inputs the scores. This narrowed window is reset to the full screen by the TEXT command in Line 1410.

It may seem strange to have MAX = 0 and LOW = 500 (as Alice said, "Curiouser and curiouser.") but they will be changed as soon as the scores are entered. Line 1310 receives the input as a string (always a good habit), and checks to see if it is null (just «**RETURN**» having been pressed) in which case it continues with the processing of data. The data entry routine in lines 1250-1400 cannot be done as a FOR-NEXT loop as there are varying numbers of students taking the tests at any given time. (When was the last time you had *all* of your students there on test day?)

The Shell Sort in lines 1600-1750 is a much improved algorithm from the bubble sort which I had been using. A comparison of speeds shows that a bubble sort requires approximately four minutes to sort 150 items, whereas the Shell Sort can do it in under 15 seconds — usually a lot under! Both array A and array SC are sorted in parallel fashion so that the calculations required for the Modal value can be made. Lines 1690-1710 contain the actual swapping algorithm which is the same as the one used in the bubble sort. It is the multiple loops which give the Shell sort its increased speed. Comparisons are made between the first element and one in the middle of the array, rather than comparing adjacent pairs of values.

Once the sort is completed, the results will be printed out, beginning at line 1900. The title and date of the test is printed at the top, and the following values will appear:

Range of scores;
Number of students;
Mean (average score);
Standard deviation;
Median (the central score); and
Mode (the score obtained by the most students)

The tally list (lines 6000-6090) will print out the scores in a column in descending order, and will also show the number of students who earned each score. Line 6050 deletes printing any scores which were not earned by any student; otherwise the list gets *very* long by the end of the semester!

The Grade Spread asked for in line 6080 is what answers the student's question posed at the beginning of this article. In our school, the grades are cummulative for the entire semester, rather than starting fresh each marking period. For this reason, telling a student that "87 points is an A" is only valid reasonably early in the term. As mentioned above, giving them a percentage breakdown doesn't seem to answer their question entirely. I consider the top student score to be the 100% mark, which allows for some slack in achievement due to poor test construction or incomplete explanation in class. Line 7040 will calculate the grade distribution or grade spread mentioned in line 6080.

Because I teach a senior Physics class and the students have already been screened by their math background, the curve used is rather generous. This program was first used in my Chemistry classes with students of approximately the same academic ability as those in Physics. As I had taught Chemistry for 20 years, the tests had been fairly standardized, and the statistical analysis of grade distributions for a three-year period (utilizing the "There's-a-break-I-guess-I'll-call-that-an-A" method) resulted in the percentages shown in line 7040 (81.9%=A, 62%=B, 43%=C, 26.4%=D).

If you use some other distribution (90%=A, 80%=B, 70%=C, etc. for example) change the decimal values in line 7040 to whatever percentages are standard for your classes. Just to make sure, I mark the tally list with red lines, and indicate at the side the number of students in each category (See Figure 1). Since doing this, I have had no questions, just a very close group crowding around the bulletin board the day after the test! It also seems to have eliminated the majority of complaints about the fairness of the grading scale, as they can see that although an individual test score might be low, their overall score remains in a respectable range. The setting of the tab at 9 leaves enough space at the left-hand edge of the paper for holes to be punched so that results may be stored in a binder when you're through displaying them.

Figure 1: Sample Output

```
PHYSICS 1   CH.11     15 OCT. 1982
              RANGE...   8-30
  NO. OF STUDENTS ...  58
              MEAN ...  19.72
   STD. DEVIATION ...  5.06
            MEDIAN ...  20
              MODE...   23   (7)

30  3
26  3      8A     13.8%
25  2
24  5
23  7
22  4
21  5      26B    44.8%      58.6%
20  3
19  2
18  6
17  3
16  3      19C    32.8%
14  5
13  2
12  1
11  1
10  2      5D      8.6%
8   1

  MAXIMUM STUDENT SCORE = 30
 MAXIMUM POSSIBLE SCORE = 33

A = 25 TO 33
B = 19 TO 24
C = 13 TO 18
D = 8 TO 12
F = 0 TO 7
```

In my Physics classes, which I have been teaching for only two years, the statistics allow me to see if I'm improving, and also to see what areas are more difficult for the students so that I may rearrange the schedule to allow more time for those topics.

The subroutine for the screen pause in lines 30000-30040 uses the POKE addresses to allow the message to be displayed without a flashing cursor which would result if there were a GET statement. Line 30020 checks the keyboard strobe to see if a key (any key) has been pressed. Since I assumed that the program would be used by a reasonably sophisticated person, I allow any key to count; if you want to be sure that only the space bar will cause the program to continue, substitute the following line at 30030: IF PEEK (-16384) < > 160 THEN 30020.

I hope that this program will help to show what computer-using is all about — a teaching tool for the person entering the program, and an applications tool to allow more time to be spent where it counts . . . with the students.

```
]LIST

100  REM *STATISTICAL ANALYSIS*
110  REM *  BY JOYCE CONKLIN   *
120  REM * COPYRIGHT (C)1982  *
500  REM

** TITLE PAGE **

510  TEXT : HOME
520  VTAB 5: HTAB 4: FOR I = 1 TO
     31: PRINT "*";: NEXT I
530  FOR X = 1 TO 4
540  PRINT  TAB( 4);"*"; TAB( 36)
     ;"*"
550  NEXT X
560  HTAB 4: FOR I = 1 TO 33: PRINT
     "*";: NEXT I
570  VTAB 7: HTAB 10: INVERSE : PRINT
     "STATISTICAL ANALYIS": NORMAL

580  VTAB 20: HTAB 22: PRINT "BY
     JOYCE CONKLIN": VTAB 21: HTAB
     22: PRINT "(C) 1982 "
590  FOR X = 1 TO 2000: NEXT X
600  TEXT : HOME
1200  REM

** INPUT INFO **

1210  VTAB 3: PRINT "TITLE AND DA
     TE OF TEST": INPUT TL$
1220  PRINT : PRINT "DO YOU WANT
     A PRINTED REPORT(Y/N)";
1230  INPUT RPT$
1240  DIM A(400): DIM SC(400):: DIM
     TA(400)
1250  HOME : PRINT "INPUT SCORE:"
1260  PRINT "(PRESS 'RETURN' IF"
1270  PRINT "ALL SCORES IN)"
1280  VTAB 1: HTAB 20: POKE 33,20
     : POKE 32,20
1290 MAX = 0:LOW = 500
1300  HOME
1310  INPUT X$: IF X$ = "" THEN 1
     410
1320 X =  VAL (X$)
1330  IF X > MAX THEN MAX = X
1340  IF X < LOW THEN LOW = X
1350 A(X) = A(X) + 1:TA(X) = TA(X
     ) + 1
1360 S = X ^ 2: REM  **  X^2 USED
      IN CALC. STD.DEV. **
1370 N = N + 1: REM  ** TALLIES #
      OF STUDENTS **
1380 X1 = X1 + X: REM   ** SUMS X
      - USED IN CALC. STD.DEV. **
1390 S1 = S1 + S: REM  ** SUMS X^
     2 - USED IN CALC. STD.DEV. *
     *
1400  GOTO 1310
1410  TEXT : HOME : VTAB 10:TT$ =
     "PROCESSING DATA": GOSUB 400
     00
1420  FOR I = 0 TO MAX:SC(I) = I:
      NEXT I
1600  REM

** SHELL SORT **

1610 JUMP = MAX
1620 JUMP =  INT (JUMP / 2)
1630  IF JUMP = 0 THEN 1910
1640 J2 = MAX - JUMP
1650  FOR J = 0 TO J2
1660 I = J
1670 J3 = I + JUMP
1680  IF A(I) <  = A(J3) THEN 174
     0
1690 T = A(I):T1 = SC(I)
1700 A(I) = A(J3):SC(I) = SC(J3)
1710 A(J3) = T:SC(J3) = T1
1720 I = I - JUMP
1730  IF I > 0 THEN 1670
1740  NEXT J
1750  GOTO 1620
1900  REM

** ANALYSIS **

1910  TEXT
1920  IF  LEFT$ (RPT$,1) <  > "Y"
      THEN 1940
1930  PR# 1
1940  HOME : PRINT : PRINT
```

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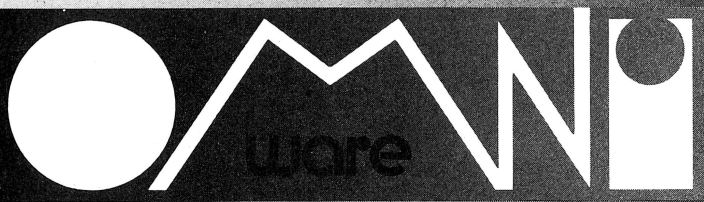
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```
1950 TT$ = TL$: GOSUB 40000
1960  PRINT  TAB( 16);"RANGE...";
      TAB( 26);LOW;"-";MAX
1970  PRINT  TAB( 6);"NO. OF STUD
     ENTS ..."; TAB( 26);N
2000  REM


** MEAN **


2010 XBAR = X1 / N
2020  PRINT  TAB( 17);"MEAN ...";
      TAB( 26); INT (XBAR * 100 +
     .5) / 100
3000  REM

** STANDARD DEVIATION *
     *


3010 F = S1 / N:S2 = (X1 ^ 2) / (
     N ^ 2)
3020 STDEV =  SQR (F - S2)
3030  PRINT  TAB( 7)"STD. DEVIATI
     ON ..."; TAB( 26); INT (STDE
     V * 100 + .5) / 100
4000  REM


** MEDIAN **


4010  FOR L = LOW TO MAX
4020 MED = MED + TA(L)
4030  IF MED >  = N / 2 THEN M1 =
     L:L = MAX: GOTO 4050
4040  NEXT L
4050  PRINT  TAB( 15);"MEDIAN ...
     "; TAB( 26);M1
5000  REM

** MODE **


5010  PRINT  TAB( 17);"MODE...";
5020 CNTR = MAX
5030  PRINT  TAB( 26);SC(CNTR); SPC(
     2);"(";A(CNTR);")": GOTO 505
     0
5040  PRINT  TAB( 26);SC(CNTR)
5050  IF A(CNTR - 1) = A(CNTR) THEN
     CNTR = CNTR - 1: GOTO 5040
5060  PR# 0: GOSUB 30000
6000  REM

** TALLY LIST **


6010  IF  LEFT$ (RPT$,1) <  > "Y"
      THEN  HOME : GOTO 6030
6020  HOME : PR# 1
6030  PRINT : PRINT
6040  FOR L = MAX TO LOW STEP  -
     1
6050  IF TA(L) > 0 THEN  PRINT  TAB(
     5);L; SPC( 2);TA(L)
6060  NEXT L
6070  PRINT : PR# 0
6080  VTAB 23: PRINT "DO YOU WANT
      A GRADE SPREAD PRINTED";: INPUT
     AA$
6090  IF  LEFT$ (AA$,1) = "Y" THEN
     7000
6100  END
7000  REM

** GRADE SPREAD **


7010  TEXT : HOME : VTAB 3
7020  INPUT "HIGH SCORE =";MAX
7030  PRINT : INPUT "MAX POSSIBLE
      =";M2
7040 A =  INT (.819 * MAX + .5):B
      =  INT (.62 * MAX + .5):C =
      INT (.43 * MAX + .5):D =  INT
     (.264 * MAX + .5)
7050  HOME : IF  LEFT$ (RPT$,1) <
      > "Y" THEN 7070

7060  PR# 1
7070  PRINT : PRINT "      MAXIMU
     M STUDENT SCORE = ";MAX
7080  PRINT "     MAXIMUM POSSIBL
     E SCORE = ";M2
7090  PRINT : PRINT  TAB( 5);"A =
      ";A;" TO ";M2
7100  PRINT  TAB( 5);"B = ";B;" T
     O ";A - 1
7110  PRINT  TAB( 5);"C = ";C;" T
     O ";B - 1
7120  PRINT  TAB( 5);"D = ";D;" T
     O ";C - 1
7130  PRINT  TAB( 5);"F = 0 TO ";
     D - 1
7140  END
30000  REM

** PRESS SPACE TO C
     ONTINUE **


30010  POKE  - 16368,0: VTAB 24: INVERSE :
  PRINT ">>>PRESS THE SPACE BAR T
     O CONTINUE<<<";: NORMAL
30020  IF  PEEK ( - 16384) < 128 THEN
     30020
30030  PRINT
30040  POKE  - 16368,0: RETURN
40000  REM

** PRINT CENTER **


40010 WIDTH = 20 - ( LEN (TT$) /
     2): IF WIDTH <  = 0 THEN  PRINT
     TT$: RETURN
40020  HTAB WIDTH: PRINT TT$: RETURN

]
```

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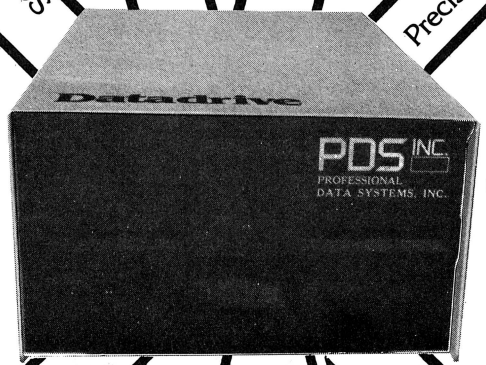
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Protocol Converters: The Personal Computer User's Key to Information

by W.C. Shepard
Apple Computer

(Note: Within the past month, Apple Computer has announced its 3270 Cluster Controller Emulator. One important feature of this unit is that it is interactive, rather than passive. We'll have more on this in upcoming issues. Meanwhile, Bill Shepard provides background and evolution, based in part on his own experience with the Oregon State Legislature. — PCW.)

The discussions of the "Office of the Future" and the transition from an industrial society to an informational society seem to be everywhere. The scope spans from the pocket electronic game to the introduction of computerized manufacturing methods into third-world countries. The microcomputer has clearly made its mark.

Estimates indicate there are currently more than 2 million computers in the United States, with a projected growth to 7 million by 1985. The number of personal computers has passed 1 million and is growing at a rate in excess of 500,000 per year. The demand centers on the availability of accurate, timely and usable information in greater volume than has ever before been available. In conjunction with this growth, we have seen dramatic progress in nationwide communication networks, primarily supported through satellite relays. Tymnet and Telenet are two examples. The natural evolution has been the commercializing of these capabilities.

Data Processing service companies began the evolution by offering multifunction timeshare services for a moderate cost. Databases and computing functions were made available for the limited capability terminals. Some of the more widely advertised services include Data Dialog, The Source and CompuServe. Electronic mail is available through many facilities. For example, the Electronic Mail System is available through Tymnet, and Telemail is available from GTE on Telenet.

The Directory of Online Databases, published by Cuadra Associates, lists more than 800 commercially available databases. The Encyclopedia for Information Systems and Services, published by Gale Research, contains more than 2,000 listings.

In January, 1982, Prestel, the British videotex system, began operating in the U. S. The service provides access to 200,000 pages of information from 600 information providers. In February, the Times Mirror Corporation announced a joint agreement with Informart, a Canadian news and cable firm, to sell the Telidon Videotex system in the U.S.

From the personal computer user's perspective, the availability of information is coming at a rate that is almost too fast to digest the announcements, let alone evaluate the capabilities and their utility. Even with all these information services, there remains an equally valuable set of databases which have been unavailable to the user of the personal computer or the inexpensive terminal. These are the thousands of private and governmental databases which have been developed for large-scale IBM computers over the past decade.

These systems have an essential common component; they were designed and function only with the IBM 3270 type terminals. The 3270 series of equipment included numerous terminal and controller models which are identified with model numbers such as 3271, 3276, 3278, etc. For simplicity, these are generically referred to as 3270. The 3270 equipment was designed to minimize the processing requirements of the central processor. To accomplish this, the terminal controller became a small minicomputer with extensive capabilities. Text is transmitted in screen sized blocks together with control and positioning characters.

With the increasing use and sophistication of teletype compatible terminals, a protocol standard has evolved. This standard has been adopted in both the U. S. and Europe in substantially identical form. The U. S. standard was adopted by the American National Standard Institute and is referred to as the American National Standard Code for Information Interchange (ASCII). With Europe, the standard has been adopted by the International Standards Organization. Even when a piece of equipment does not conform to the standard, the similarities are usually close enough to be easily supported through emulation. For the Apple user two programs are available through Special Delivery Software which emulate the ASCII standard. These are VT-100 Emulation for the Apple II and Access /// for the Apple ///.

To provide 3270 emulation on the personal computer, the first obvious choice would be to develop a program for this purpose. This, however is not an easy task. The capabilities of the 3270 have evolved over 10 years into a complicated interaction of software and hardware. Duplicating this on other hardware is a challenge for only the most capable communications software specialist. The emulation is further complicated by the use of two communications protocols.

The original 3270s communicated using a synchronous protocol which IBM named Binary Synchronous (BISYNC). While BISYNC is still used by many installations, most are converting to the newer Synchronous Data Link Control (SDLC) of IBM's System Network Architecture (SNA). The software necessary to function as a network node in an SNA environment is far from trivial.

In contrast, the asynchronous protocol used by the inexpensive terminals and personal computers is relatively straightforward to implement. In addition the personal computer software can easily emulate the display controls, such as, those to erase the display or position the cursor, of any particular terminal.

As if software problems weren't enough, we have some with the hardware. First of all, a different modem is generally required. This means the personal computer user must purchase one type of modem to access the local bulletin board system, and another for 3270 emulation. This environment requires both additional expense and continual hardware reconfiguration. However, a more troublesome problem centers on the limited support for dial-up.

The 3270 system functions as a polled device as opposed to one which responds to random interrupts. With polled devices, the host processor periodically sends a message to the device. In the case of the 3270, this periodic message inquires if the 3270 wishes to send or is ready to receive a block of text. A response is required. If no response is received after several attempts, the 3270 is assumed to be out of service, and the line is deactivated with no further polls being attempted.

Most remote 3270 controllers are connected through a dedicated telephone line. In addition, the controller is maintained in a ready state 24 hours per day. Thus, polls are always answered. Dedicated lines are not practical for a large diverse community of occasional users particularly when long distance rates are involved. Furthermore, the personal computer will certainly not be dedicated to the communications task 24 hours per day. Clearly, dial capabilities must be provided. The limitations of a polled system now surface.

When the dial is initiated, the answering equipment will answer the call and complete the connection, but no data will be sent. Why? Because the line is not active. Since the controller didn't answer the poll for the terminal that hadn't dialed in yet, the line was assumed out of service. What now? A second call must be placed to the computer operator to request that the line be placed back in service. The operator must enter a command at the console to reinstate the polling. If communications are still intact between the personal computer and the answering equipment, the session is established. Of course two telephone lines must be available.

With an interrupt system, the processor would respond to an interrupt generated from the answering equipment without the need for the second line, a voice call and operator involvement.

Where are we? If 3270 is required, and an inexpensive terminal with 3270 capabilities is not available, and emulation on a personal computer is not readily available, how can access be accomplished? With a new device called a protocol converter.

During 1981 and 1982 we saw the introduction of microcomputer based hardware which looks to the mainframe computer as a 3270 controller, yet provides complete communications support for the ASCII terminal. This device is generically referred to as a protocol converter. Text and control keys entered at the terminal are translated into functionally identical entries for the 3270 and sent to the mainframe. A symmetrical process is followed for data sent to the terminal.

The protocol converter solves the dial-up problem, because just like the 3270 controller, it is always there to answer the poll. It solves the cost issue because now the inexpensive equipment can be used.

The protocol converter can be physically placed at two locations, either in the office or in the computer center. The office is the better choice if there are a substantial number of individual personal computers in the office and access is frequent and to a single center. In this configuration, the personal computers are connected to the converter with standard RS-232 cable. A dedicated telephone line connects the converter to the computing center through a synchronous modem.

In the more typical case, where a wide variety of unrelated users wish to access a specific center, the protocol converter is placed within the data center. The converter is configured to support a sufficient number of incoming telephone lines for the user community. These are asynchronous lines supporting both 300 and 1200 baud rates with auto answer to any available lines, all accessed from a single number.

The Oregon State Legislature has permitted access to the Legislative Information System by governmental agencies, private organizations, and individuals since 1979. However, this access has only been available to 3270 users with dedicated telephone lines. For most users, particularly those not located in the State Capital at Salem, the costs have been prohibitive. In April 1982 a protocol converter was purchased and installed in the data center.

The unit selected is the model 1076 from Protocol Computers of Woodland Hills, California. The PCI 1076 appears to the center as an IBM 3276 operating in full SNA/SDLC protocol. On the user side, menu selectable support is provided for more than a dozen popular ASCII display terminals. In addition, it supports the "paper" terminals. The "paper" mode is particularly useful for the portable typewriter terminals as well as personal computers with communications software which does not provide complete display control. With Access /// for instance, the VT-100 mode is selected and full display control is provided.

With the 1983 Legislative session, all of the pieces are in place for public access. Late in 1982, the issues of security and accounting were resolved, paving the way for general public usage. The system is now available for public subscription, and is not limited to Oregon residents.

The Legislative Information System has a wealth of information for those concerned with Oregon law or proposed legislation. Full text is available for all measures, the state Constitution, Statutes, Index to the Statutes, Administrative Rules, Attorney General's Opinions, and the Appellate and Supreme Court decisions. A public records database is in the process of being made available by the Secretary of State. In spite of the large mass of text, a specific section of interest can be located very rapidly through the use of key words or phrases. In addition to the text, a complete history is available for every measure. This history includes all actions of the Senate and the House with a record of all votes, committee assignments, hearing schedules, etc.

Making the Legislative information available to business and individuals at a minimal cost will provide an unprecedented opportunity for citizen participation in the legislative process. Fifteen minutes once a week using a personal computer, a person can identify proposed legislation which should be either supported or opposed, depending on your view of course. A much greater number of individuals will have the opportunity to review the proposals and comment to their Legislator before, rather than after, the law is enacted.

In January 1981, EDP Analyzer stated: "We cannot remember a time in the history of the computer field when there were so many important new technological developments reaching the marketplace within a short time period." This statement is even more on-point in 1983. Perhaps through communications and the personal computer we can take advantage of this technology turning the wealth of databases into a valuable information tool.

ALLEVIATE THE "DISK FULL" PROBLEM

by J. David Anderson

Much of the work that I do requires the storage of a lot of data on disk. There's nothing more frustrating than to be told that a disk is full when I'm trying to save another program or body of data. Apple's invention of 16-sector disks went a long ways toward alleviating the problem but, being the greedy person I am, I'd like still more space.

A 16-sector diskette contains 560 sectors of 256 bytes each for a total of 143,360 bytes of information. However, only 492 of these sectors are available to the user. This means that the DOS image and VTOC consume over 12% of the space on each disk. After realizing this, I began to ask myself, "Do I need to keep a copy of DOS on every disk I own? Why not keep it on the few disks I use for booting and take it off the others?" Wheels began to turn in my mind and, with a little snooping around, I've discovered a way to remove DOS and regain a considerable amount of lost disk space.

The VTOC (volume table of contents) is the anchor of each disk. It keeps track of where the first catalog sector may be found, the direction of track allocation and the last track where sectors have been allocated. It also contains a map of which sectors are free and which have been used. As files are saved and deleted, the map is changed to reflect the increased or decreased space. The map is stored on track $11, sector $0, beginning at byte $38. Each four-byte string tells the status of an entire track. For instance, bytes $38-3B give the status of track 0, $3C-3F that of track 1, etc. It's necessary to change the hex characters to binary in order to determine which sectors are free or used. A binary 0 is stored in the string if a sector has been used, a 1 if not used. The bit positions are assigned as follows:

Byte 0 = sectors FEDC BA98
Byte 1 = sectors 7654 3210
Byte 2 = not used, contains zeros
Byte 3 = not used, contains zeros

Using this knowledge, let's take a look at a few examples, remembering that a binary 0=used, 1=free:

```
11111111 00000000 = $FFFF 0000
    All sectors on this track are free
00000000 00000000 = $0000 0000
    All sectors on this track are used
00111111 00000000 = $3FFF 0000
    Sectors F & E used, remainder free
00000111 00000000 = $0007 0000
    Only sectors 2, 1 & 0 remain free
```

On a freshly-initialized disk, tracks $0, 1, 2 and 11 will all be used with part of $12 being used, depending on how long the "hello" program is. DOS resides on tracks $0-2 and the VTOC on $11. Our object is to change the map in the VTOC to free the sectors used by DOS.

Having accomplished that, we need to do something to let the computer know that DOS has been removed. Otherwise, if you accidentally boot a DOSless disk, the system will hang with the drive running and you've no choice but to turn it off and begin again. In DOS 3.3, track 0, sector 0 is read into memory by the controller card and then executed. Knowing that, we can place a machine language routine there to tell us that no DOS resides on that disk. The routine (listing 1) stops the drive, sends a flashing message to the screen, toggles the bell, and neatly returns us to Basic.

Stuff like this is not for the faint-hearted, but if you're willing to continue, here's the procedure, step by step:

1. Initialize a disk in the normal manner.
2. Delete the "hello" program.
3. Using a disk zap program, look at the VTOC on track $11, sector $0.
4. Place an FFFE at byte $38, FFFF at $3C, FFFF at $40. Don't change the data at bytes $7C-7D or your VTOC will disappear! All the other maps should already have contained FFFF 0000.

5. Now look at track 0, sector 0, and change the first byte to 01. Then enter the $31 bytes of the machine-language routine (listing 1) in the following space. The rest of the sector can contain garbage without harm.

6. Check your work carefully and then try booting the disk. If it comes back and flashes "No DOS on this disk," you've done your work correctly.

I'd suggest using the disk you just created as a master and make copies of it using a copy program. That way, you won't have to create future DOSless disks manually.

```
]ASM

                        1000 ************************************
                        1010 *ENTER THE OBJECT CODE DIRECTLY *
                        1020 *ON TRACK 0, SECTOR 0, USING ANY*
                        1030 *DISK ZAP ROUTINE.              *
                        1040 *                               *
                        1050 * J. DAVID ANDERSON             *
                        1060 * 819 JACKSON AVENUE            *
                        1070 * NORTH AUGUSTA SC  29841       *
                        1080 ************************************
                        1090         .OR $800
                        1100 SETVID  .EQ $FE93   ;PR#0
                        1110 SETKBD  .EQ $FE89   ;IN#0
                        1120 BELL    .EQ $FBDD
                        1130 COUT    .EQ $FDED
                        1140 HOME    .EQ $FC58
                        1150 BASIC   .EQ $E000
                        1160 RTS1    .EQ $F831
                        1170 SLOT    .EQ $2B
                        1180 MOTOFF  .EQ $C088
0800- 20 93 FE          1190         JSR SETVID ;UNHOOK DOS
0803- 20 89 FE          1200         JSR SETKBD
0806- 20 58 FC          1210         JSR HOME    ;CLEAR SCREEN
0809- A6 2B             1220         LDX SLOT      ;WHO CALLED?
080B- 9D 88 C0          1230         STA MOTOFF,X ;TURN HIM OFF
080E- A2 13             1240         LDX ##13
0810- BD 1F 08          1250 MSG     LDA ERROR,X   ;DISPLAY THE
0813- 20 ED FD          1260         JSR COUT      ;MESSAGE
0816- CA                1270         DEX
0817- D0 F7             1280         BNE MSG
0819- 20 DD FB          1290         JSR BELL
081C- 4C 00 E0          1300         JMP BASIC
                        1310
081F- 4B 53 49
0822- 44 20 53
0825- 49 48 54
0828- 20 4E 4F
082B- 20 53 4F
082E- 44 20 4F
0831- 4E                1320 ERROR   .AS /KSID SIHT NO SOD ON/


SYMBOL TABLE

SETVID FE93    SETKBD FE89    BELL   FBDD
COUT   FDED    HOME   FC58    BASIC  E000
RTS1   F831    SLOT   002B    MOTOFF C088
MSG    0810    ERROR  081F
```

Book Review:

Apple Backpack

Review by Pat Parker

Book Review
APPLE BACKPACK
by Scot Kamins and Mitchell Waite

BYTE/McGraw-Hill
Peterborough, NH 1982
181 pages, softcover $14.95

Apple Backpack is a book about programming microcomputers in BASIC. But much more than that, it's about writing user-friendly software. That is, programs which really take into account the fact that those who will eventually be using them will be *people*. Kamins and Waite call this concept "humanized programming, and attitude toward writing code that puts major emphasis on communication with the user." Using clear, well organized and thoroughly explained examples, Apple Backpack leads the reader chapter by chapter through most of the major stumbling blocks to good programming and offers methods for breaking through these blocks to writing truly user-friendly software: screen formatting, crashproofing, clear and concise instruction writing, verifications, help menus, hard copy documentation. All of the examples are written in Applesoft BASIC but can be modified easily to run in any computer using a form of Microsoft BASIC.

I wish I had known about Apple Backpack a few months sooner. Knowing nothing about programming or the mysterious working of microcomputers, I recently enrolled in a BASIC programming class at San Francisco State University designed to teach teachers about using computers in education. During the 16 week course, we were expected to become pretty good BASIC programmers, write several short programs, two long "special projects" and evaluate many existing pieces of educational software on hand in the computer lab. Whew! There were many times, especially as the semester wore on and the deadlines drew nearer, when I would have saved myself a great deal of time and aspirin had I had a copy of Apple Backpack by my side.

For instance, Chapter 1 deals with screen formatting, how to organize the presentation of a program so it is clearly understandable and aesthetically pleasing to the user. Lacking the wonderful anti-splitword routine by Dr. Kamins in Chapter 1, I actually did spend hours writing my code by hand on graph paper, little square by little square, in order to avoid line wraparound and split words in the format. (My teacher actually told me she thought the graph paper was a good idea!)

Chapter 2 is about crashproofing programs. It deals with the problem of incorrect entries by the user, and offers advice as to what the programmer can do ahead of time in order to prevent a program from going down in flames. It covers length violations, empty inputs, bad inputs, using string inputs including inputting numbers as strings, and the use of the numeric menu. As a teacher of small children, I am aware of the need for programs that allow the user to make errors without crashing out of the program. Children make errors (as do most of us) as a function of learning. Chapter 2 offers straightforward, easy to use routines that can be inserted into any program to allow for user error. I particularly liked the section on the numeric menu which includes the "axiom of minimum contact" : the "fewer keys the user must press, the less likelihood of an error". It's so simple and elegant.

Chapter 3 is called Verification and Validations. I think of this as giving the user another chance. Routines for checking and correcting mistakes by the user are provided, including routines for verifying and correcting data as it is entered as well as routines for correcting data at any point after it's been entered. The GET statement is nicely explained in this chapter and demonstrated in the routine for checking and verifying single inputs.

Chapter 4, Direction on the Display, brings me back again to my class in BASIC. It begins, "One of the greatest problems with computer programs is that users can't figure out how to use them. Many programs are written with few directions, and some we've seen have no instructions at all." While learning to write programs for elementary age kids, my class was asked to run and evaluate educational software developed by more experienced programmers. Some of these programs were easier to run than others. I remember being particularly frustrated by those programs which began by printing the word "READY" on the screen followed by a flashing "?". I was faced right away with having to guess whether to respond with "yes", "y", "oui", etc.

The software that lacked clear instructions on how to proceed from step to step, or how to go about getting help when presented with an operation I didn't understand was often put aside in favor of the more clearly written user-friendly software also available for evaluation. Chapter 4 addresses the need for good, compact on-screen directions, and provides suggestions for formatting instructions for clarity including

IT'S TIME KIDS STARTED USING STRONG LANGUAGE.



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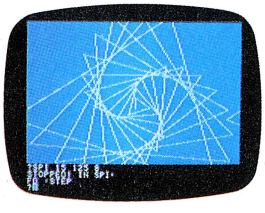
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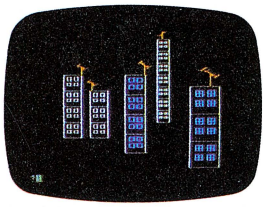
Presenting Apple Logo.

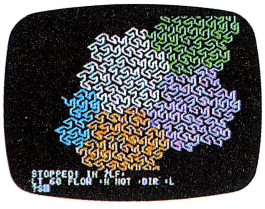
It's not just a programming language for computers, but a learning language for people.

Enough so that anyone, working with Apple Logo, can easily learn the programming principles once reserved for college courses.

Apple Logo encourages you to break problems into small steps, and then shows you how to make those steps automatic.







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some examples of tricky formatting problems with dates and telephone numbers. Also explained here are help menus which provide on-screen user assistance when needed during the run of a program, and the expansion of help menus through the use of disk storage and easy, one key retrieval.

Chapter 5 introduces hard copy documentation: detailed printed information about a program that enables the user to decide whether the program meets that user's needs and demonstrates how to use the program. Included are ideas for providing tables of contents, reference cards, and glossaries as well as information about the program's purpose, definition and individual requirements (memory, specific hardware, etc.), and user-friendly operating instructions. There is a bonus section in this chapter on copyright information to protect the programmer from rip-offs.

Altogether, *Apple Backpack* is beautifully organized. It is laid out in fact according to its own user-friendly philosophy. First, it clearly states in the preface what the authors intend to accomplish, with a brief description of each of the chapters and appendices. This information is restated in the introduction with some explanations of why the book exists and how it will teach one to program in user-friendly style. Then, after the 5th chapter on programming technique, there is a complete chapter by chapter synopsis of the book and its methods in the conclusion. Each chapter is summarized according to Problem, Solution, and Method. Also stated here is *Apple Backpack's* "hidden curriculum" which is to bridge the gap between machines and people, because, "high technology and everyday people can and should get along together".

Finally, there are three appendices. The first is an ASCII Code Chart. The second and third are programs that demonstrate all of the humanized programming techniques and methods described in the book. Appendix II is a learning program called States and Capitals written for kids and easily modified for many educational uses. A special feature of the game is a random data scrambler that keeps the game from becoming boring and repetitive for the user. Appendix III is the Electronic Phone Pad. This is a telephone message and retrieval program that is full of examples of how to document a business oriented program very thoroughly in the best user-friendly style.

The writing style of *Apple Backpack* immediately caught my attention. Writing about computer code can be a very dry and boring process. Not so in *Apple Backpack*. Page after page, Kamins and Waite made me smile, and occasionally burst out laughing, with witty tongue in cheek comments, amusing little asides, great cartoons and generally down to earth language.

My only criticisms of *Apple Backpack* have to do with minor editing points and a couple of ideas that could have been included but weren't. On two or three occasions the discussion of the code of a particular program refers to line numbers that are nonexistent. A bit confusing. Also, the word "algorithm", used repeatedly throughout the book, is finally defined toward the end of Chapter 4. By that time, the reader who needed to know had probably looked it up anyway.

I would like to see a section on using graphics for screen formatting added to Chapter 1. As a teacher, I would find this information particularly useful in writing eye-catching, interesting educational software. Also missing, this time from the Verifications and Validations chapter, is a section offering a user's On Error subroutine.

Apple Backpack is altogether a very useful book. Anyone who wants to write clear, usable, humanized programs will benefit from owning a copy.

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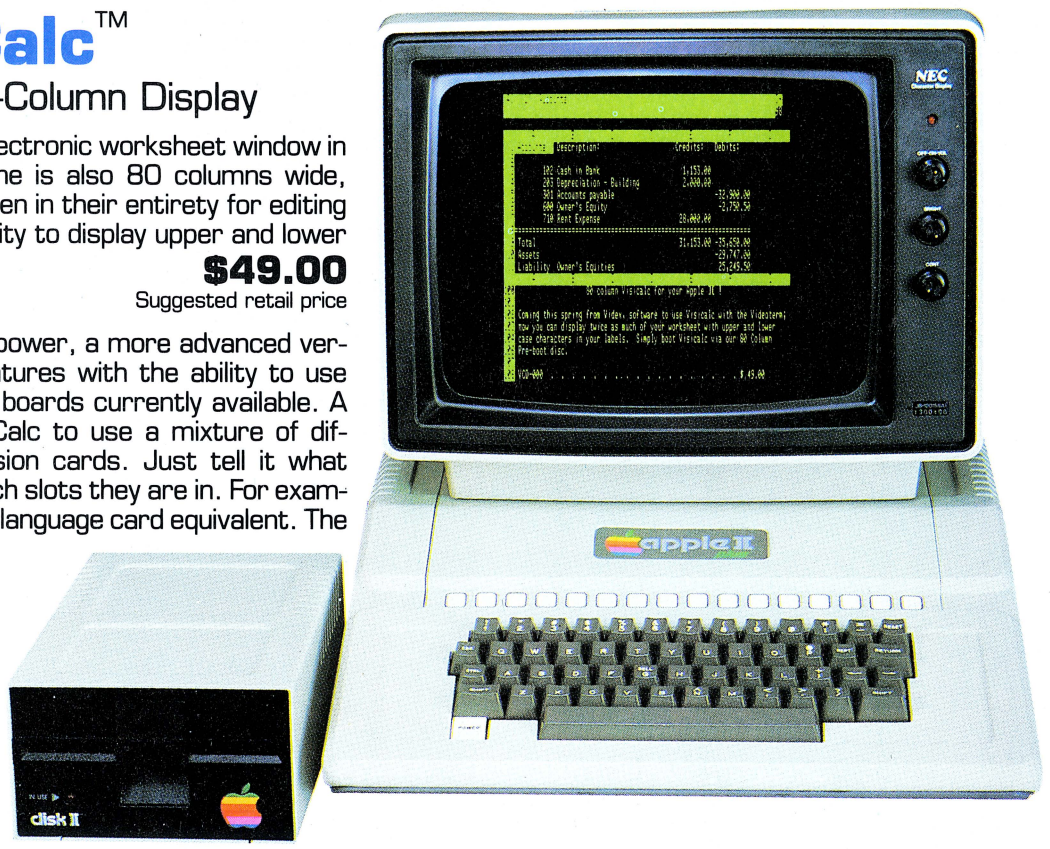
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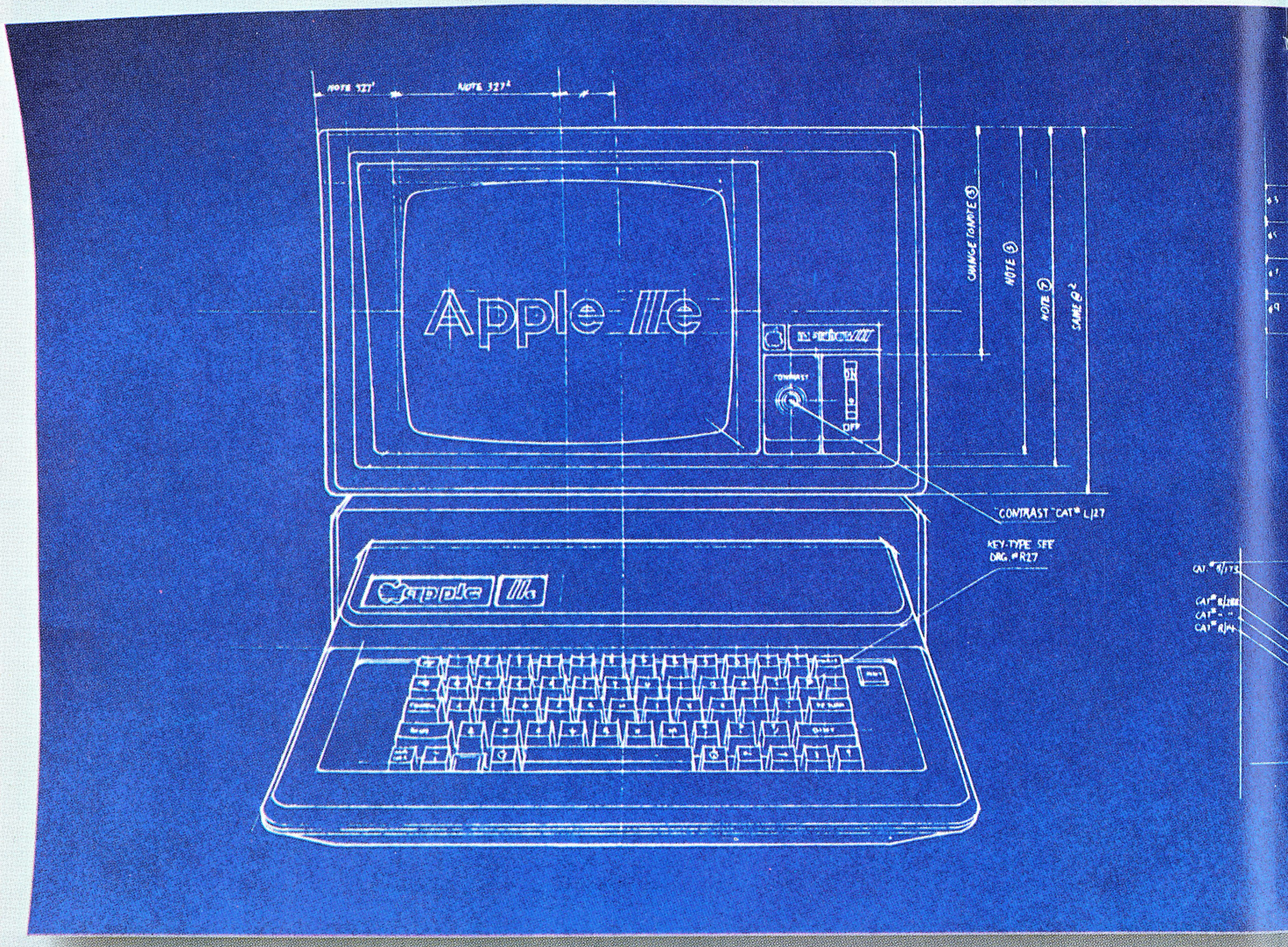
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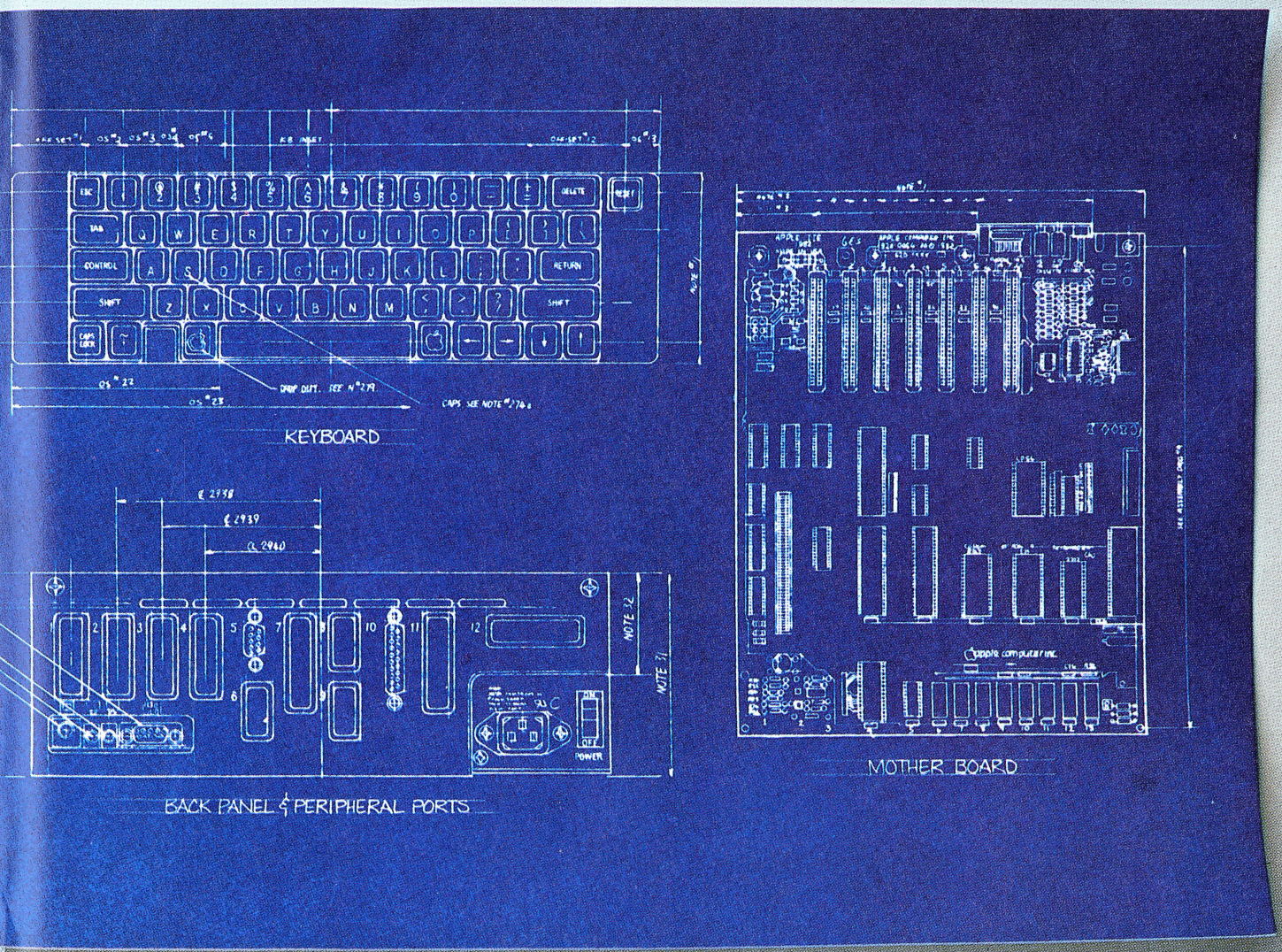
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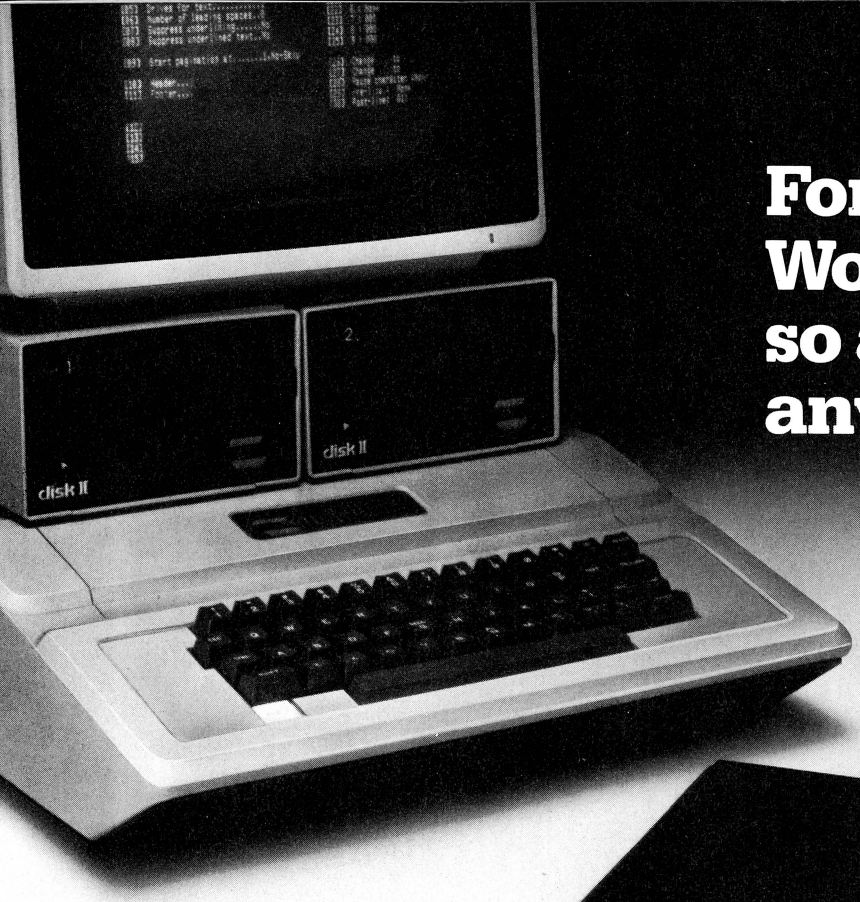
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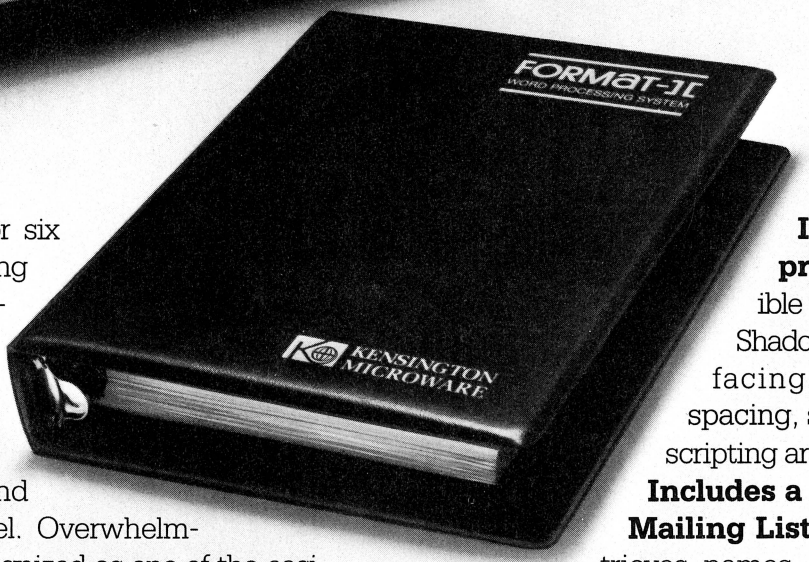
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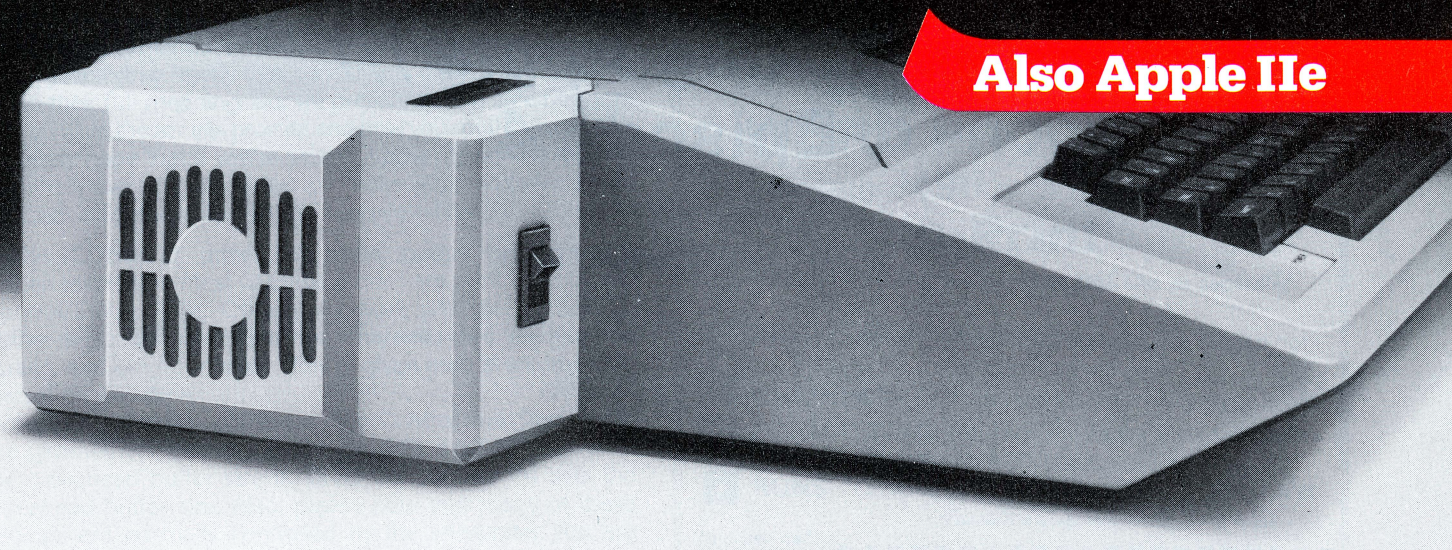
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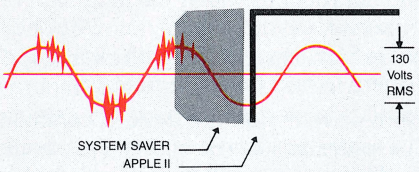
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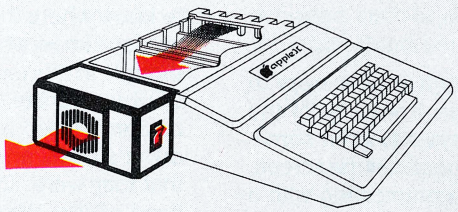


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise signals by a minimum of 30 dB from 600 khz to 20 mhz, with a maximum attenuation of 50 dB.

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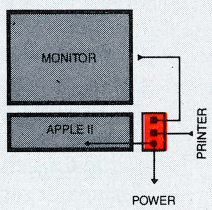
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.

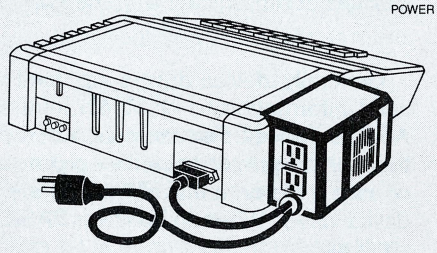


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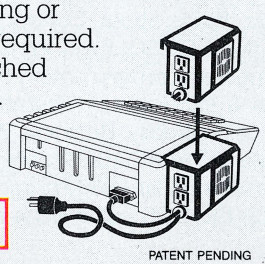




The heavy duty switch has a pilot light to alert when system is on.You'll never use the Apple power switch again!

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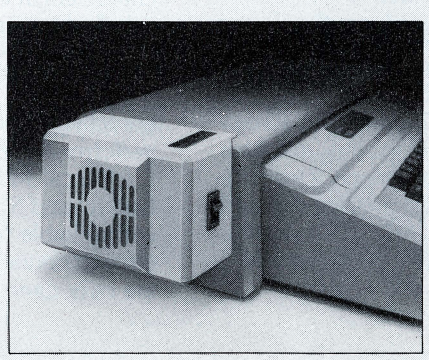
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Unlocking Apple /// Episode 4

by Alan Anderson

GREETINGS, Apple Addicts! This time around, we're going to explore one of the most intricate and powerful pieces of code around, the **.CONSOLE** driver (note the dot; regular readers know that's not really a period) used by the Apple ///'s Sophisticated Operating System. As you already know, SOS uses nifty little programs called device drivers to communicate with everything that gets plugged in or built into the Apple /// (if you don't, please read the Apple /// Standard Device Drivers Manual, the Apple /// Owner's Guide, and, if you can get 'em, the previous installments of this column). (*Of course you can get 'em; back issues of* APPLE ORCHARD *are available.*) According to the Standard Device Drivers Manual, peripheral devices are "the eyes and ears and other senses" of the Apple ///; in turn, the device drivers are the nerve paths by which the devices communicate with the computer.

Generally, device drivers are used when it is necessary to send information to or obtain information from any of the Apple's devices. For example, when you want to print something on the printer, or cause a picture to appear on the screen, or save a file on a disk drive, you are communicating with a device driver. When, in Business BASIC, you issue a command such as

OPEN #1, ".D2/GOOD.DATA"

the **.D2** part is the name of the device driver. Similarly, when in Pascal you have a statement like

reset (paper, '.printer')

there is a device called ".printer" ("dot printer") lurking in there doing the work at the end. Note that case doesn't matter: upper and lower work equally well.

So the most common function of device drivers is to perform input and output. However, many devices (especially the more complex ones) also need to be able to perform other functions. As an example, the driver for the graphics screen needs to be able to switch between the various graphics modes; the text screen has to scroll, backspace, clear the screen, and so on. These functions are traditionally performed by sending control characters to the device. And so it is with the Apple /// and the .CONSOLE driver, which is the name of the driver that controls the keyboard and the text screen.

Still, there is more that a device needs to do, more complex functions which directly affect the performance of the device in a more complex way. An example of this in the .CONSOLE driver is the management of the keyboard's typeahead buffer. Sometimes it is necessary to know if there is a key in the buffer; sometimes a programmer wants to flush the buffer or disable it. In more traditional systems, functions like this are often performed by calling subroutines within the language of the operating system. However, as you probably know by now, you can't call subroutines in SOS, since SOS is relocatable and you never really know where to find things in memory.

How is this problem solved? How are devices controlled at this level? In previous issues we have discussed the concept of SOS calls, ways of calling routines within SOS without having to know where the routines are located (which is handy, since we don't know where they're located). This situation is different, though. In this case, we really don't want to call a routine within SOS; we want to call one within the **.CONSOLE** driver. Can this be done? Need you ask? SOS provides two calls to hook into a driver's code, and we've mentioned them before. If you knew that they were "D_STATUS" and "D_CONTROL", go to the head of the class. If not, don't worry, 'cause the discussion continues.

Status Symbol

D_STATUS and D_CONTROL, which we'll call Status and Control, are ways to exploit the full power of a device driver by talking directly to it. Status allows a program to inquire about the workings of a driver, while Control lets the programmer change those workings. Let's use our previous example of controlling the typeahead buffer: finding out if there are characters in the typeahead buffer is performed with a Status call; flushing or disabling the buffer can be done with a Control call. More about this later.

One of the nicest things about Control and Status calls, especially those to the .CONSOLE driver, is that they can be performed from almost any programmer environment. Apple /// Pascal includes a statement, **Unitstatus**, which makes Control and Status calls directly. Business BASIC comes with an invokable module called **REQUEST.INV** which makes the calls. Of course, an assembly language programmer can make the calls directly with the SOS call mechanism.

Myriads of Modes

Of all the Apple ///'s device drivers, none exploits the power of the Control/Status calls more than the **.CONSOLE** driver, which is arguably the most powerful and most complex driver. The calls to .CONSOLE are documented in the Standard Device Drivers Manual on pages 59-71, but unfortunately, they are presented so briefly that it's difficult, if not impossible, to grasp their full meaning. So, we present here a little bit more info on what these calls provide and how you might use them. I sincerely hope that if you're writing Apple /// software, you'll use the power in this driver to make your software more sophisticated and easier to use (end of editorial).

The **.CONSOLE** driver has more modes than a poorly written text editor. Most of these modes are controlled by the Control/Status calls. Other calls work with the typeahead buffer, keyboard interrupts, the character set, reading the screen, and other fun stuff. They're given here in a somewhat logical organization.
Note: in most cases, corresponding Control and Status calls are symmetrical; that is, for example, Status call #4 asks what the typeahead buffer size is, while Control call #4 sets the typeahead buffer size. Also, please note that many of these settings are normally controlled by the interpreter you are using, and often will not be changed unless you are creating your own interpreter.

Here we go!

Calls affecting input modes

Call number: 2 (status and control calls)

Name: newline mode

Description:

This call lets the programmer choose how an input request is terminated. There are two options: (1) Input requests are terminated by typing the number of characters requested, and (2) Input requests are terminated either by typing the number of characters requested or by entering the line-termination character. What is the line-termination character? Normally, of course, it's the carriage return (ASCII 13), but you can set it to anything you want.

Parameters:

1. Newline status
   possible values: $00 newline character processed normally
   $80 newline character terminates input

2. Newline character
   possible values: $00 through $FF
   (normally $0D, carriage return)

(remember that the Control call changes these values, the Status call inquires about it)

Applications:

By using the Control call, you can change the character which denotes an end-of-line to anything you want. I don't have a real good practical example for when you might want to do this (other than just playing around), but it's there if you ever need it.

Call number: 3

Name: raw-keystroke mode

Description:



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This is the mode that lets you figure out whether the user has pressed «**RETURN**» or «**ENTER**», or whether a number was entered on the main keyboard or the numeric keypad. When raw-keystroke mode is inactive, each read from **.CONSOLE** returns the ASCII code of each keystroke; when this mode is activated, each keypress produces two bytes: the ASCII code of the key pressed, plus a second byte of data which tells us more.

Bit	Meaning
7	Special key pressed. Special keys are ESCAPE, TAB, space bar, arrow keys, and numeric keys. Note that the manual says that **RETURN** is a special key. This is incorrect.
6	Keyboard on. This bit is always one. It means that your keyboard is connected.
5	Closed-Apple key pressed. The Closed-Apple key was pressed and held before pressing a standard key. Note that if the standard key is pressed first, then Closed-Apple, the keystroke is auto-repeated at 33 characters per second and this bit is not on.
4	Open-Apple key pressed. The Open-Apple key was pressed and held before pressing a standard key. Note that if the standard key is pressed first, then Open-Apple, the Open-Apple has no effect and this bit is not on.
3	ALPHA LOCK key is down.
2	CONTROL key pressed. See the explanation under Open-Apple key for details.
1	SHIFT key pressed. There is no way to determine which of the two SHIFT keys was pressed. See the explanation under Open-Apple key for details.
0	Any key was pressed. This bit is always on, indicating that a key was pressed.

Parameters:

1. Raw-keystroke mode status
   possible values: $00 read returns ASCII code only
   $80 read returns ASCII code plus extra byte

Applications:

It is often handy to determine whether the main keyboard or the numeric keypad has been used, and this is the main application for raw-keystroke mode (bit 7 is the important one). Note that setting raw-keystroke mode, then using BASIC's INPUT statement or Pascal's read and readln produces bizarre results (try it!)

Call number: 10

Name: no-wait input mode

Description:

The no-wait mode allows the programmer to perform input requests that don't wait for the user to type anything; input requests with no-wait mode set only return characters that are in the typeahead buffer at the time the request is made. If the buffer is empty, no characters are returned.

Parameters:

1. No-wait status
   possible values: $00 no-wait mode is inactive
   $80 no-wait mode is enabled

(once again, a reminder that the Control call lets you set the mode, while the Status call lets you find out what the mode is currently set to.)

Applications:

One of the best examples of a good use for no-wait input mode is a real-time game. In a game, you frequently have to write precisely interleaved timing loops which update the screen's graphic displays. With no-wait input, a loop that includes an input request would always proceed instantly, whether or not any keys had been pressed.

Call number: 11

Name: screen-echo mode

Description:

This mode, when enabled, causes the **.CONSOLE** driver to automatically display all keystrokes as they are read. This is the standard way of doing things — it lets the user see his keystrokes. However, sometimes it is handy to disable this feature, in case the programmer wants to perform some other type of echoing. In addition, a third setting for this mode will cause control characters to be echoed to the screen as two letter abbreviations (for example, 'BS' for backspace, 'LF' for line feed, etc.).

Parameters:

1. Screen-echo status
   possible values: $00 keystrokes will not be displayed on the screen
   $80 keystrokes will be displayed
   $C0 keystrokes and control characters displayed

Applications:

Sometimes in a program you will want to perform special functions when certain keys are pressed, and not echo them directly to the screen. By disabling the screen-echo, you can have complete control over what is printed on the screen.

Call Number: 12

Name: retype mode

Description:

This mode controls the function of the right-arrow key in screen editing. When retype is enabled, pressing the right-arrow key causes the character under the cursor to be entered into the typeahead buffer as if it had been typed. When retype is disabled, the right-arrow key simply moves the cursor to the right, and nothing is entered into the typeahead buffer.

Parameters:

1. Retype status
   possible values: $00 retype is disabled
   $80 retype is enabled

Applications:

In certain types of systems, such as the Apple /// Pascal system, the retype function is inappropriate, so it is disabled. Similarly, if you are writing your own input routines, you may wish to enable or disable retype, depending on how you handle the input.

Call Number: 13

Name: backspace function

Description:

The backspace switch lets the programmer select what the **.CONSOLE** driver is going to do when the user presses the backspace key. If backspace is disabled, it is treated just like any other character, and the program should handle it. If backspace is enabled, there are two possible options: destructive and nondestructive. Destructive backpace causes the character which is spaced over to be deleted from the screen; nondestructive backspace leaves the character on the screen.

Parameters:

1. Backspace status
   possible values: $00 backspace is disabled
   $80 backspace is enabled and nondestructive
   $C0 backspace is enabled and destructive

Applications:

Although most applications allow the backspace to be used for deleting the previous character, sometimes it is desirable to handle the backspace like any other character.

Call Number: 14

Name: cancel function

Description:

The cancel function is related to the backspace: cancel deletes the entire line currently being typed when CONTROL-X is pressed. Like the backspace function, it can be enabled in two modes, destructive and nondestructive.

Parameters:

1. Cancel status
   possible values: $00 cancel is disabled

$80 cancel is enabled and nondestructive
$C0 cancel is enabled and destructive

Applications:

This is a function which, while handy in some data entry and editing applications, is often undesirable for applications software. You may wish to define your own "cancel" function within your data entry routines.

Call Number: 15

Name: escape mode

Description:

The escape mode, also known as cursor command mode, is used in Business BASIC to move the cursor around, erase the screen, set the viewport, and perform other functions easily. This escape mode is actually built into the **.CONSOLE** driver and can be selectively enabled or disabled.

Parameters:

1. Escape mode status
   possible values: $00 escape mode is disabled
   $80 escape mode is enabled

Applications:

If you're looking for a simple screen editor, your software can use the built-in escape mode. Otherwise, you'll probably want to disable the escape mode.

Calls affecting the typeahead buffer

Call Number: 4

Name: typeahead buffer size

Description:

This call lets you set (or inquire about) the number of characters that can be held in the typeahead buffer. The size is normally set to 128.

Parameters:

1. Buffer size
   possible values: $00 through $7F

Applications:

In applications programs you're often dealing with novice or unsophisticated users. In these situations, it's sometimes handy to disable the typeahead so that the user can't do anything fatal (such as deleting a file) without verifying it first. Typeahead can be disabled by setting the buffer size to zero.

Call Number: 5

Name: Buffered keystroke count (Status call)
Flush typeahead buffer (Control call)

Description:

Sometimes a program needs to know if there are any keystrokes awaiting it in the typeahead buffer. Status call 5 will return the number of buffered keystrokes. Also, you will occasionally need to flush the typeahead buffer, and Control call 5 accomplishes this for you.

Parameters:

Status call
1. Keystroke count
   possible values: $00 through $7F number of

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keystrokes buffered
(Control call has no parameters)

Applications:

Flushing the typeahead buffer can be used in conjunction with disabling the buffer (see the Call 4, Buffer size entry above) to prevent disaster from striking novice users. Checking the number of characters in the buffer can be used to help you determine when there is input to de processed.

Calls relating to system character set

Call Number: 16

Name: Download character set (Control call only)

Description:

Control Call 16 lets you load in a new character set on the fly, without having to reconfigure and reboot the software. Apple supplies several character sets on various diskettes, including the System Utilities Data and Business BASIC diskettes.

Parameters:

1. Character set
   128 character definitions, each definition occupies 8 bytes total: 1024 bytes
   The format of a character definition is given in the Standard Device Drivers Manual, appendix G

Applications:

Changing the character set has all sorts of applications. You can take the slash out of the zero; you can program special characters or company logos; you can even perform animation. For some tips on how to best use this call from Business BASIC, take a look at the DOWNLOAD files on the BASIC master diskette.

Call Number: 17

Name: download partial character set (Control call only)

Description:

This call is similar to call 16, but differs in that it allows you to download just one to eight characters at a time.

Parameters:

1. number of characters
   possible values: $00 through $08
2. character definitions; each character definition takes 9 bytes: the first byte gives the ASCII code of the character defined, while the remaining 8 form the character as defined in Appendix G of the Standard Device Drivers Manual.

Applications:

This call should be used instead of Call 16 when you are only changing a few characters, since it is faster and takes less memory than loading a complete character set.

There are a few more calls which perform some other functions such as handling keyboard interrupts, reading the character on the screen at the cursor position, and finding out where the cursor is located. Most of these can be figured out by reading the Standard Device Drivers Manual documentation on the **.CONSOLE** after reading this article, while others (the keyboard interrupt handlers in particular) are complex enough to require a lot more discussion another time (let me know if you're interested).

Right now, I'll present the SOS call format for the D__STATUS and D__CONTROL calls (see previous issues of Apple Orchard for details).

D__STATUS
SOS Call number $82

Parameters:

1. $03 (1-byte value)
   Indicates number of parameters
2. Devnum (1-byte value)
   The device's number, obtained with GET__DEV__NUM (see below)
3. Reqnum (1-byte value)
   Status request number (given in this article)
4. Status list (2-byte pointer)
   Points to the parameters for the call. Different parameters are defined for each call (see appropriate call documentation above).

D__CONTROL
SOS Call number $83

Parameters:

1. $03 (1-byte value)
   Indicates number of parameters
2. Devnum (1-byte value)
   The device's number, obtained with GET__DEV__NUM (see below)
3. Reqnum (1-byte value)
   Control request number (given in this article)
4. Control list (2-byte pointer)
   Points to the parameters for the call. Different parameters are defined for each call (see appropriate call documentation above).

GET__DEV__NUM
SOS Call number $84

Parameters:

1. $02 (1-byte value)
   Indicates number of parameters
2. Devname (2-byte pointer)
   Pointer to the device name
3. Devnum (1-byte result)
   SOS returns the device number here

That's it! You now have everything you need (except practice) to use the power of the **.CONSOLE** driver. Remember that many of these modes and settings are not meant to be used with existing interpreters like Business BASIC and Pascal, and in fact these languages will sometimes change things back if you fool around, but there's no harm in trying! And, if you're about to write the Great American Word Processor, you'll find all this stuff very useful.

Remember that if there's a subject about the Apple /// that you'd like to see unlocked, write to

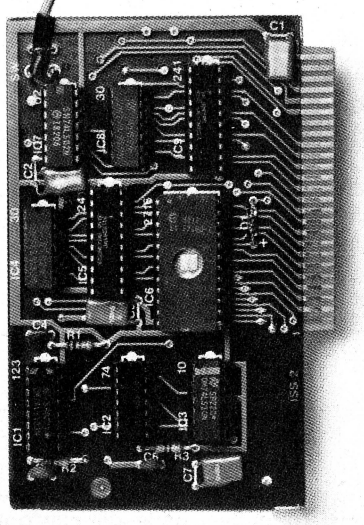
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The Technique of Animation

Part III

by William Harvey

If you typed in the source listings from the last issue you may have found yourself mixed up in a most unfortunate situation. Did the screen light up with a graphic display of inverse and flashing characters? Did the speaker come alive with a cacophonous tune of obnoxious beeps? Did the disk drive add musical accompaniment to the whole situation? If so, here is some comforting news: it wasn't your fault. The source listings were a little scrambled. Don't lose hope, though. All you have to do is type in the object listing instead. And with regard to the draw routines themselves, they are listed correctly in this issue. So with a little make-up work, you can be designing your first game after reading this last article in the series.

The objective is to draw and move a picture around the screen. Now that you have the new listings, you can do the drawing. With the editor, you can easily make pictures. But what about moving the pictures? What about erasing them? These are the subjects of animation.

First off, here's how to use those fancy draw routines and pictures. The first thing you have to do is make your picture. Then choose the appropriate draw routine, the one which draws shapes the same width as yours. Load both the shape and the draw routine into memory.

The draw routine does have to know how tall your shape is. Tell it how tall by POKEing into a certain memory location your shape's height. This location acts as a variable. The location is 774. The height is up to you. If your shape is twenty bytes high, type POKE 774,20.

Next, you have to tell the draw routine where to find your shape. You have to find the address of the correct *shift* of the shape. You have seven choices. To find out which of the seven, you have to find the remainder of the X-coordinate divided by seven. Think about this a minute; it really is logical. Finding the remainder is easier in Integer BASIC than in Applesoft. In Integer BASIC, just find X MOD 7. In Applesoft BASIC, find INT((X/7-INT(X/7))*7+.5). The number resulting, from zero to six, is the number of the shape whose address you should convey to the draw routine. You use the POKE command again, twice this time because an address takes two bytes. There are thus two variables or memory locations to fill, one for the high byte of the address and one for the low byte. It is difficult to figure out what values to POKE into what locations. If your address is in hexidecimal, then split the four digits of the address into two sets of two digits. Each of these two-digit numbers is a byte of the address. The one containing the digits on the left is the high byte. The one containing the digits on the right is the low byte. Convert the two numbers to decimal and POKE them into 250 and 251. Make sure you POKE the high one in 251 and the low one in 250. If your address is in decimal, then just type POKE 250, address MOD 256 and POKE 251, address/ 256.

Fine. Now the routine knows where it can find the shape and it knows how tall the shape is. You still have not told the routine where to put the shape. Doing that involves two more POKEs. First, tell the routine the Y-coordinate of the shape, or how far down the shape should be. The Y-coordinate can be any number from zero to 191. Type POKE 771,y. The X coordinate, remember, should be in bytes, not dots; it is a number from 0 to 39, not from 0 to 279. To tell the routine the X-coordinate, type POKE 770, x/7, where x is a number up to 279.

The last variable to set is the page counter. It tells the routine whether to draw the shape on Page One of Hi-Res graphics or Page Two. This location, 769, should be set to either zero ($0) for Page One or thirty-two ($20) for Page Two. To set the variable, type POKE 761,0 or POKE 769,32.

So far, you have set quite a few variables and yet have not seen any results. Here they come. Clear the screens by typing HGR and then HGR2. Load the correct machine language draw routine or type it in. Set the page variable to page two and then type CALL (start address of draw routine). Whammo, it's there (isn't it?). If it is not there, make sure you typed all the variables correctly and give it another try.

Erasing the shape is a different matter. Some types of animation do not require an erasing step because the shapes are erased as they are redrawn. Others do. For those that do, two options are available. One is to simply use the same draw routine and draw a black shape. The other is to make a specialized draw routine, or erase routine, that does not read a shape from memory, but always transfers zeros. The latter is a bit faster and a little bit more memory efficient. Erase routines for the four sizes of shapes are supplied.

Putting it Onto the Screen

You recall that there are several ways to transfer a shape onto the screen. The most basic way is to simply store it in the appropriate memory. But this is not always the most practical. What if, for instance, there were a background that you did not want to destroy? Transferring the shape directly onto the screen would leave a black square around it. On the other hand, erasing the shape would destroy it anyhow. Or would it? The truth is, there are just about as many ways to draw a shape onto the screen as there are different needs to do so. But basically there are only three different transferring operations. These are OR, XOR, and STORE.

Most of the draw routines provided use the STORE operation. This provides the easiest way of erasing shapes as you go along, but moving and erasing shapes is discussed later. There really is not much to storing a shape onto the Hi-Res screen.

Just remember that it does erase anything over which the square is drawn. Therefore, if you are drawing several shapes on the screen and one intersects the other, the one drawn last will put black corners on the one drawn first. How can one get around this? Page flipping. Read on.

ORing a shape onto the screen has the effect of superimposing the shape and the background onto which it is drawn. "Background" does not mean only mountains and such, but previously drawn shapes as well. Look at the OR operation from a Boolean point of view. You're dealing with two bytes of memory at a time, one for background and one for the shape to be drawn. For example, say that the background byte is dit-dit-dah (?) . . . in Morse Code (Oh). Call this byte " D ". In decimal, the number is eighty-seven; in binary, it is %01010111; and in hexadecimal, $57. Call the byte of the shape to be drawn byte " R ". It is a decimal 93, a binary %01011101, and a hexadecimal $5D. The OR operation compares the bits of the two binary numbers place by place, aligning the bits of the ones place, the twos place, etc. In each place, if there are zeros in both bytes, the result is zero. If there are two ones, the result is one. And if there are one one and one zero, the result is one. In the example of byte " D " and byte " R ", the result is byte " A " (dit-daaaah). And the actual bit pattern is %01011111.

You still have to use the store command, even with ORing. The OR does not store the result in the target memory address. It keeps it in the accumulator. (The accumulator is a scratch-pad variable in machine language.) The draw routine must have a STORE operation in order to put the result back on the screen. This method is a little bit slower than just storing, because of the extra step. A pittance? Maybe, but every little bit (pun?) helps.

The last of the three operations is XOR. This is short for Exclusive OR. To go back to the original example, byte " R " and byte " D " get XORed. The resulting byte " I " contains the bit pattern %00001010. Another look at it Boolean-wise. The original two bytes are compared by places such that only a one and a zero in any order produce a one. Any other combination such as two zeros or two ones produces a zero. This does an interesting thing with shapes and backgrounds. Wherever a shape is drawn over black, the result is shape. However, when the shape is drawn over background (i.e., the places where it intersects with another shape) the result is black. Therefore if you were to draw the shape once, the parts of it overlapping another shape or background would appear black and the other parts white or colored. On the other hand, if you were to draw the shape again in the same position, it would disappear and the background would reappear, leaving everything the same as it was before you drew the first shape.

You can do many interesting things using the three operations in combination. But this is animation, not just drawing. So move quickly through the section on color and go on to the next. Learn how to put the shapes, the draw routines, the POKEs, and all the work together to produce real moving animation.

A 280-Color Resolution?

Yes, you *can* get 280 resolution in full color. The books will all say that this is technically impossible. Indeed, it is to a certain extent. But there is a trick to drawing large color shapes that makes them look much more contained and less blurry, and through this trick you get the super resolution. The trick is to make a white line around the periphery of the shape. A full color shape has dots in only every other position, horizontally. If it were solidly dots it would turn out white. In order to get the white edge around the shape, you simply have to make sure that on the edges there are always two dots adjacent to one another. Refer to the figure. Now you can draw the shape on all horizontal positions, not just on even or odd. But still the color will change. In order to get around this you must make a shape identical to the first as far as edges go, but in the middle, having dots in the other every-other positions (see figure). Whenever you draw a shape in an odd horizontal position, you draw one of the shapes and whenever you draw the shape in an even position, you draw the other. Again refer to the figure. It is not at all difficult to include in your program a small check that will draw one shape if the position is odd and another if the position is even. Also, this gives rise to another color of your shape. To get the other color, simply reverse the correspondence between the shapes and the horizontal position. In short, the 280 color resolution is really pseudo-resolution. No rules have been broken nor books contradicted. This is simply another fancy method by which graphics can be made smoother with little expansion of program code or complication.

There is a way of getting the remaining two colors of shapes without having to even make another picture. This method deals with the MSB, or color bit. You have to make your original two shapes with the MSBs off. Then you have a variable called the color variable which either adds the high bit or does not add the high bit according to which color shape you want. Actually, during the draw routine, this variable itself is added to each byte of the shape, so if you want the high bits on, set the high of the variable by making the variable 128 in decimal and $80 in hexadecimal. If you want the high bits off, set the variable to 0. The variable is 775 ($307) in the provided routines. In this way, the color variable, 775, is very similar in method to the page variable, 769 ($301). Together, the page and color variables allow you to draw a shape on any page in any color. The last step is to move that colored shape across the screen.

Moving On

There are many ways to move a shape across the screen. They are all different in their results. But they all use those three basic operations, OR, STORE, XOR.

The object is to move the shape across the screen as fast as possible without having it flicker, and without making other things over which it passes flicker. If you have no background, then you obviously do not have to worry about background flicker and can use a simpler method of animation. On the other hand, if you have many shapes that might intersect, you may have to use a more complicated method of animation.

First, let's examine the easy method. This is automatically erasing shapes. Remember the black square around the shape? The idea behind auto-erase shapes is to make the square larger than the shape in all dimensions so that when you store it onto the screen in a slightly different position than you did last, you draw the new shape and at the same time erase the old shape with the encompassing black square. Just how much larger the square has to be than the shape depends on how many spaces the shape is to skip when it is redrawn. Horizontally, it will skip somewhat less than seven if it is at all smooth, so you only have to make the square one byte larger on each side, plus the one for the extra shifts. Vertically, adding three bytes on the top and three bytes on the bottom will usually suffice. But if your animation has the shape skipping by more than three spaces at a time, you have to enlarge the square.

Another type of animation uses both of the Hi-Res pages, One and Two. It's called page flipping. This method is extremely smooth, but a bit complicated in programming and slow. Consequently, not too many arcade games use it. But

some have to use it. What makes these games different from all the rest of the programs? Large intersecting shapes. Using auto-erase shapes would leave unsightly corners in the shapes when they intersect.

Page flipping is unique in that the viewer or player of the game can never see a shape being erased or redrawn because while he is looking at one page, the erasing and drawing is being done on the other. Then the program flips pages on him so that he is looking at the most recently drawn page. Again the computer begins work behind the player's back, drawing on the screen that it just flipped away from him.

Page flipping is a bit more complicated than that, however, because erasing cannot be done the auto-erase way. This is because when you erase a shape, you are actually erasing it two steps back. That means that to use auto-erase you would have to enlarge the square around the shape twice as much as normal. Furthermore, using auto-erase would defeat the original purpose by erasing the background anyway. Instead, you OR it onto the screen for drawing and store zeros for erasing. Look at the example. Whenever you erase a shape, you are not erasing the most recently drawn one. That one is on the other screen getting viewed by the viewer. The one you have to erase is the one drawn even before that, which means that you have to retain those old coordinates in order to know where to erase.

The easiest method of constantly retaining and updating the old coordinates of a shape is to use more than one variable for the X and Y coordinates. Instead of just having BALLX AND BALLY for the coordinates of a ball, for instance, you have BALLX, BALLXOLD, BALLY, and BALLYOLD. In each program cycle, you first erase the shapes (on the screen that the player is not seeing) according to the OLD variables. You then transfer all the new variables to old variables. (An analogous BASIC command is BALLXOLD= BALLX.) Then update the NEW variables and draw (OR) the shapes by those new variables on the same screen, invisible to the user. The last step is to flip screens on the viewer, displaying the changes in position. Page flipping in this fashion erases any background that is not constantly being redrawn. In short, it's a way of ORing a shape onto the screen without ever letting the player see the erasing of the shape.

In addition to page flipping, there is another way of preserving background scenes. This method, however, preserves the stationary kind: the trees, mountains, the space stations, etc. While page flipping does not preserve the non-moving background, this method does not preserve the moving background. Also, the background that it preserves is not turned black as with XOR. Instead, by using Page One and Page Two, both containing the background, you can use one as the template and the other as the target. To draw a shape, first OR it with the template screen and then store it onto the target screen. What about erasing? With this technique, you have to make sure that drawing the shape will erase the shape in its previous position. In other words, make the square larger in all dimensions than the shape.

There are even more combinations of OR, XOR, and STORE which produce usable results. You can even AND (another logical bit comparison; the result is only one when both bits are one) shapes onto template background screen and then transfer them onto the target screen, producing shapes only where they intersect the backgrounds. Or you could OR just the high bits to make things change colors as they move. The possibilities are unlimited. With all of the different ways to draw shapes onto the screen, you may even find yourself making a game . . . Based on a technique.

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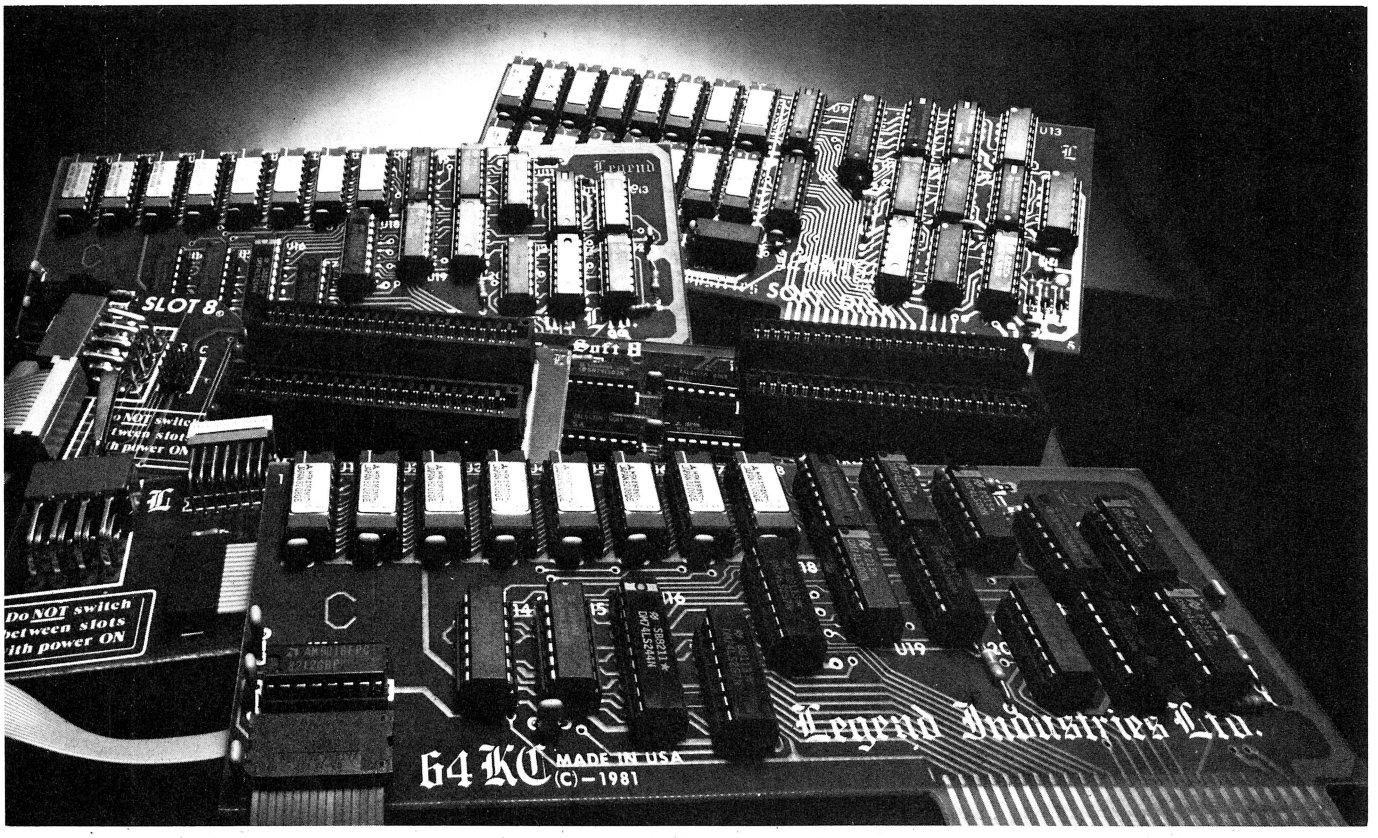
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```
!L
    1 ; DRAW ROUTINES
    2 ; "SIMPLE AND QUICK"
    3 ; OBJECT LISTINGS IN
    4 ; LAST ISSUE OF THE
    5 ; APPLE ORCHARD. THIS
    6 ; FILE WAS CREATED ON
    7 ; LISA 2.2 ASSEMBLER.
    8             ORG  $6000
    9             OBJ  $800
   10             OBJ  $800
   11 SHPLO       EPZ  $FA
   12 SHPHI       EPZ  $FB
   13 TRGLO       EPZ  $FC
   14 TRGHI       EPZ  $FD
   15 CNTR1       EQU  $300
   16 PAGE        EQU  $301
   17 XCO         EQU  $302
   18 YCO         EQU  $303
   19 XTEMP       EQU  $304
   20 YTEMP       EQU  $305
   21 HEIGHT      EQU  $306
   22 COLOR       EQU  $307
   23 YAXHI       HEX  2024282C3034383C
   24             HEX  2024282C3034383C
   25             HEX  2125292D31353935D
   26             HEX  2125292D31353935D
   27             HEX  22262A2E32363A3E
   28             HEX  22262A2E32363A3E
   29             HEX  23272B2F33373B3F
   30             HEX  23272B2F33373B3F
   31             HEX  2024282C3034383C
   32             HEX  2024282C3034383C
   33             HEX  2125292D31353935D
   34             HEX  2125292D31353935D
   35             HEX  22262A2E32363A3E
   36             HEX  22262A2E32363A3E
   37             HEX  23272B2F33373B3F
   38             HEX  23272B2F33373B3F
   39             HEX  2024282C3034383C
   40             HEX  2024282C3034383C
   41             HEX  2125292D31353935D
   42             HEX  2125292D31353935D
   43             HEX  22262A2E32363A3E
   44             HEX  22262A2E32363A3E
   45             HEX  23272B2F33373B3F
   46             HEX  23272B2F33373B3F
   47             HEX  2024282C3034383C
   48             HEX  2024282C3034383C
   49             HEX  2125292D31353935D
   50             HEX  2125292D31353935D
   51             HEX  22262A2E32363A3E
   52             HEX  22262A2E32363A3E
   53             HEX  23272B2F33373B3F
   54             HEX  23272B2F33373B3F
   55 YAXLO       HEX  0000000000000000
   56             HEX  8080808080808080
   57             HEX  0000000000000000
   58             HEX  8080808080808080
   59             HEX  0000000000000000
   60             HEX  8080808080808080
   61             HEX  0000000000000000
   62             HEX  8080808080808080
   63             HEX  2828282828282828
   64             HEX  A8A8A8A8A8A8A8A8
   65             HEX  2828282828282828
   66             HEX  A8A8A8A8A8A8A8A8
   67             HEX  2828282828282828
   68             HEX  A8A8A8A8A8A8A8A8
   69             HEX  2828282828282828
   70             HEX  A8A8A8A8A8A8A8A8
   71             HEX  5050505050505050
   72             HEX  D0D0D0D0D0D0D0D0
   73             HEX  5050505050505050
   74             HEX  D0D0D0D0D0D0D0D0
   75             HEX  5050505050505050
   76             HEX  D0D0D0D0D0D0D0D0
   77             HEX  5050505050505050
   78             HEX  D0D0D0D0D0D0D0D0
   79 ;TWO BYTE DRAW
   80 DRAW2B      STX  XTEMP
   81             STY  YTEMP
   82             LDA  YCO
   83             TAX
   84             CLC
   85             ADC  HEIGHT
   86             STA  CNTR1
   87 D2B         LDY  #$00
   88             LDA  YAXLO,X
   89             CLC
   90             ADC  XCO
   91             STA  TRGLO
   92             LDA  YAXHI,X
   93             ADC  PAGE
   94             STA  TRGHI
   95             LDA  (SHPLO),Y
```

```
 96             STA  (TRGLO),Y
 97             INY
 98             LDA  (SHPLO),Y
 99             STA  (TRGLO),Y
100             CLC
101             LDA  SHPLO
102             ADC  #$02
103             STA  SHPLO
104             LDA  SHPHI
105             ADC  #$00
106             STA  SHPHI
107             INX
108             CPX  CNTR1
109             BNE  D2B
110             LDA  XTEMP
111             LDY  YTEMP
112             RTS
113 ;THREE BYTE DRAW
114 DRAW3B      STX  XTEMP
115             STY  YTEMP
116             LDA  YCO
117             TAX
118             CLC
119             ADC  HEIGHT
120             STA  CNTR1
121 D3B         LDY  #$00
122             LDA  YAXLO,X
123             CLC
124             ADC  XCO
125             STA  TRGLO
126             LDA  YAXHI,X
127             ADC  PAGE
128             STA  TRGHI
129             LDA  (SHPLO),Y
130             STA  (TRGLO),Y
131             INY
132             LDA  (SHPLO),Y
133             STA  (TRGLO),Y
134             INY
135             LDA  (SHPLO),Y
136             STA  (TRGLO),Y
137             CLC
138             LDA  SHPLO
139             ADC  #$03
140             STA  SHPLO
141             LDA  SHPHI
142             ADC  #$00
143             STA  SHPHI
144             INX
145             CPX  CNTR1
146             BNE  D3B
147             LDA  XTEMP
148             LDY  YTEMP
149             RTS
150 ;FOUR BYTE DRAW
151 DRAW4B      STX  XTEMP
152             STY  YTEMP
153             LDA  YCO
154             TAX
155             CLC
156             ADC  HEIGHT
157             STA  CNTR1
158 D4B         LDY  #$00
159             LDA  YAXLO,X
160             CLC
161             ADC  XCO
162             STA  TRGLO
163             LDA  YAXHI,X
164             ADC  PAGE
165             STA  TRGHI
166             LDA  (SHPLO),Y
167             STA  (TRGLO),Y
168             INY
169             LDA  (SHPLO),Y
170             STA  (TRGLO),Y
171             INY
172             LDA  (SHPLO),Y
173             STA  (TRGLO),Y
174             INY
175             LDA  (SHPLO),Y
176             STA  (TRGLO),Y
177             CLC
178             LDA  SHPLO
179             ADC  #$04
180             STA  SHPLO
181             LDA  SHPHI
182             ADC  #$00
183             STA  SHPHI
184             INX
185             CPX  CNTR1
186             BNE  D4B
187             LDA  XTEMP
188             LDY  YTEMP
189             RTS
190 ;FIVE BYTE DRAW
191 DRAW5B      STX  XTEMP
192             STY  YTEMP
193             LDA  YCO
194             TAX
195             CLC
196             ADC  HEIGHT
197             STA  CNTR1
198 D5B         LDY  #$00
199             LDA  YAXLO,X
200             CLC
201             ADC  XCO
202             STA  TRGLO
203             LDA  YAXHI,X
204             ADC  PAGE
205             STA  TRGHI
206             LDA  (SHPLO),Y
207             STA  (TRGLO),Y
208             INY
209             LDA  (SHPLO),Y
210             STA  (TRGLO),Y
211             INY
212             LDA  (SHPLO),Y
213             STA  (TRGLO),Y
```

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```
214             INY
215             LDA (SHPLO),Y
216             STA (TRGLO),Y
217             INY
218             LDA (SHPLO),Y
219             STA (TRGLO),Y
220             CLC
221             LDA SHPLO
222             ADC #$05
223             STA SHPLO
224             LDA SHPHI
225             ADC #$00
226             STA SHPHI
227             INX
228             CPX CNTR1
229             BNE D5B
230             LDA XTEMP
231             LDY YTEMP
232             RTS
233 ;TWO BYTE ERASE
234 ERASE2B     STX XTEMP
235             STY YTEMP
236             LDA YCO
237             TAX
238             CLC
239             ADC HEIGHT
240             STA CNTR1
241 E2B         LDY #$00
242             LDA YAXLO,X
243             CLC
244             ADC XCO
245             STA TRGLO
246             LDA YAXHI,X
247             ADC PAGE
248             STA TRGHI
249             LDA #$00
250             STA (TRGLO),Y
251             INY
252             STA (TRGLO),Y
253             INX
254             CPX CNTR1
255             BNE E2B
256             LDA XTEMP
257             LDY YTEMP
258             RTS
259 ;TWO BYTE OR-DRAW
260 OR2B        STX XTEMP
261             STY YTEMP
262             LDA YCO
263             TAX
264             CLC
265             ADC HEIGHT
266             STA CNTR1
267 O2B         LDY #$00
268             LDA YAXLO,X
269             CLC
270             ADC XCO
271             STA TRGLO
272             LDA YAXHI,X
273             ADC PAGE
274             STA TRGHI
275             LDA (SHPLO),Y
276             ORA (TRGLO),Y
277             STA (TRGLO),Y
278             INY
279             LDA (SHPLO),Y
280             ORA (TRGLO),Y
281             STA (TRGLO),Y
282             CLC
283             LDA SHPLO
284             ADC #$02
285             STA SHPLO
286             LDA SHPHI
287             ADC #$00
288             STA SHPHI
289             INX
290             CPX CNTR1
291             BNE O2B
292             LDA XTEMP
293             LDY YTEMP
294             RTS
295 ;DRAW W/COLOR BIT
296 DRAWC       STX XTEMP
297             STY YTEMP
298             LDA YCO
299             TAX
300             CLC
301             ADC HEIGHT
302             STA CNTR1
303 DC2         LDY #$00
304             LDA YAXLO,X
305             CLC
306             ADC XCO
307             STA TRGLO
308             LDA YAXHI,X
309             ADC PAGE
310             STA TRGHI
311             LDA (SHPLO),Y
312             ADC COLOR
313             STA (TRGLO),Y
314             INY
315             LDA (SHPLO),Y
316             ADC COLOR
317             STA (TRGLO),Y
318             CLC
319             LDA SHPLO
320             ADC #$02
321             STA SHPLO
322             LDA SHPHI
323             ADC #$00
324             STA SHPHI
325             INX
326             CPX CNTR1
327             BNE DC2
328             LDA XTEMP
329             LDY YTEMP
330             RTS
331             END
```

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Interrupts and the //e

by Morgan P. Caffrey

An interrupt is an electrical signal generated by clock cards and some communications cards which temporarily stops the Central Processing Unit from doing what it is doing, executes some alternate code, and then resumes operation precisely where it was before the interrupt. The computer operator or program being interrupted isn't aware of the interruption.

The general body of folklore has it that the Apple II does not support interrupts. But the Apple II and //e come frustratingly close to being able to process interrupts; they just can't *quite* do so. Which is a shame because there is ample spare processing time to run printers, crunch numbers, or acquire data and still perform other normal tasks. This is called multi-tasking, a powerful increase in computer value to the user.

So why don't interrupts work? Because in the Apple II, II Plus or //e, the content of memory location $45 (decimal 69) is destroyed the instant the interrupt occurs. There is no way to avoid this condition with the present monitor code. The worst news is that the disk operating system DOS 3.3, the monitor save-registers and Steve Wozniak's Sweet-16 routines all use this location. Many other programs may use it. If location $45 holds any important data, an interrupt can cause serious loss of program control or worse, loss of data in memory or on diskette.

The chief problem was always DOS 3.3. When DOS makes a hex-to-dec conversion it keeps a temporary result in $45. If the information is there when an interrupt goes off, and the operation is a WRITE, the information goes out to an unpredictable sector. The more you are using your disk drive, the more likely it is to occur.

The solution described below allows interrupts to be processed with no danger to datafiles. It can be easily implemented on the language in RAM, but whenever the motherboard ROM is selected problem crops up again. I hoped that APPLE would resolve the problem. When I found that the Monitor code had been altered in the //e to solve 80-column problems, I hoped even more the interrupt handler would be included. It wasn't. If you are interested, read further.

The fault isn't fatal if you never try to use interrupts. I, however, have been working on using interrupts in the Apple for several years. The heartbreaker is that the change that could have been made in the ROM has been published several times. Apple has issued one license to sell an altered F8 ROM with the change, to be provided with one piece of software.

The change which solves the interrupt problem simply forces those programmers writing interrupt-processing code to include code to differentiate between a software *break* and a hardware *interrupt*.

Another rather complicated solution is possible with the //e due to a forward looking hardware design decision. The chip which contains the offending code may be replaced with an 8K EPROM (Eraseable Programmable Read Only Memory). Thus all a vendor has to do is buy and program and, I suppose, get a license to resell the interrupt-processing code. After issuing the first license, however, Apple refused others who approached them on the same subject.

A simple twelve byte change in the monitor solves the problem. Here's the original and changed code:

II, II+, //e CODE	Improved Version
FA40- STA $45	FA40- JMP ($03FE) (BREAK or INTERRUPT)
FA42-PHA	FA43- STA $45 ($03FE points here)
FA43- PLA	FA44- PHA
FA44- ASL	FA45- PLA
FA45- ASL	FA46- ASL
FA46- ASL	FA47- ASL
FA47- BMI $FA4C	FA48- ASL
FA49- JMP ($03FE)	FA49- BPL $FA5F (Unprocessed INTERRUPT to $FF65)

» Here the formal code resumes «

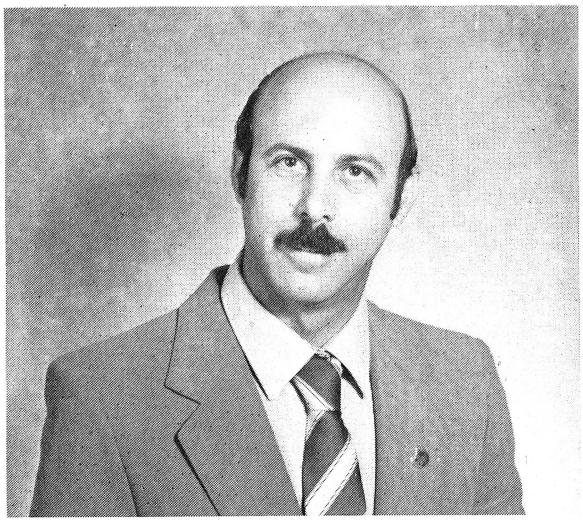
FA4C- PDP (Process BREAK) FA4C- PLP (Process BREAK)

The only change is that code at $FA49 is moved to $FA40, and everything else moves down three bytes. The interrupt program is responsible for differentiating between BREAK and INTERRUPT and returns to this code at $FA43 for BREAKS. It is a trivial problem with published information to change DOS so that it sets the vector at $03FE to point to $FA43. In a year, no problems have been reported with this solution.

So much for how the change could have been made. It wasn't made. In spite of the dangers of using interrupts with this problem, the //e documentation indicates that that interrupts are viable and safe. Since the effect of a well (or badly) timed interrupt can be to destroy a diskette's contents, this is not just a trivial problem. Hobbyists and professional developers alike are left to stumble into a destructive situation, or place the code change described above into an EPROM and change DOS 3.3 accordingly.

From the IAC Office...

Ken Silverman, Executive Director



One full year has now passed since the IAC opened its office in Santa Clara. In that period of time a great deal has been accomplished but still much more is planned to serve and help you, the Apple User.

We would like to thank all of those volunteer individuals who made it happen but especially a few who went beyond the norm.

First, but not neccessarily in the order of contributions or importance, Dr. Charles Smith from Apple-Can who took over the task of Software Chairman. He has presented us with our most recent DOM's which include a variety of useful software for all. The task of looking over and obtaining software from many sources is a time consuming job. Dr. Smith took over this effort from the IAC's first software chairman, Neil Lipson, who has in turn taken on the task as one of the contrubuting authors to the "Apple Orchard".

Major Terry Taylor, IAC Librarian, who maintains the vast library of public domain software (somewhere around 900 disks - both sides), catalogs, and distributes the same. He is also responsible for the hard copy library of newsletters and magazines. We are at a loss to figure where he finds the time.

Ransom Fields for the time he takes to provide answers to those who wish to start a club. He has even had calls from non-Apple people who need help. Ransom has also given his time to write articles on developing club growth.

Harlan Felt who organizes the IAC efforts at our annual meeting, and helps in the IAC appearance at computer faires around the United States. I understand that this year will be better than last.

Louis Milrad, the IAC's Vice President in charge of SIGs. The amount of time required to organize such vast and divergent groups is overwhelming. Lou now has a handle on how the SIGs should operate in order for IAC member clubs to get the most out of them.

Those directors and officers who also contribute articles to this publication, Barry Bayer, Dave Alpert, Joe Budge, Bernie Urban and James Hassler.

To all the rest that took their own time to help the IAC grow and their contributions in helping the end Apple User — the IAC Thanks You.

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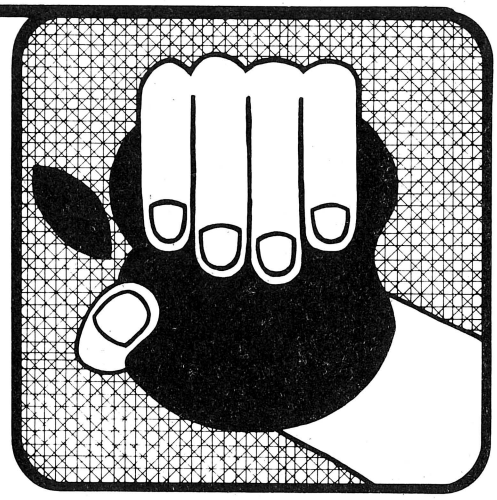
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Forbidden Fruit



NEW PRODUCTS FOR THE APPLE

Edited by
Mark L. Crosby

Producers of products for the Apple line of computers should send news releases two months in advance to:

NEW PRODUCTS EDITOR
Apple Orchard
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The IAC cannot be held responsible for claims made by manufacturers.

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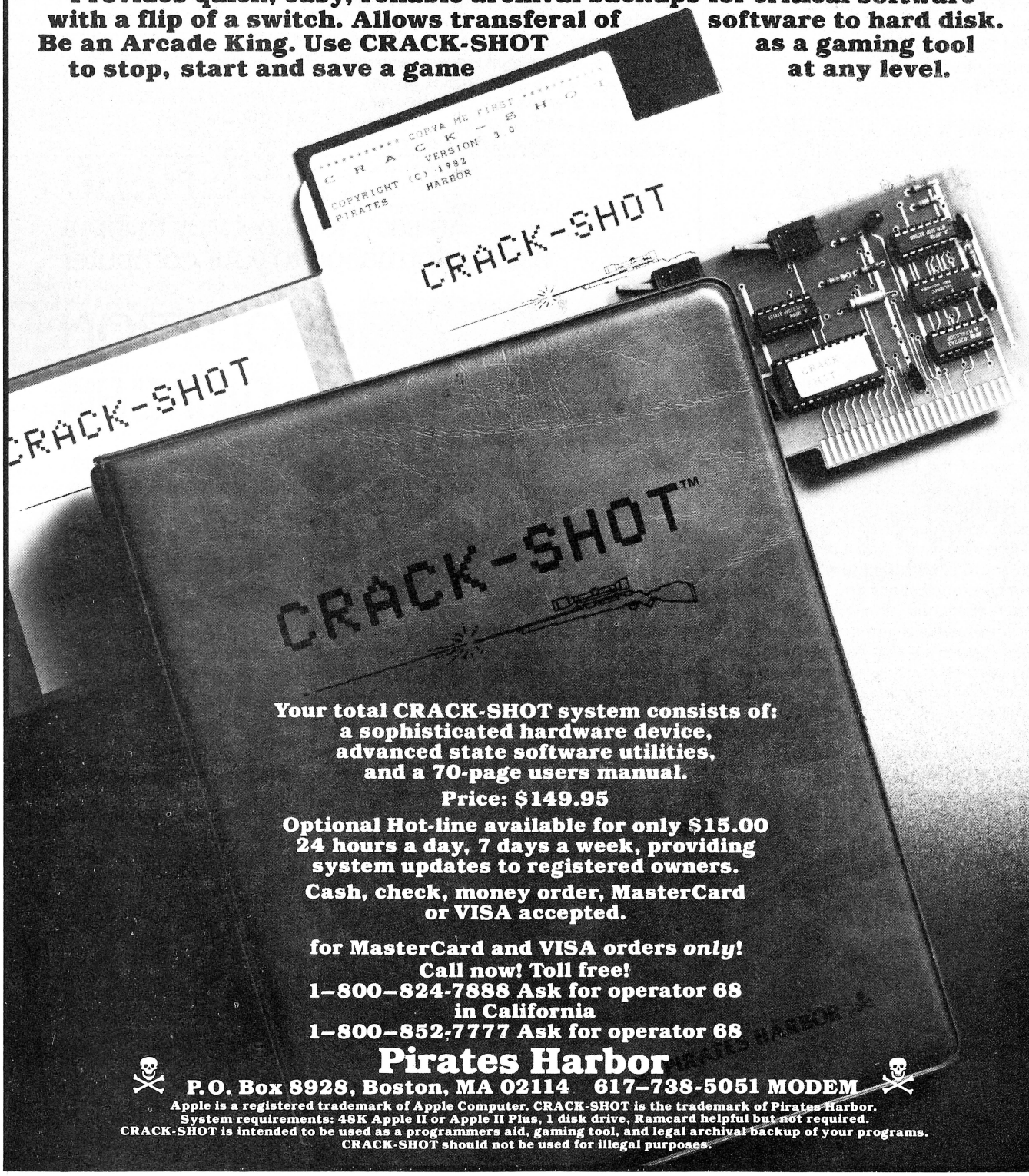
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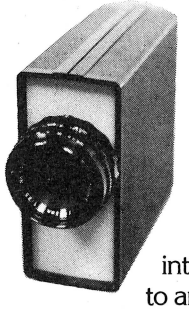
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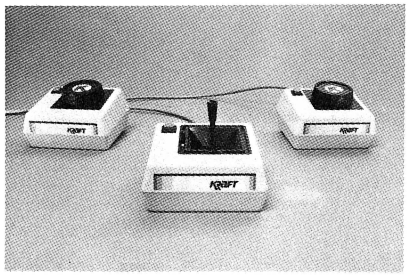
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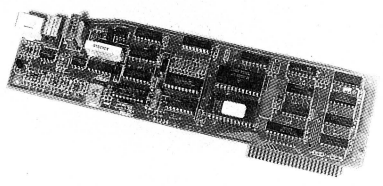
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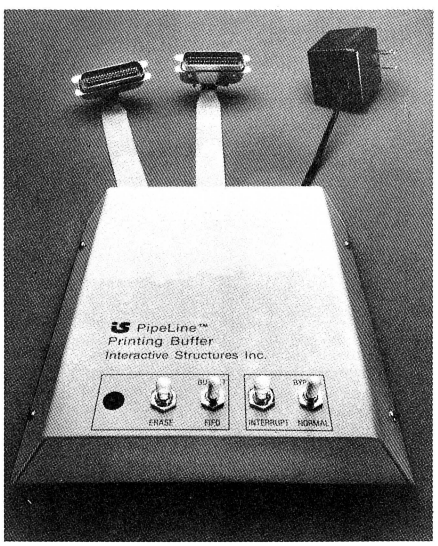


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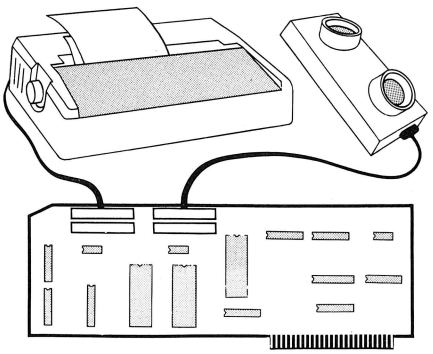


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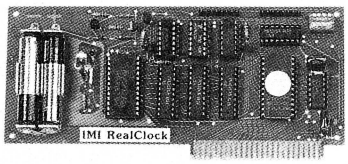
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SAT

SCORE HIGHER ON THE SAT USING THIS 5 1/4 INCH DISKETTE ON THE APPLE COMPUTER. DRILLS ON ANALOGY, READING, GRAMMAR, STANDARD WRITTEN ENGLISH, ANTONYMS, MATH I, MATH II, MATH III, AND MORE. GIVES EXPLANATIONS AND HINTS FOR RIGHT AND WRONG ANSWERS. A COMPUTER TESTING CONSULTANT FROM A LARGE PUBLIC SCHOOL SYSTEM STATES 'WE HAVE REVIEWED 5 OTHER SAT DISKETTES AND THIS ONE IS FAR SUPERIOR THAN THE OTHERS AT LESS THAN ONE HALF THE PRICE.'
SAT.....$33.95
ALSO AVAILIBLE :
HIGH SCHOOL ENTRANCE EXAMS..$25.00
IMMEDIATE DELIVERY
FINER PROGRAMMING SERVICE
7310 PARKDALE AVENUE
CINCINNATI, OHIO 45237
(513) 761-0380
MASTER CARD OR VISA

shows methods of reading and writing to the clock plus a demonstration of using interrupts to create a topline time/date display on the screen while running other programs. $190.00 plus $5.00 shipping from:
Innovative Measurements Inc.
P.O. Box 3879
San Clemente, CA 92672
(714) 493-2174



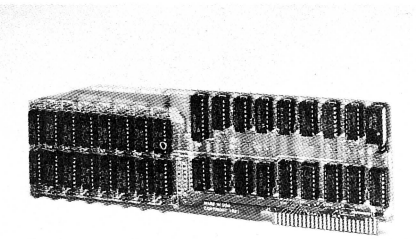
Cavridex is a hardware/software package that provides an electronic method for cataloging and retrieving videotaped and text material, using an Apple computer. Text information is stored in the computer and corresponding audiovisuals on videotape. Users carry out a computer search to retrieve desired text and/or video material by typing in descriptive keywords. Cavridex finds and displays the text and video that matches the keywords, and/or prints it out. Cavridex is made up of a printed circuit board and machine language programs paired with Visidex by Personal Software. It requires a 64K Apple. Perfect for customer or employee training, real estate agencies (for display of properties), sales departments, museums, etc. $995.00 plus $600.00 for the Cavri interface board.
Cavri Systems
26 Trumbull Street
New Haven, CT 06511
(203) 562-4979

Spool/64, the 64K hardware print spooler from Apparat has been reduced in price to $319.00. Buffers up to 64,000 characters saving as much as 25 minutes of computer and operator time each time a long listing is printed. Available with a standard parallel or optional serial RS232 interface, plugs easily into both computer and printer. Write or call for a free brochure.
Apparat, Inc.
4401 S. Tamarac Parkway
Denver, CO 80237
(303) 741-1778.



Memory

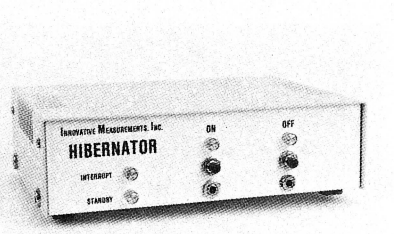
Ramplus card expands the memory of Apple II computers to 80,000 characters from the standard 48,000 available with the machine. The package also includes a diskette which serves as a language expander, providing the user with both Integer and Applesoft BASIC capability. A VisiCalc Expander diskette can expand the memory available for VisiCalc calculations up to 145,000 bytes, tripling the memory size of the Standard Apple II in VisiCalc applications. When used alone, the Ramplus card gives users an extra 32,000 bytes of memory to run larger applications programs than possible with a standard Apple II. Up to four cards can be used to increase total memory to 170,000 bytes. The card is easy to install as there is no need to remove existing chips, and its low power drain prevents heating problems. Ramplus is $219.00 and the VisiCalc Expander is $100.00. At your local dealer or contact:
Mountain Computer, Inc.
300 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6650



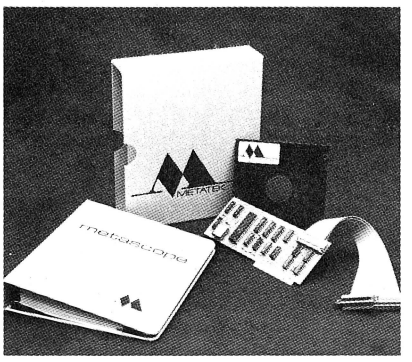
Miscellaneous

Sixth Finger is an automatic repeat "key" for your Apple II. Adapts your Apple so that all keys held down will repeat after the perfect delay. It's great for program editing, word processing and VisiCalc. It's easy for anyone to install. Plugs onto the Apple's encoder board (all Rev. 7 or later and late Rev. 6 with encoder board). 30-day trial. $9.95 plus $1 shipping and handling.
Ivers Specialties
12841 Hawthorne Blvd. Box 524
Hawthorne, CA 90250.

The **IMI Hibernator** is a self-contained AC Line Power Switch which may be operated in several ways, from multiple sources. Controlled by the IMI RealClock (with the Apple power turned off), the Hibernator is turned on, causing the Apple to boot up at the program controlled times. This results in the power being on for only minutes each day and can prevent overheating problems or conserve energy. Applications range from using a computer as an intelligent burglar/fire alarm (booting up at a switch closure to the Hibernator) to an Apple based industrial data logging system where readings are remotely taken twice per day. Three AC sockets are provided with transient suppression. On/Off power switching may be from the IMI RealCLock, remote TTL lines, remote switch contacts or manual front panel pushbuttons. $95.00 plus $5.00 shipping from:
Innovative Measurements Inc.
P.O. Box 3879
San Clemente, CA 92672
(714) 493-2174.



Metascope is a low cost data line monitor designed to operate on an Apple II personal computer. The monitor, from Metatek, consists of a printed circuit board, documentation, and all software necessary to turn an Apple II computer into a fully programmable data line monitor. The unit is capable of displaying and storing data in asynchronous, byte oriented synchronous, or bit oriented synchronous (SDLC, HDLC) modes at speeds to 19.2K bits per second. Features "trigger" pattern match, storage of data on diskette, and a programmable "host emulation" mode that allows the Apple II to act as a sophisticated communications controller capable of generating polling sequences with reply. Has a built-in capability to generate synchronous clock signals - $895.00. Distributed by:
Parity Products Crestview Drive
Minneapolis, MN 55331
(612) 938-4850



Bus Rider is a self diagnostic development tool that allows real time analysis of software and hardware in the Apple II computer. It provides monitoring and saving 512 cycles of the address and data bus, NMI,

IRQ, DMA, R/W and 4 external lines. Features pretrigger viewing of up to 512 samples; 4 external inputs with variable threshold reference. Display cycle by cycle execution of 6502 disassembled code. Comes complete with circuit card, reference manual, software diskette, and "easy hook" external input cable. $395 from:
R.C. Electronics Inc.
5386 Hollister Avenue, #D
Santa Barbara, CA 93111
(805) 968-6614.

Crack-Shot is a total copy system comprised of hardware and software modules. Provides quick, easy, reliable archival backups for critical software with a flip of a switch. Allows transferral of software to hard disk. Use Crack-Shot as a gaming tool to stop, start and save a game at any level. Includes a 70 page users manual, advanced state software utilities, and a hardware board. Optional Hot-Line available for only $15.00 24 hours a day, 7 days a week, providing system updates to registered owners.
Pirates Harbor
P.O. Box 8928
Boston, MA 02114 (617) 738-5051 (modem)

The **Model 460 Microprocessor Analyzer** is a self-powered, ready-to-use a provides a direct hexadecimal display of address data for debugging and microprocessor, or a plug-in board adapts for S-100 or standard bus. It has the capability to halt program execution at any selected address (breakpoint), with selective gating on memory reads, memory writes, I/O reads or I/O writes. It can be set for fullspeed program execution to the breakpoint, or for single-stepping through a program either manually or automatically at a selected speed. It can also step through a single instruction rather than through a full cycle. There is a choice of plug-in adaptor modules for the following microprocessors: 8080, 8085, Z80, 6502, 6800, 6809, 1802, SC/MP, S100 or standard bus.
Chemical Data Systems, Inc.,
Industrial Products Division
7000 Limestone Road
Oxford, PA 19363
(215) 932-3636

Wildcard is a hardware copying device featuring push button operation. Copies all memory resident software, 48K or 64K. Does not require any parameters. It can be simply installed in any slot and is undetectable by software. It will produce an autobooting disc in 2 minutes. Your copies become accessible for alterations. Utility software is included.
East Side Software Company
344 East 63rd Street, Suite 14-A
New York, NY 10021
(212) 355-2860.

The **RB5X** is the first manufactured **intelligent robot** for the horne experimenter. The RB5X learns from its experience. With its own microprocessor, memory, programs and tactile sensors, the robot detects and responds to objects in its path. Once a succesful random response is achieved, the RB5X remembers its actions and repeats the correct response when confronted again with the same situation. Designed for technically oriented consumers, the features of the robot support experimentation in the field of robotics. Users may increase the "experience" and capability of the robot by installing additional mechanical functions and additional sensors, such as Polaroid's Rangefinder sonar sensor. A standard RS-232 interface makes it compatible with the Apple, TRS-80, IBM-PC and other popular microcomputers to allow for program entry and data transfer. The robot automatically seeks out its battery charger when its batteries are low. The basic unit sells for $1,195.00. A special option package with additional memory, the Polaroid Rangefinder sonar sensor, and pulsating light option is available for $295.00. Future enhancements include a mechanical arm, a voice synthesizer, and digital radio communications between RB5Xs.
RB Robot Corporation
14618 West Sixth Avenue, Suite 201
Golden, CO 80401
(303) 279-5525.

The **Guardian Angel uninterruptable power source** will provide up to 6 minutes of standby power during power outages and brownouts. Gives you backup for your computer, monitor, printer, 5 1/4-inch floppy, and hard disk drive. Available in 115 or 220 volt, 50 or 60 Hz. Complete versatility - operate your system from a 12 volt DC source (automobile cigarette lighter, etc.). Automatic audio alarm warning tone during commercial power failure or interrupt. UL listed and FCC approved. Transient voltage suppressor gives added insurance from line voltage spikes. Green/red LED

TAX BREAK

TURNS YOUR APPLE© INTO A TAX CONSULTANT

PROFORMA SOFTWARE'S TAX BREAK '82 puts an end to your anxiety, confusion and apprehension associated with researching the new tax laws and preparing your 1982 personal income tax return. Written by an IRS Enrolled Agent with over 24 years of experience, TAX BREAK '82 is easy to use and quickly helps you to determine your lowest tax.

TAX BREAK '82 automatically examines the full spectrum of loopholes, benefits, deductions, all special income averages and limitations. It evaluates over 120 possible reporting options, searches for and finds the best tax path. TAX BREAK '82 then displays or prints an optimum tax return and provides you with a return analysis showing the minimum tax due and how your return compares with a typical taxpayer in your income range.



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Containing all the features of TAX BREAK '82, PROFORMA SOFTWARE's new TAX BREAK PLANNER takes you beyond this year's tax return and into a new dimension of multi-year "TAX PLANNING". Now you can easily model an investment program, and evaluate its impact on your current and future tax status. You can play "what if" simulations with real estate, stocks and bonds, annuities, interest rates, etc...and measure their impact on your potential tax liability. You can also get a printed copy of the optimized tax returns.

TAX BREAK '82 and TAX BREAK PLANNER turns your APPLE Computer into your personal tax consultant. Available at a tax deductible price of:

TAX BREAK (ANNUAL)..... $129.95
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TAX BREAK PLANNER (MULTI-YEAR)....$179.95
+ $2.00 shipping and handling & applicable sales tax.

Examine TAX BREAK '82 and TAX BREAK PLANNER at your local dealer today.

TAX BREAK '82 was previously distributed by DATAMOST under the name "TAX BEATER". PROFORMA SOFTWARE will provide TAX BEATER 1981 purchasers with a new TAX BREAK '82 update for only $49.95 or upgrade to TAX BREAK PLANNER for only $99.95.

PROFORMA SOFTWARE
2706 HARBOR BLVD. - SUITE 200
COSTA MESA, CALIFORNIA 92626
(714) 641-3846

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C.O.D. VISA

VisiCalc® Business Templates

Each template package includes a detailed user's manual with instructions and examples; and a variety of well designed, easy to use, VisiCalc templates.

Business Basics™ $76.00
Two disks full of the most commonly asked for, professionally formatted reports and analysis. Included are templates for Cash Flow, Break-Even, Product Sales, Sales Goals, Contracts Bidding, Checking Accounts, Inventory, Profit/Loss, Basic Budgeting, Operating Costs, Job/Task Planning, Project Analysis and others to assist the business manager in today's demanding business environment. Each is adaptable and copiable.

Business Budgeting™ $48.00
Eight well designed budgeting models for budget managers including: Business Budgeting Master, Advertising, Cost of Goods, Profit, Product, Operating Costs, Unit Budgeting, and Government Administration Budgeting templates. Each model is a stand alone template which will help you meet your budget analysis requirements.

Business Inventory™ $48.00
Harness the power of VisiCalc to keep track of your important inventory. Use these templates for periodic inventory, reorder points, turnover rate, and inventory values in various formats allowing you to choose the right one(s) for your business needs.

Business Bookeeper™ $48.00
Six interactive bookeeping templates designed as a mini-system for the small business. You will be provided with important specific and overall financial information regarding cash receipts, cash disbursements and banking reconciliations. Easy to use and more reasonable in price than other database oriented accounting packages, you can easily use VisiCalcs® powerful DIF (Data Interchange Format) commands for interactive Bookkeeping.

Business Reports™ $48.00
Advanced, easy-to-use report templates, formats, and analysis algorithms for significant decision information including modifiable models: (2) Profit/Loss, (2) Variations Analysis, (2) Group Comparator, (3) Goal Analysis, Tangible Assets, Inventory Value, Depreciation, and Business Offering Price Analysis.

AppoinTimeTemp™ $38.00
Maintain efficient appointment schedules, time records, and time analysis for you, managers, and executives. Analyze the time effectiveness of the tasks being performed in various organizational environments - individually or in groups.

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Twenty specific money market computations designed to compute discounts, yields, effective returns, tails, and other significant decision yielding information.

SAVE: Order Business Basics and any other 3 packages and pay only $175.00!

Specify system—Apple II or III (call or write for others). TERMS: Charge V/MC, COD or check. Add $3.00 postage/handling; MD residents add tax.

SPREADSOFT™
The Electronic Spreadsheet
Support People™
Post Office Box 192 Clinton, MD 20735
(301) 856-1180

power status indicator shows normal operation, 6 or 2 minutes remaining power. $595 from:
R&H Electronics, Inc.
5666 Irelan
Buellton, CA 93427
(805) 688-2047.

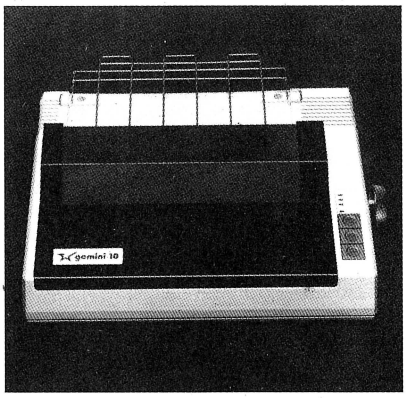
Replay is an Apple program copy system that makes disk formatting irrelevant. Copies total load programs in just 20 seconds. Restart in 10 seconds. A 60 page manual is included. It will pack and condense copied programs to BRUNnable DOS files. Replay is an interface card that plugs into any Apple slot. It does not copy a disk, rather it copies a program executing in memory. Game players can save a game at any level and quickly restart it with the replay card. The copied program does not need the replay card to execute. Two copied programs can be put on one DOS 3.3 disk which is all that is needed to run the program. Tutorials are given on multi-access disk analysis, copying and packing.
Texas Ranch and Shoreline Systems
5712 Manor Road, Box 20
Austin, TX 78723
(512) 926-4527.

Printers

The DTC 380Z Daisy Wheel printer has a 48K buffer for high speed throughput. Diablo 1640/1650/630 software compatible. Includes serial and parallel interfaces with automatic serial baud rates to 19.2K. Features 4 CPUs, no cables, belts, wheels or pulleys, automatic bi-directional printing, up to 32 CPS in typical applications. Interconnecting cables are available for major microcomputers. Also has automatic proportional spacing. Optional extras: forms tractor, single sheet feeder. $1,199 from:
DTC
590 Division Street
Campbell, CA 95008
(800) 962-8185 or in CA (800) 538-9294

The **Brother HR-1 daisy wheel printer** has opened up a new market in low cost, high performance printers. Assures letter-quality printing for all your most demanding business requirements, with a noise level comparable to a shower in a soft rain. Now available with tractor option which enables conversion to fanfold in seconds, and a dual warning system of sight and sound to signal 'paper out' and 'ribbon end'.
Dynax
333 South Hope Street Suite 2800
Los Angeles, CA 90071

The **Gemini series of printers** combines many high performance features found on various competitive models but not previously available in one printer. The Gemini-10 has a 10-inch carriage, while the Gemini-15 is equipped with a 15 1/2-inch carriage. Most notable features are a built-in 2.3K buffer (with an additional 4K optional), extra fast forms feed, 100% duty cycle, 100 cps, super/subscript, underlining, backspacing, double strike mode, emphasized print mode and optional proportional spacing. The print head life is more than 100 million characters and is user replaceable. The Gemini is also covered by a 180 day warranty.
Star Micronics, Inc.
1120 Empire Central Place
Dallas, TX 75247
(214) 631-8560.



SOFTWARE

BUSINESS (GENERAL)

Statpro is the most powerful statistics package on the Apple II and ///. The manual and programs have been rewritten for first time users. Now you can harness these powerful programs with minimal computer knowledge. It is a complete database system for statistical analysis of real numbers. Includes: non-parametric, descriptive, Q-Q normality testing, non-parametric comparisons, cross-tabulation/contingency analysis, linear & non-linear regression, statistical matrices, etc. Also includes Plotmod which produces colorful scatter plots, histograms, regression plots, etc. You can edit graphs and create your own character sets too. $600.00 from:
Blue Lakes Software
3240 University Avenue
Madison, WI 53705
(608) 233-2006

This **versatile records program** accepts up to 300 entries with name, address, affiliation, phone number, and two optional categories for sorting. It prints alphabetized lists sorted by category, and prints mailing labels up to 3-across arranged by ZIP code. Ideal for membership records, real estate listing, client lists, sales leads, school class records, and home cataloging projects. For the Apple II Plus with 48K, disk drive and printer. Very low cost. Send for free brochure.
Navic Corporation
P.O. Box 14727
North Palm Beach, FL 33408
(305) 627-4132

New Book

IT'S JUST GREAT

№ 1 IN THE SERIES

THE CUSTOM APPLE & Other Mysteries.

CREATE A WHOLE NEW WORLD OF POSSIBILITIES FOR YOU AND YOUR APPLE.

Dateline: California, January 1983.

J.R. Programmer, bit diddler and hardware hacker extraordinaire', wished that his APPLE computer had 6522 I/O capabilities available.

To have that one enhancement would open new vistas in data acquisition and display, complete his project, and make him millions.

"Gosh, wouldn't it be nifty?" exclaimed J.R.

But alas, the lack of appropriate hardware prevented him from accomplishing his goal.

J.R. looked everywhere in his local computer store for an interface or expansion board to solve his dilemma, but none were designed for the magnificent project he had in mind.

"Shucks . . ." he stormed, "what am I to do?"

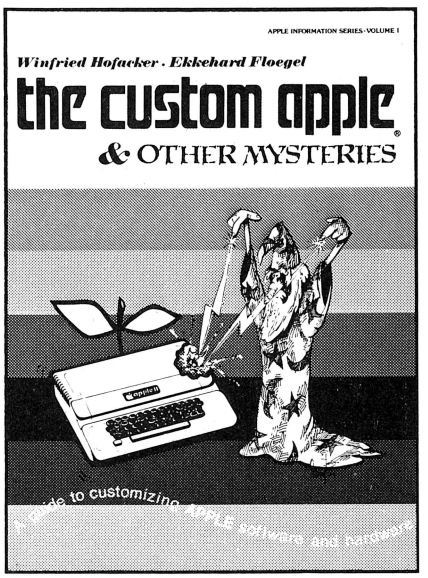
Poor J.R.

But then, just as he was about to give up all hope, a splash of color caught his eye over in the book section . . .

The Custom APPLE & Other Mysteries.

"Oh joy, Oh joy!" cried our hero. "This book gives me the information, specifications and references I need to do the hardware enhancements, whether I am a beginner or an expert, and provides me with the basic information required to write the software, common to many of the projects, myself. This book is just crammed with all kinds of neat stuff!"

J.R. left the store, also an IJG book dealer, a very happy man.



A Hardware and Software Modification Guide.

The Custom APPLE & Other Mysteries provided J.R. with a number of data acquisition and control projects with camera ready printed circuit layouts like the 6522 application interface board, an 8-Bit D/A and A/D converter, a sound and noise generator board, an EPROM burner board, an APPLE Slot Repeater, and included information on the APPLE as a square wave generator, the control of two stepper motors, connecting two 6502 systems, and lots lots more.

Plug-In To Power And Get Turned On!

The Custom APPLE & Other Mysteries is available for $24.95 at computer stores, B. Dalton Booksellers and independent book dealers around the world. If your dealer is out of stock, order direct from IJG.

Include $4.00 for shipping and handling. Foreign residents add $11.00 plus purchase price. U.S. funds only please.

IJG, Inc. 1953 West 11th Street
Upland, California 91786
Phone: 714/946-5805

Helping You Help Yourself.

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Bulk Mailer is a sophisticated mailing list program for an Apple II Computer. Designed to run with a Corvus Hard Disk (32,000 names) or single (1200 names) / dual (2400 names) Disk II system. Advanced features eliminate duplications and has the fastest possible sort. Allows coding capability with instant record access. Prints from one to four-up labels. Disk II version (can upgrade to hard disk version) $125.00. Corvus Hard Disk version $250.00.
Satori Software
5507 Woodlawn North
Seattle, WA 98103
(206) 633-1469

When you buy **Infortory**, you're buying the best inventory system. Many people learn the system in less than four hours. It has great flexibility and power. You design your own report with its unique reporting feature called Anyreport. This easy to learn feature will deliver customized reports within minutes.
SSR Corporation
1600 Lyell Avenue
Rochester, NY 14623
(716) 254-3200

Color Calendar can organize your busy days, whether it's birthdays, appointments, business meetings or a regular office schedule. The calendar display is a beautiful Hi-Res color graphics calendar of the selected month with each scheduled day highlighted in color. Using the daily schedule, you can review any day of the month and schedule an event or activity in any one of 20 time slots. Requires a 48K Apple II. $30.00 from:
Spectrum Software
690 W. Fremont Avenue
Sunnyvale, CA 94087
(408) 738-4387

File-Fax is claimed to be the easiest-to-learn DBMS available today. Quickly accesses records, retrieving information at high speeds. It has an eight-level sort, wide ranging search capability, and a powerful report generator. Use it for inventory control, customer files, mailing lists, purchase records, and more. Requires an Apple II or II Plus. Write for full details:
TMQ Software, Inc.
82 Fox Hill Drive
Buffalo Drive, IL 60090

Cdex Training for VisiCalc can make you a VisiCalc user. Or for the experienced VisiCalc user Cdex acts as an instantaneous electronic reference and review system. It's a computer-assisted training program that works. It's highly interactive, so it creates a dialogue with you and serves as your personal tutor. It's completely self-paced. You set your own learning time. It's graphically-oriented, so you see what you're learning. Runs on the same Apple II as your VisiCalc program.
Cdex Corporation
5050 El Camino Real, Suite 200
Los Altos, CA 94022

Rank Master is a new concept in qualitative decision-making. The tool allows decision-makers to consider important and relevant qualitative factors which are of great importance in the decision-making process. By allowing the user to consider qualitative factors for which there are no standard set of measures, individuals can fully utilize their knowledge to resolve complex problems. The range of applications includes priority setting, preference analysis, resource allocation and policy impact assessment. Typical users include managers at all corporate levels, public officials, engineers, scientists, teachers, counselors, and personal decision-makers. $195.00 from:
Exemplary Software
725 Cowper Street, Suite 46
Palo Alto, CA 94301
(415) 328-0545

Quick-Search Librarian is a new data base software package that keeps track of technical references and journal articles using the 48K Apple II Plus microcomputer. Articles may be cross-referenced with up to 12 keywords. Only 2 keystrokes are needed to select any one of the 255 user defined keywords or journal titles. Features a powerful screen editor that allows easy editing by means of a variety of simple commands. Typical search speed is 50 articles per second, even for complicated 16-parameter search expressions. Sorting speed is 40 articles per second for concurrent sorting on three different fields. Information for up to 1000 articles may be stored on a single disk. A flexible report module is provided to format and output any combination of stored information. $75.00 from:
Microware, Inc.
P.O. Box 771
State College, PA 16810-0771
(814) 238-8294

PDQ is an inexpensive, friendly, unconventional and extremely fast data handler. To put it simply, PDQ allows you to create screens full of information, up to 840 characters per screen. Change this information with some very sophisticated editing features, and save this information in computer memory or on a diskette. Up to 114,500 characters may be saved per diskette in 4 files. Files can be loaded from a diskette in under 5 seconds. Once loaded, information can be shuffled around in memory, scanned for a particular record, searched for any one or two numbers or words you are interested in, and displayed or printed. Searches can be performed for any word, number or character on a screen, or any record number. Requires a 48K Apple II or II Plus and DOS 3.3. $59.95 from:
Howard W. Sams & Co., Inc.
4300 W. 62nd Street, P.O. Box 7092
Indianapolis, IN 46206
(317) 298-5400.

PROpartner is a client billing and time management software package for lawyers, consultants, architects, CPAs and other professionals, PROpartner, which was designed by two CPAs, runs on Apple II or Apple III microcomputers. Designed for professional firms with a maximum of 30 employees, 200 billing codes and 500 clients. PROpartner produces client statements in summary or detail format and can generate billing detail, charge data and statement notes. Also, the system provides billing and revenue analysis in both month to date and year to date format by client, employee or billing code. Mailing lists and labels, which can be selected or sorted from the master client list, can be produced. Requires an Apple microcomputer system with either floppy disk or hard disk drives and a printer. Under $700 from:
Starsoft
4984 El Camino Real, #125
Los Altos, CA 94022
(415) 965-8000.

SpeedSTAT is a major statistical analysis system for Apple II computers. It has a capacity of over 10,000 data points and over 30 different statistical measures. The illustrated user's manual and software assumes that the user has little or no computer experience. Designed for small business and profesional users, including marketing professionals. Requires an Apple II or II Plus with 48K and two disk drives. $250.00 from:
SoftCorp International, Inc.
229 Huber Village Boulevard
Westerville, OH 43081
(614) 890-2820 or (800) 543-1350

Comprehensive Medical Management for the Apple (COMMA) is a complete, flexible, yet easy-to-operate medical management system for practices of up to 9 doctors. Features include total accounts receivable control with variable period aging reports, delinquency notices, daily cash reports, statements, journal and day sheet. Provides complete insurance forms handling with most major types. Practice management features include daily and period to date reporting of services performed, by doctor and practice and period to date diagnosis analysis. Also features a recall appointment scheduler with recall report, mailing notices and labels. Requires a 48K Apple II Plus, 80-column card, 3 mini floppy drives, 80-column printer. Operates on a Corvus Hard Disk and is Constellation compatible. $1,495 from:
Spectra/Soft, Inc.
P. O. Box 277
Chandler, AZ 85224
(602) 963-6380.

With the help of **VIZ.A.CON**, you can add a third dimension to your VisiCalc models. You can combine multiple "pages" of VisiCalc data from a model for hierarchical

consolidations or for summations over periods of time. You can combine weekly sales reports into months, department budget data into division, region and company level reports, etc. VIZ.A.CON creates data files usable with VisiCalc. Gives you the ability to set up special formulae that can be recalculated after a consolidation process. You can customize titles, row and column headings, footnotes, etc. for each report created by VIZ.A.CON. Reports can be automatically saved in standard ASCII form that can be used with a word processor. VisiCalc precision is maintained for all data. Apple II or II Plus version $89.95, Apple III version (64K and up) $119.95. Add $3.95 for shipping and handling.
Abacus Associates
Suite #240, 6565 W. Loop South
Bellaire, TX 77401
(800) 547-5995 ext 170.

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Lakewood, CO 80215
(303) 232-8346



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Southwestern Data Systems
P.O. Box 582-S
Santee, CA 92071
(619) 562-3221

Super Smart is terminal emulation software for the Apple II that utilizes the full capabilities of the D.C. Hayes Micromodem II for terminal to terminal computer communications. It can capture up to 21,224 characters of data. It can send or receive telegrams, Hi-Res pictures, BASIC or machine language files as well as text files. It can access and maintain any number of phone list files each containing more than 500 entries. Rapid searching is available. Super Smart will look up and automatically dial selected telphone numbers. Manual phone number specification with redial capability is provided for numbers not contained in the phone list. Requires a Micromodem II, 48K Apple II or II Plus and DOS 3.3. $60.00 from:
Softspoken
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Redondo Beach, CA 90277

Move-It, a smart terminal program for CP/M will work with any CP/M based computer. It allows the transmission of disk files and the movement of received data to a disk. The software comes with some customized installation programs that can attach routines allowing you to easily use the Hayes Smartmodem and Bizcomp Intelligent Modem. The program allows a full range of transmission options and protocols. It also supports auto-dialing on the Hayes or Bizcomp modems. The manual is spiral-bound and contains 80 pages. $99.00 from:
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23842 Archwood Street
Canoga Park, CA 91307

The **Apple-IBM Connection** is the first software package enabling computer users to transfer information back and forth easily between the Apple II and IBM PC. In minutes, the software duplicates files created on one machine and transfers them into files that can be used on the other machine. Among other things, it enables VisiCalc models to be transferred without investing hours manually re-entering the data or the formulae. Another useful application is the transfer of written information developed under the Wordstar word processing program. It can also be used to send and receive electronic mail messages between these two computers or from Apple to Apple or IBM to IBM. Comes complete with documentation and a cassette tape that verbally introduces users to the program through an interactive demonstration. $195.00 from:
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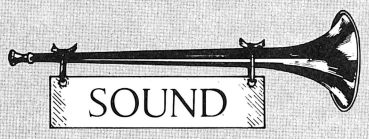
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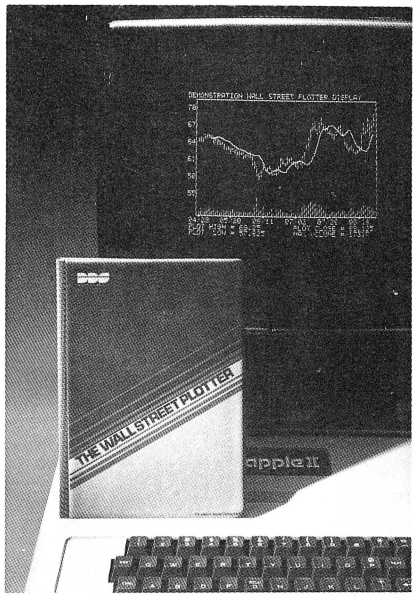
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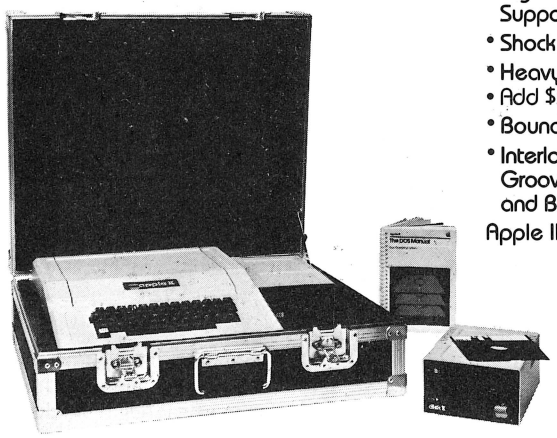
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Net Worth Calculator prepares and prints a personal financial statement. Prints all five schedules - with itemized and non-itemized assets and liabilities. Posts from schedules to financial statement. Shows totals by category to be transferred. All schedules are open-ended with open code (personal backups possible). All reports are well formatted with pagination, headings and columnar data. Requires a 48K Apple II with DOS 3.3 or a 96K Apple III with SOS 1.1 and Business BASIC.
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Funtastic Inc.
5-12 Wilde Avenue
Drexel Hill, PA 19026
(215) 622-5716

Four new games have been introduced by Superior Software, Inc. **The Quest For The Holy Grail** is an adventure game featuring both high and low resolution graphics, extensive, interactive text, and music.
Search for the Grail throughout Merrye Olde England and encounter killer rabbits, black knights, fair maidens, wizards, and others - $24.95. **Boom Valley** is a classic adventure where you attempt to save the lives of United Nations ambassadors after their plane crashes in a remote area. Modify to suit your own tastes. The perfect way to learn programming on the Apple while having fun at the same time - $24.95. **Asteroid Belt** is a fast action, arcade type, game. Navigate your ship through asteroids while avoiding alien spacecraft, space mines, and vicious swarmers sent to destroy your fleet. Uses a joystick or keyboard. Assembly language for speed. Includes source code - $24.95. **Usable Graphics** - Demo Disk I is a truly superior collection of over 35 graphics routines, programs and short games, which you can use and incorporate into your own programs. No copyright or protection problems. Even includes a few commercial games "in the making". High and low resolution. Over 400 sectors of tricks and fun - $19.95. All programs are fully listable, modifiable, and copyable. Requires a 48K Apple II with ROM Applesoft, DOS 3.3.
Superior Software, Inc.
P. O. Box 261
Kenner, LA 70063
(504) 468-2273

Beneath Apple Manor is now in colorful Hi-Res. Written by Don Worth, who co-authored Beneath Apple DOS and Bag of Tricks, now returned to his first love - fantasy adventure. This special edition of the game is far better than the popular original - with faster reaction time, high resolution graphics, sound effects, a deeper dungeon, and more monster types and magic items - $29.95. At your local dealer or contact:
Quality Software
6660 Reseda Blvd., Suite 105
Reseda, CA 91335
(213) 344-6599

Micro Mother Goose is a set of three fun games for kids ages 3 to 9. Arcade quality games start easy for the little ones, but challenge all at higher levels. Nine magical Mother Goose rhymes are so easy to run even 3 year olds can operate successfully. No reading required to operate. Enjoy good feelings with your children as you read and sing along with popular Mother Goose rhymes together. Complete illustrated parents manual provided. Large color "Micro Do's and Don'ts" poster shows the "rules of the road" for happy and safe family computing. At your local dealer or contact:
Software Productions, Inc.
2357 Southway Drive
P. O. Box 21341
Columbus, OH 43221
(614) 486-3563

Genesis is an adventure creator. Create any world: Time-Space, Magic & Myth, Crime & Suspense, the Occult & the Supernatural, War & Adventure, anything. Give it a purpose and name it as you wish. Manuals will help you design the world you want. No knowledge of programming is necessary. Runs on a 48K Apple II Plus or Apple II with Applesoft ROM or Language Card and DOS 3.3. $49.00 plus $3.00 handling & 5% sales tax for MA residents.
Hexcraft Inc.
P. O. Box 39
Cambridge, MA 02238

Ice Demons is an exciting arcade style game. Trusty bow in hand, you make your way across the ice slick battlefield. Struggle with the ice pits which spew forth the most grotesque collection of creatures this side of a nightmare. They are as dangerous as they are ugly and there are hundreds of them. But this is the easy part - because below you, in his icy kingdom, the High Master waits. Keeps 64 individual high scores and names and has graduated levels of difficulty. All standard convenience controls: pause game, sound on/off, game restart, music, sound effects, full color Hi-Res. Features 1 player solo, 2 player team, or 2 player competition modes. Requires a 48K Apple II or II Plus and DOS 3.3. $29.95 from:
Morningstar
39 Florence Street
San Francisco, CA 94133
(415) 441-2535

The Pinball Construction Set is the first entertainment software that has the simplicity and freedom of interaction of a toy. You don't use this program - you play with it. It allows you to build your own video pinball games by providing a library of conventional (and unconventional) pinball pieces and a set of video tools. Use the "video hand" to put library pieces on the game board. Use the polygon tools to make borders and obstacles. Add game logic and scoring rules with the wiring kit. Create Hi-Res designs and logos using the magnifier and paintbrush. Change gravity, time, elasticity and bumper strength. Load and save designs to/from disk.
BudgeCo
428 Pala Avenue
Piedmont, CA 94611
(415) 658-8141

The hunt is on for three priceless gold keys hidden somewhere in the continental U. S. The story is **Prism**, a heroic fantasy Storydisk that tells of a young boy's quest to retrieve the magical keys. Also within Prism are the clues and riddles that lead to the whereabouts of the lost keys. The tale comes alive for you through screens of text, colorful animated graphics and special sound effects. Hidden in three separate locations are a "diamond" key, a "ruby" key, and a "topaz" key (all made of solid gold). A surprise climax to the adventure will also be revealed when all three keys are cleverly recovered. Available for the Apple II and II Plus.
International Software Marketing
Suite 421, University Building
120 E. Washington Street
Syracuse, NY 13202
(315) 474-3400

Learn to play winning poker with **Pro Poker**. Serious professional poker is the name of this game. Now you can play eight handed poker any time you want. If you can't find enough players to complete the game, the computer will fill out the table. Pro Poker will tell you when to open, when to fold, pass, or raise, and why. One of its many features allows you to play all of the opponents' hands face up. Developed and refined over a three year period, Pro Poker utilizes machine language and will play over 300 hands per hour. Combines high resolution graphics display with several text displays. $39.95 on diskette plus $1.50 shipping and handling.
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Reseda, CA 91335
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The Dark Crystal is now an exciting Hi-Res adventure for your personal computer. As Jen, last known survivor of the Gelfing race, you must restore the missing shard of the Dark Crystal and fulfill the ancient prophecy before the Great Conjunction. The power to end the Skesis' reign is yours. If you fail, all things whole and good will be destroyed. The Dark Crystal, an adventure designed by Roberta Williams and based on the epic fantasy film by Jim Henson, is available at your local computer store for $39.95 or order directly from:
Sierra On-Line, Inc.
36575 Mudge Ranch Road
Coarsegold, CA 93614

Epidemic is a new arcade type game from Strategic Simulations. Meteorites carrying deadly, alien microbes have struck Earth, causing the largest, most virulent epidemic known to man. As director of the Global Disease Control Center, your job is to contain the infection to as small of an area as possible, minimize fatalities, and ultimately to eradicate the contagion completely. Various methods are at your disposal to combat the disease. The graphics in this game are simply outstanding. A world map display using different vibrant colors and patterns summarizes the international status of the epidemic. $34.95 at your local dealer or contact:
Strategic Simulations, Inc.
465 Fairchild Drive, Suite 108
Mountain View, CA 94043

The Caves of Olympus is a Hi-Res, full color adventure game requiring quick action and careful planning and reasoning. Beneath the Palace of Anson Argyris, on the Planet Olympus, lies the last fortress to withstand the onslaught of the Loren forces . . . The Caves of Olympus. Protected by a robotic overseer, the fortress, with its miles of corridors, false chambers, death traps, one way doors and matter transport devices, is impregnable to all but one . . . the little Vario 500 egg-shaped robot you become. Requires a 48K Apple II or II Plus and DOS 3.3. $39.95 from:
Howard W. Sams & Co., Inc.
4300 W. 62nd Street
Indianapolis, IN 46206
(317) 298-5400

Geography Scramble is a unique game for the Apple II in which players must unscramble maps of various parts of the world in the least number of moves. Features include: detailed Hi-Res maps of the world and U.S.A., variations in scrambling speed and number of puzzle pieces, and ratings after each game. This game offers a new twist for "cube" fanatics. Requires an Apple II or II Plus with DOS 3.3 and 48K RAM with Applesoft ROM. $18 from:
Notable Software
P. O. Box 1556, Dept AO
Philadelphia, PA 19105



Germany 1985 is the first game in a series of four that includes RDF, Norway 1985, and Baltic 1985, representing S.S.I.'s catastrophic vision of World War III. Soviet battalions have invaded the southern center of West Germany with infantry, tanks, artillery units, and paratroopers. Speed of movement is inversely proportional to the number of enemy units that can see you. Smoke screens are available to obscure attack or retreat. Air superiority shifts from one side to the other, while the concepts of HQ units and divisional integrity are provided. There is also a solitaire option. This operational-level game comes with a map display in Hi-Res graphics for each of the two different scenarios. Germany 1985 comes complete with a diskette, two-sided map, data card, and a rule book that is applicable to all four games in the series for $59.95. Available for the 48K Apple II with Applesoft ROM or Apple II Plus or III. At your local dealer or contact:
Strategic Simulations Inc.
465 Fairchild Drive, Suite 108
Mountain View, CA 94043
(415) 964-1353

Polterguys, by Stephen Wallock, is a Hi-Res game demanding quick wits. We're trapped in the Netherworld (neither here nor there). Our souls need to be freed, but you risk being blown into the Netherworld by helping us. Obtain Spectre bullets by entering the energy realm and eliminating the Soul Orbs. You must destroy us to free our souls. Two games on the disk that may be played separately or in sequence. Requires a 48K Apple II or II Plus and DOS 3.3. In assembly language with Hi-Res animation and super sound. $34.95 from:
CPU Software
9710 24th Avenue, S.E.
Everett, WA 98204
(206) 337-5888

In your orbiting space ship, the **Earth Defender**, your nuclear powered lasers are ready to save the world. You fly through 3-D space, blasting asteroids from your path. Your ship computer flashes a warning - killer UFOs ahead. Aim fast and fire your laser cannons. A near miss might trigger an attack and enemy missles. Up to eight pilots may join the Earth Command fleet. Each pilot has a separate score, high score, and rank. Every mission is new with music and sound effects. Enemy patterns never repeat. Requires a 48K Apple II Plus with one disk drive. $29.95 plus $1.55 for postage and handling from:
New Vision
5105 Peachtree Industrial Blvd.
Chamblee, GA 30341
(404) 455-3688

A SPEECH SYNTHESIZER ON A DISK!



That's why Apples and Ataris are saying: "Talk Is Cheap"

IT'S CALLED THE SOFTWARE AUTOMATIC MOUTH, S.A.M. FOR SHORT

It's a high quality speech synthesizer created entirely in software. You use it as a software utility, load it into RAM, and then use your machine as usual, except now you can make your programs talk. It generates the speech sounds on demand, so there is no limit to what it can say.

When you hear S.A.M., you'll probably agree that it sounds better than all the hardware speech synthesizers for Apple or Atari computers. And, it has a truly remarkable price.

YOU CONTROL INFLECTION, PITCH AND SPEED

With its user-variable inflection, S.A.M. can accent words on the right syllable and emphasize the important words in a sentence.

You can also make S.A.M.'s speech higher or lower, and faster or slower, over a wide range of settings.

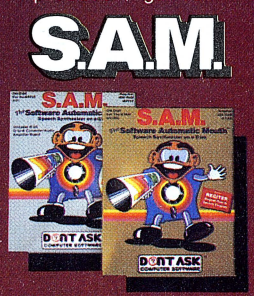
USE EASY PHONETIC INPUT OR PLAIN ENGLISH TEXT

S.A.M. understands a simple phonetic spelling system, not a mysterious alpha-numeric code. S.A.M. helps you learn phonetic spelling by showing you your mistakes, and the owner's manual gets you started with an English-to-phonetics dictionary of 1500 words. So it's easy to make S.A.M. produce exactly the sounds you want.

But suppose you want to type ordinary English, or you want your machine to read a word processor file aloud. The S.A.M. disk comes with RECITER, an English text-to-speech conversion program that lets S.A.M. speak from plain English text.

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In a BASIC program, you add speech with just a couple of commands. In a machine language program, it's just as easy. S.A.M. comes with four demonstration programs to show off its distinctive features and help to write your own talking programs. Write adventure games with talking characters, educational programs that explain aloud, or utilities with spoken prompts – put your imagination to work.



S.A.M. programmed by Mark Barton.

You can order S.A.M. directly from DON'T ASK. Add $2.00 for shipping and handling to your check or money order (or order C.O.D.)

S.A.M. for the Apple II/II+
Includes an 8-bit digital-to-analog converter and audio amplifier on a board. Only **$124.95**
Requires 48K, disk. (S.A.M. takes up to 9K; RECITER 6K.) You will also need a speaker.

S.A.M. for the Atari 400/800
S.A.M. talks through your television speaker. No additional hardware is required. Only **$59.95**
Requires 32K, disk. (S.A.M. takes up 9K; RECITER 6K.) Note: to produce the highest quality speech, S.A.M. automatically blanks the screen during vocal output; the display is preserved. S.A.M. can talk with the screen on, but the speech quality is reduced.

DON'T ASK INC.
COMPUTER SOFTWARE

2265 Westwood Boulevard, Suite B-150
Los Angeles, California 90064
Telephone: (213) 397-8811

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Production: EUROSTYLE GRAPHICS (213) 393-5728

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For the authorized Apple dealer nearest you, call **800-538-9696** (**800-662-9238** in California.)

Fruitful Connections.

There are more people in more places making more accessories and peripherals for Apples than for any other personal computer in the world.

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So if you're looking to expand the capabilities of your Apple II or III, remember:

Now you can add Apples to Apples.

A joy to behold.

The new Apple Joystick II is the ultimate hand control device for the Apple II.

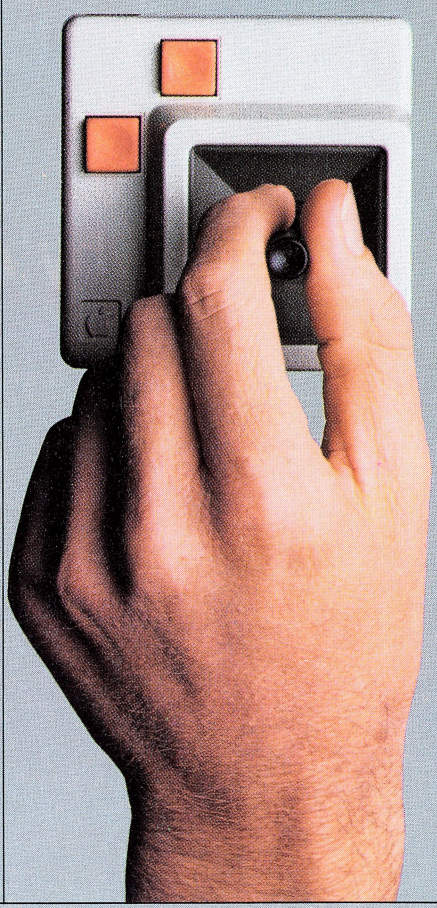
Why is it such a joy to use?

With two firing buttons, it's the first ambidextrous joystick—just as comfortable for lefties as righties.

Of course, it gives you 360° cursor control (not just 8-way like some game-oriented devices) and full X/Y coordinate control.

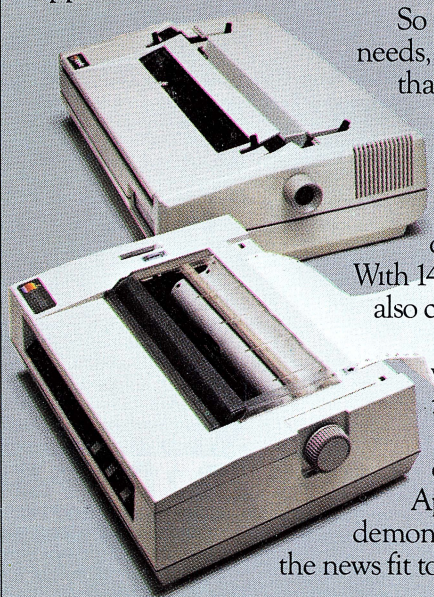
And the Joystick II contains high-quality components and switches tested to over 1,000,000 life cycles.

Which makes it a thing of beauty. And a joystick forever.



Gutenberg would be proud.

Old Faithful Silentype® has now been joined by New Faithfuls, the Apple Dot Matrix Printer and the Apple Letter Quality Printer.

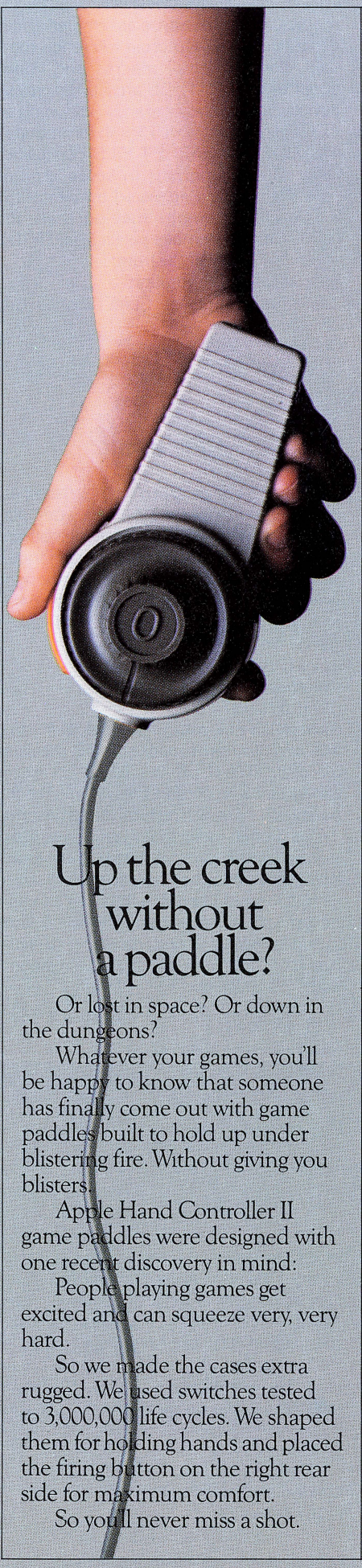


So now, whatever your budget and your needs, you can hook your Apple to a printer that's specifically designed to take advantage of all the features built into your Apple. With no compromises.

The 7x9 Apple Dot Matrix Printer is redefining "correspondence quality" with exceptional legibility. With 144x160 dots per square inch, it can also create high resolution graphics.

The Apple Letter Quality Printer, which gets the words out about 33% faster than other daisywheel printers in its price range, also offers graphics capabilities. See your authorized Apple dealer for more information and demonstrations. Because, unfortunately, all the news fit to print simply doesn't fit.

©1983 Apple Computer Inc.



Up the creek without a paddle?

Or lost in space? Or down in the dungeons?

Whatever your games, you'll be happy to know that someone has finally come out with game paddles built to hold up under blistering fire. Without giving you blisters.

Apple Hand Controller II game paddles were designed with one recent discovery in mind:

People playing games get excited and can squeeze very, very hard.

So we made the cases extra rugged. We used switches tested to 3,000,000 life cycles. We shaped them for holding hands and placed the firing button on the right rear side for maximum comfort.

So you'll never miss a shot.

A storehouse of knowledge.

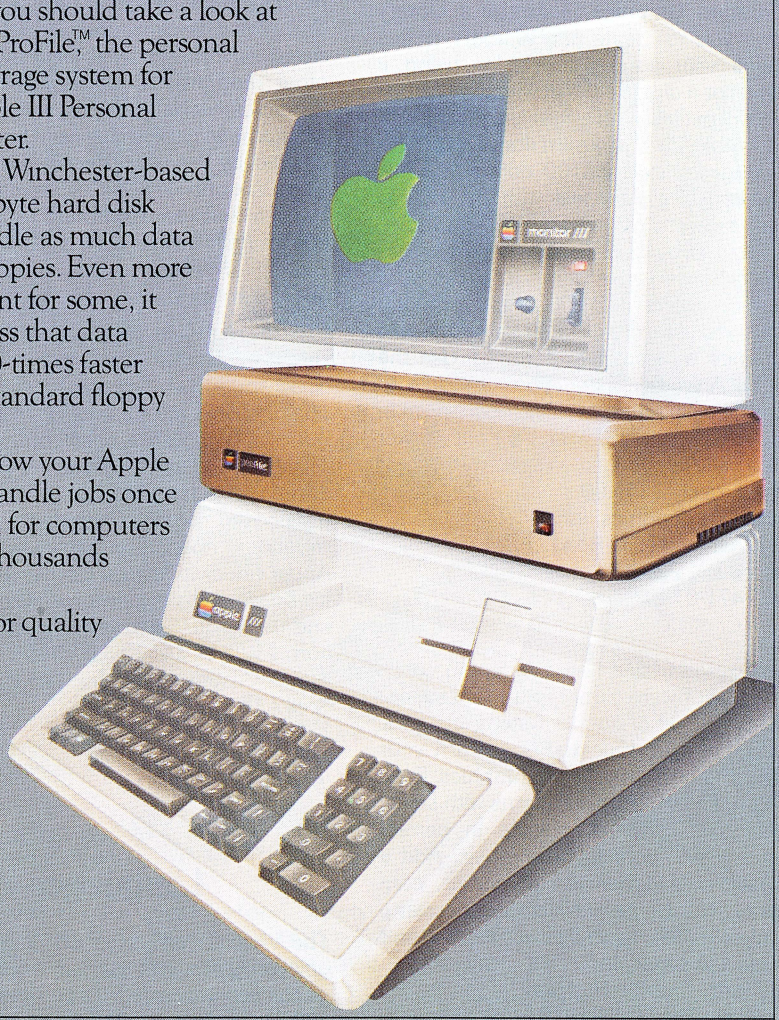
If you work with so much data or so many programs that you find yourself shuffling diskettes constantly, you should take a look at Apple's ProFile,™ the personal mass storage system for the Apple III Personal Computer.

This Winchester-based 5-megabyte hard disk can handle as much data as 35 floppies. Even more important for some, it can access that data about 10-times faster than a standard floppy drive.

So now your Apple III can handle jobs once reserved for computers costing thousands more.

As for quality and reliability, you need only store one word of wisdom:

Apple.



Launching pad for numeric data.

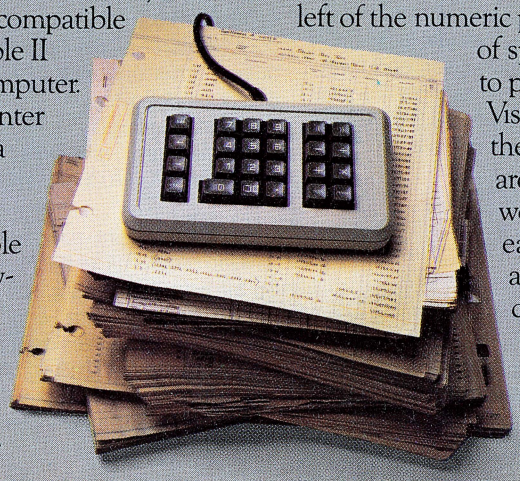
Good tidings for crunchers of numerous numbers:

Apple now offers a numeric keypad that's electronically and aesthetically compatible with the Apple II Personal Computer. So you can enter numeric data faster than ever before.

The Apple Numeric Keypad II has a standard calculator-style layout. Appropriate, because unlike some other keypads, it can actually function as a calculator.

The four function keys to the left of the numeric pad should be of special interest to people who use VisiCalc.® Because they let you zip around your work sheet more easily than ever, adding and deleting entries.

With one hand tied behind your back.



VisiCalc is a registered trademark of VisiCorp. Inc.

Graphics

Animation Graphics Illustrator's Library allows you to create and animate HI-Res images with sound and color using a joystick or a digitizer tablet with total Applesoft compatibility. Menu driven, error-proof and flexible. Paint program draws on two Hi-Res pages with over 100 colors and textured brushes. Add text with the built-in graphics word processor system. Save, load and copy to disk. Supports graphics printers, video digitizers, joysticks and graphics tablets - $139.00. With Animation editor you can create a Hi-Res animated sequence with color and sound. Use the unique Animated Slide Show module to automatically replay multiple sequences in any order - $89.00. Shape/Font Maker Editor allows you to create multi-color shapes easily - $59.00.
Animation Graphics, Inc.
11317 Sunset Hills Road
Reston, VA, 22090
(703) 471-0740

Kaleido-Sound is a new concept in entertainment software. Simply plug your stereo, cassette player or sound system into your Apple II and let Kaleido-Sound turn your music into brilliant full color graphics. Four different kaleidoscopic patterns with selectable color schemes pulsate in perfect harmony with your favorite music. Add a fantastic new dimension to parties, concerts or your home entertainment system. Requires a 48K Apple II Plus. $39.95 from:
Passport Designs, Inc.
116 North Cabrillo Highway
Half Moon Bay, CA 94018
(415) 726-0280

The Fonts is a full-featured programmable type face system for the Apple II. Features multiple fonts on the same line, incremental line and character spacing, continuous or broken underline, programmable page dimensions, skip over perforation, condensed, double stroke, and emphasized modes as well as inverse. Includes a BASIC interface program, file processor, and font editor/generator plus 10 sample fonts. Requires a 48K Apple II, DOS 3.3, MX-80, Graftrax. $30 (California residents add 6.5%) from:
Softspoken
P. O. Box 7000-863
Redondo Beach, CA 90277
(213) 375-8567

Shapes in Color is a BASIC precision shape drawing program for the Apple II which enables the user to create and compile shapes that can be drawn on a medium -resolution grid in various colors, sizes and angles. It can be used to design shapes ranging from unique typography to animation. Various shapes can be designed in the high resolution colors of green, violet, white, orange, blue and black. Graphic backgrounds can be "painted" with free-hand brushstrokes and then used with moving shapes to generate striking effects. Completed backgrounds and shapes are saved on disk to be reloaded for use in other programs. Detailed documentation describes techniques for writing original programs with the shapes and backgrounds created by the user. Requires an Apple II with Disk and 48K. $49.95 from:
Hayden Software Company
600 Suffolk Street
Lowell, MA 01853
(617) 937-0200

Ciarcia High-Resolution **Sprite Graphics Board** will enable you to maintain as many as 32 sprites (single color figures of 8x8 or 16x16 pixels) at one time or Hi-Res alphanumerics, all with a solid-color backdrop. The Sprite Graphics Board is Apple slot-compatible; just plug it in. With Krell's multi-video board (included), only one monitor is needed to display both normal Apple video or Sprites. Comes with graphics board, 2 disks, demonstration software and the Sprite Editor with full documentation. $325 or $450 with Krell's Logo language. Also available for TRS-80 - $325.
Krell
1320 Stony Brook Road
Stony Brook, NY 11790
(516) 751-5139

Languages

The Visible Computer: 6502 is a unique new program that teaches machine language programming. It combines a Hi-Res 6502 simulation with an extensive user manual/tutorial to provide the easiest way yet to come up to speed with machine language. You'll watch the registers change as instructions are performed. You'll see how instructions are executed - not just their results. You control how fast or slow TVC runs. Features on-line 4 function calculator; single step and 6502 modes; disassembler; flexible register and memory display. Requires a 48K Apple II Plus, One disk drive, printer optional. $49.95 at your local dealer or contact:
Software Masters
3330 Hillcroft, Suite BB
Houston, TX 77057

Now Apple users can add the ability to develop programs for the Motorola MC68000 16-bit microprocessor. The **68000 Macro Cross Assembler** is a complete macro assembler with co-resident program editor. It is written in 6502 machine language for execution in the Apple II computer. It assembles standard Motorola 68000 mnemonics, using the same assembler syntax described in the Motorola reference manual. Allows powerful macros and conditional assembly. There are 20 assembler directives and 29 commands (including an EDIT command with 15 subcommands). INCLUDE and TARGET FILE capabilities allow source programs to be as large as your disk space. Registered owners of the S-C Macro Assembler may purchase the 68000 Cross Assembler package for $50.00, otherwise it's $130.00 from:
S-C Software Corporation
2331 Gus Thomasson, Suite 125, P.O. Box 280300
Dallas, TX 75228
(214) 324-2050

Personal

Lovers or Strangers can tell how compatible you are in love, sex, money, work, play and more. Were you made for each other? Are the two of you destined for romance? It's fun, it's serious, it's romantic, it's thought-provoking, it will keep you up nights. Available at your local dealer or direct from:
Alpine Software
2120-E Academy Circle
Colorado Springs, CO 80909
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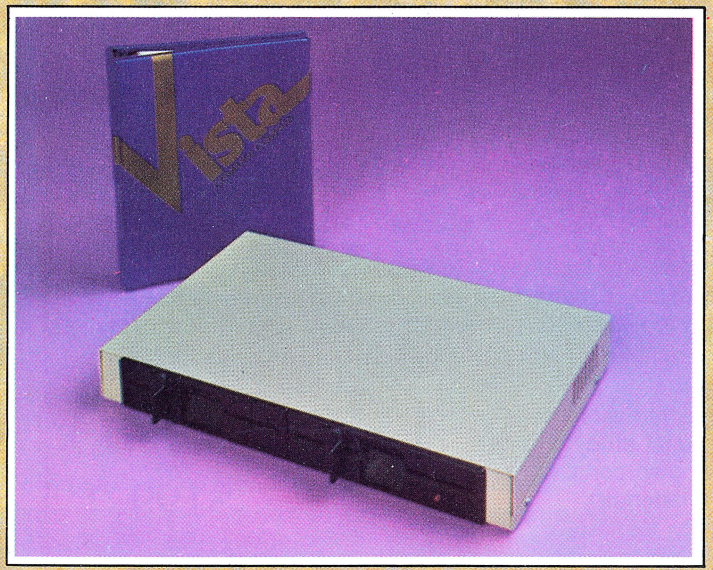


In Italy in the 15th century Leonardo Da Vinci was a multi-talented genuis. Leonardo's ideas and designs were endless. He was always creating new devices to solve the world's problems. Pictured here are many studies for military arms and armor and battlements.

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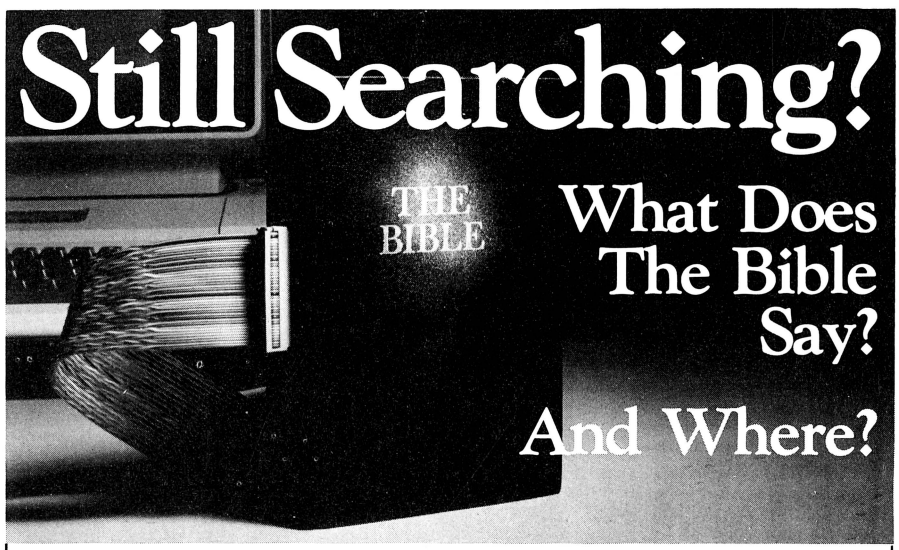
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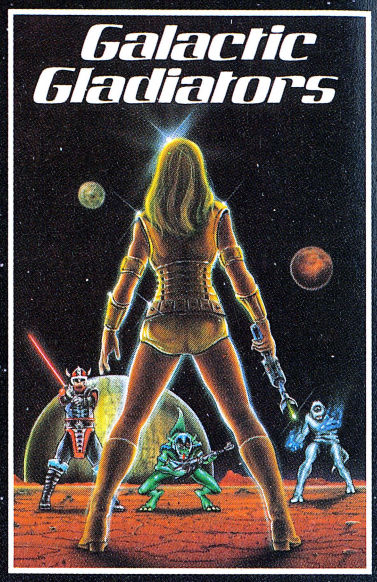
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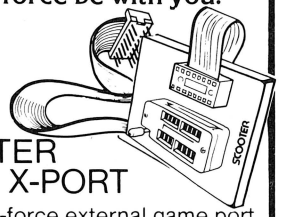
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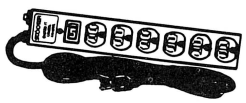
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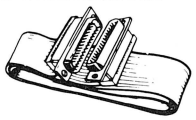
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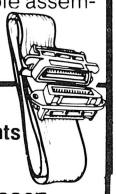
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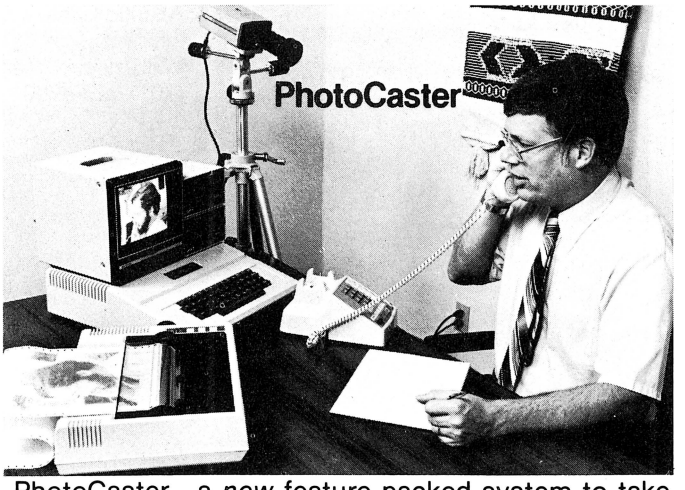
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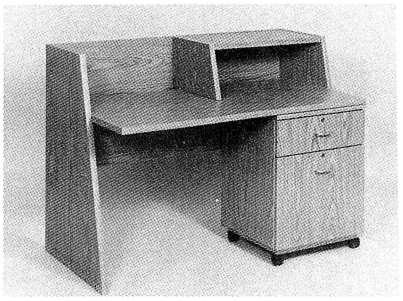
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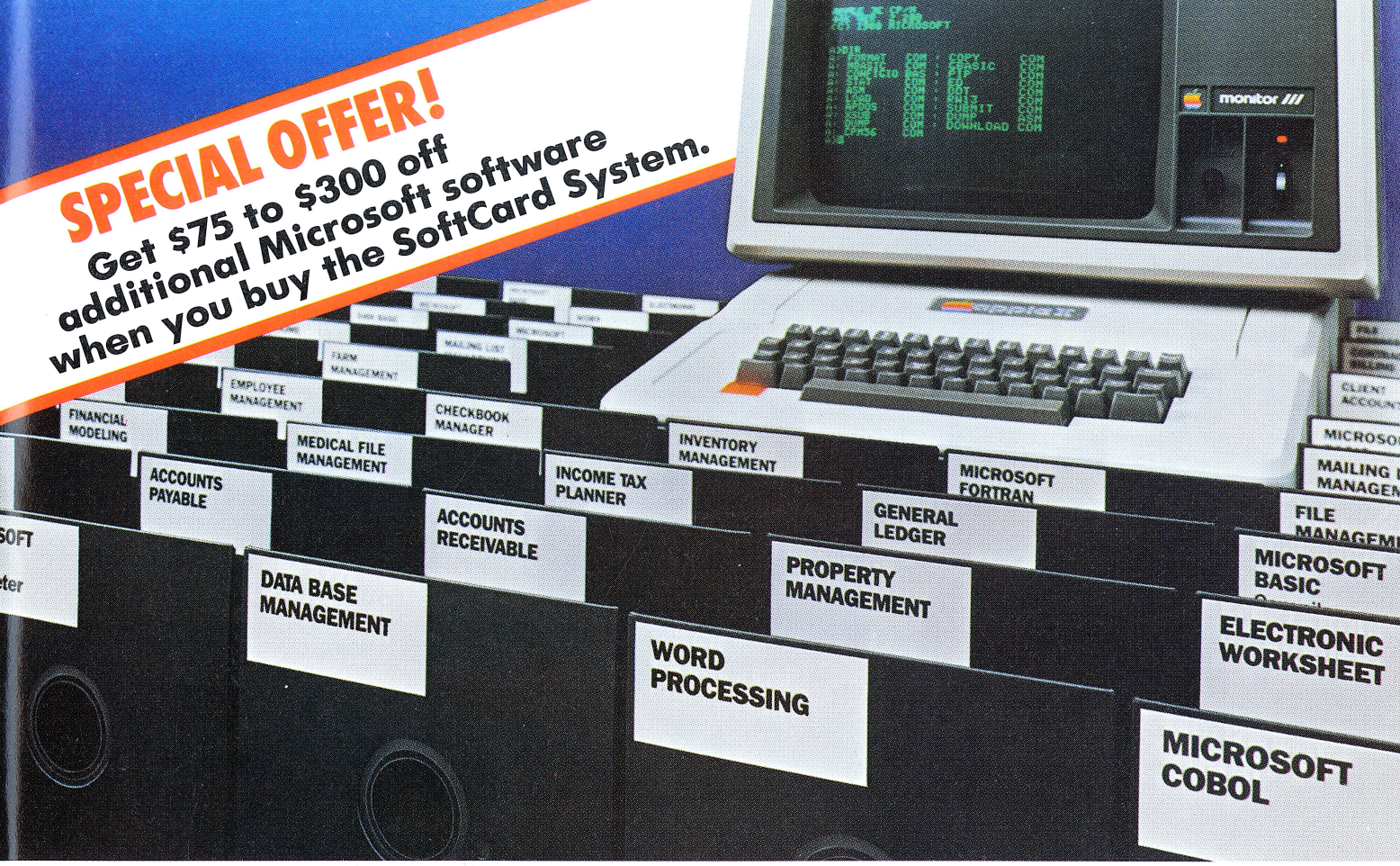
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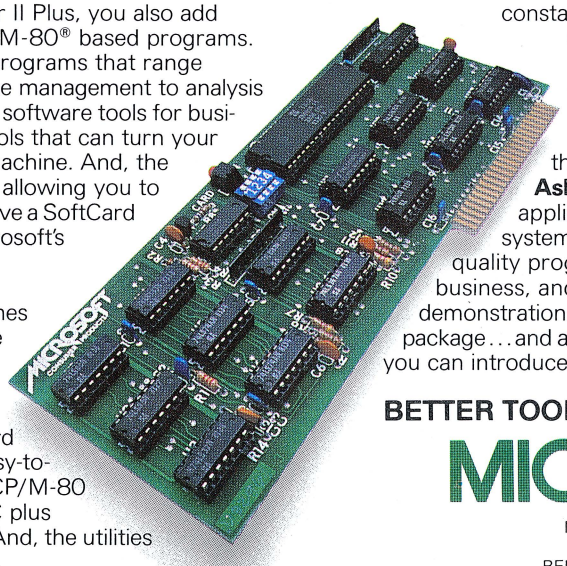
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