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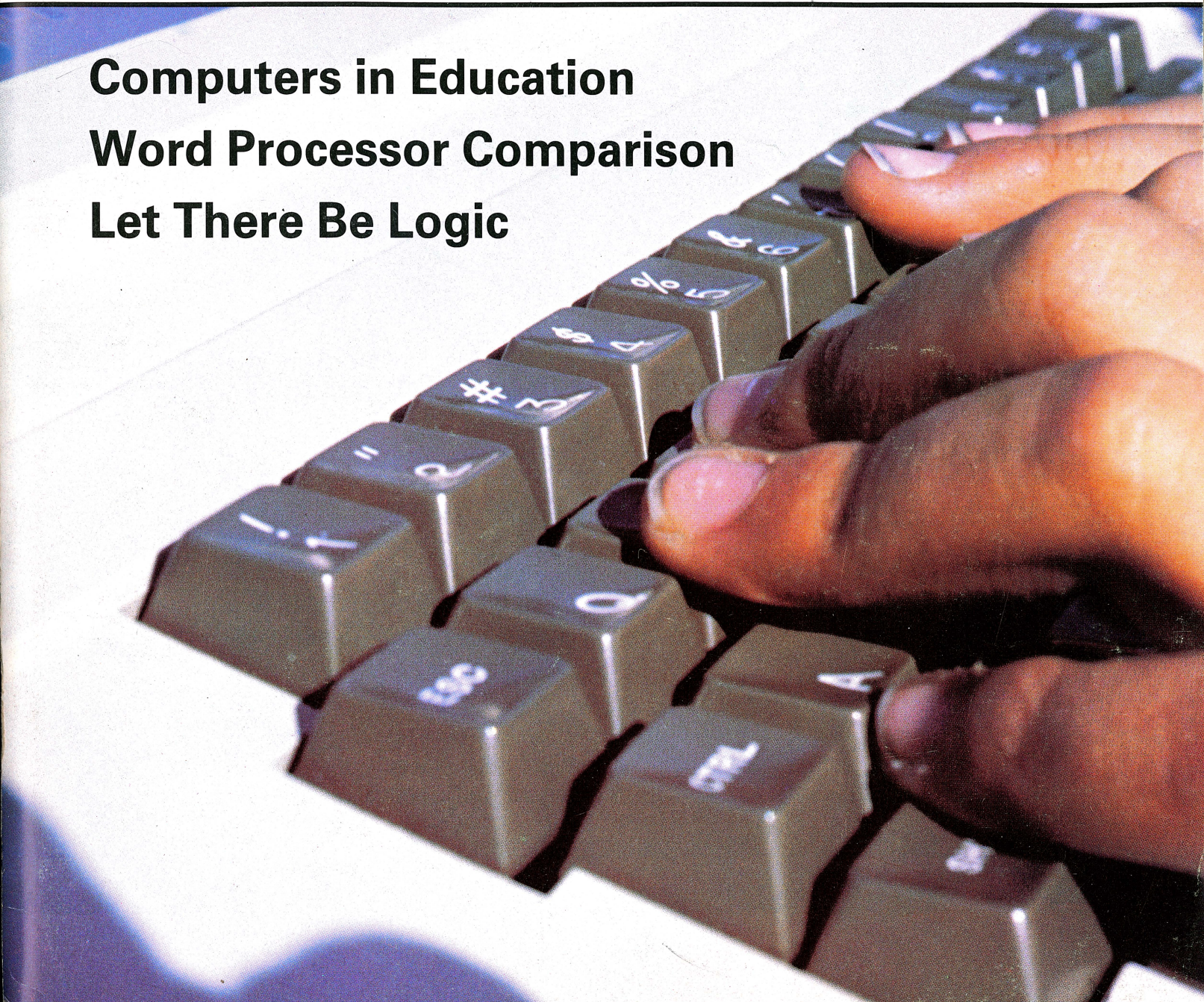
Apple Orchard™

VOLUME 3 NUMBER 1 MARCH-APRIL 1982 $3.25

Computers in Education
Word Processor Comparison
Let There Be Logic



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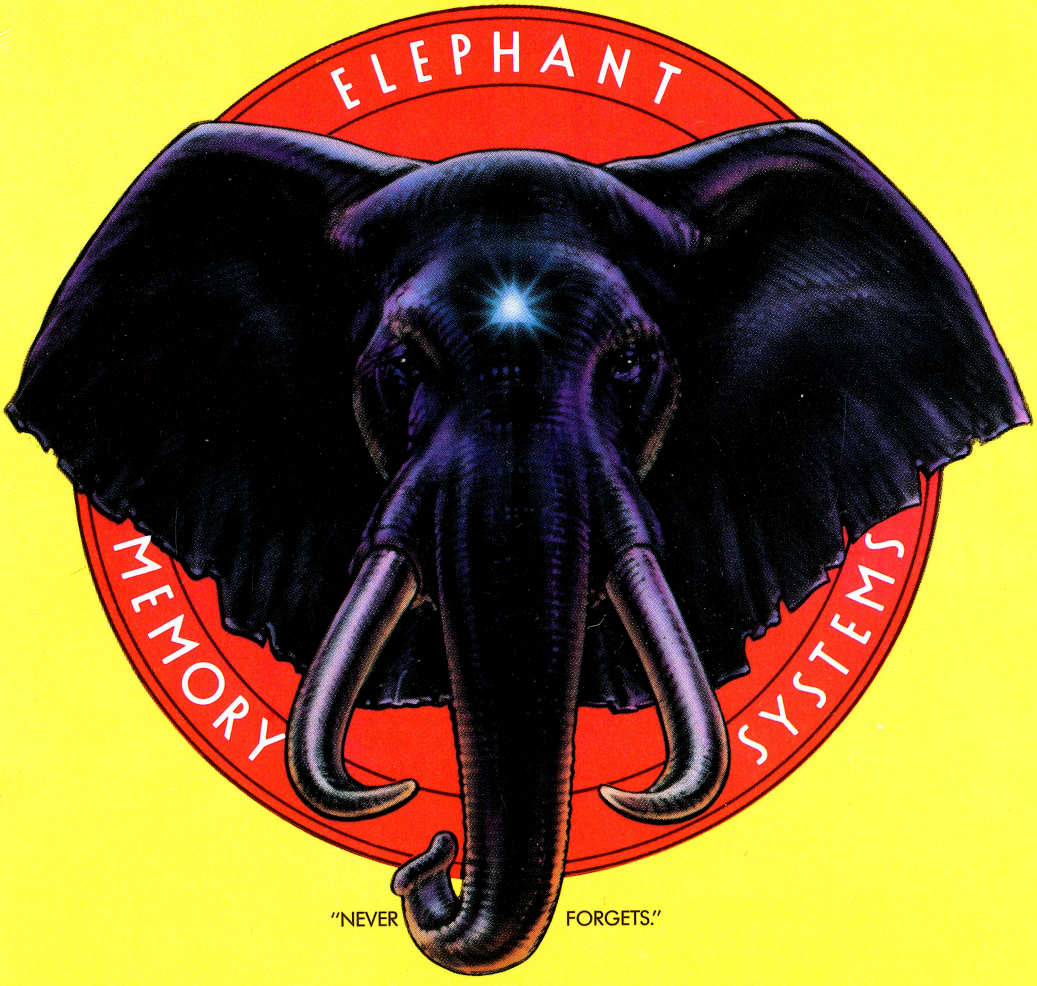

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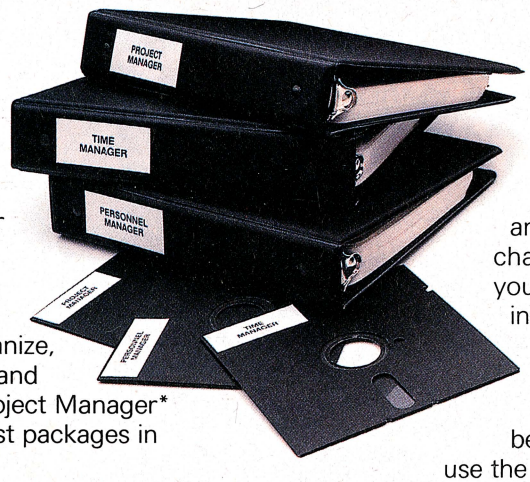

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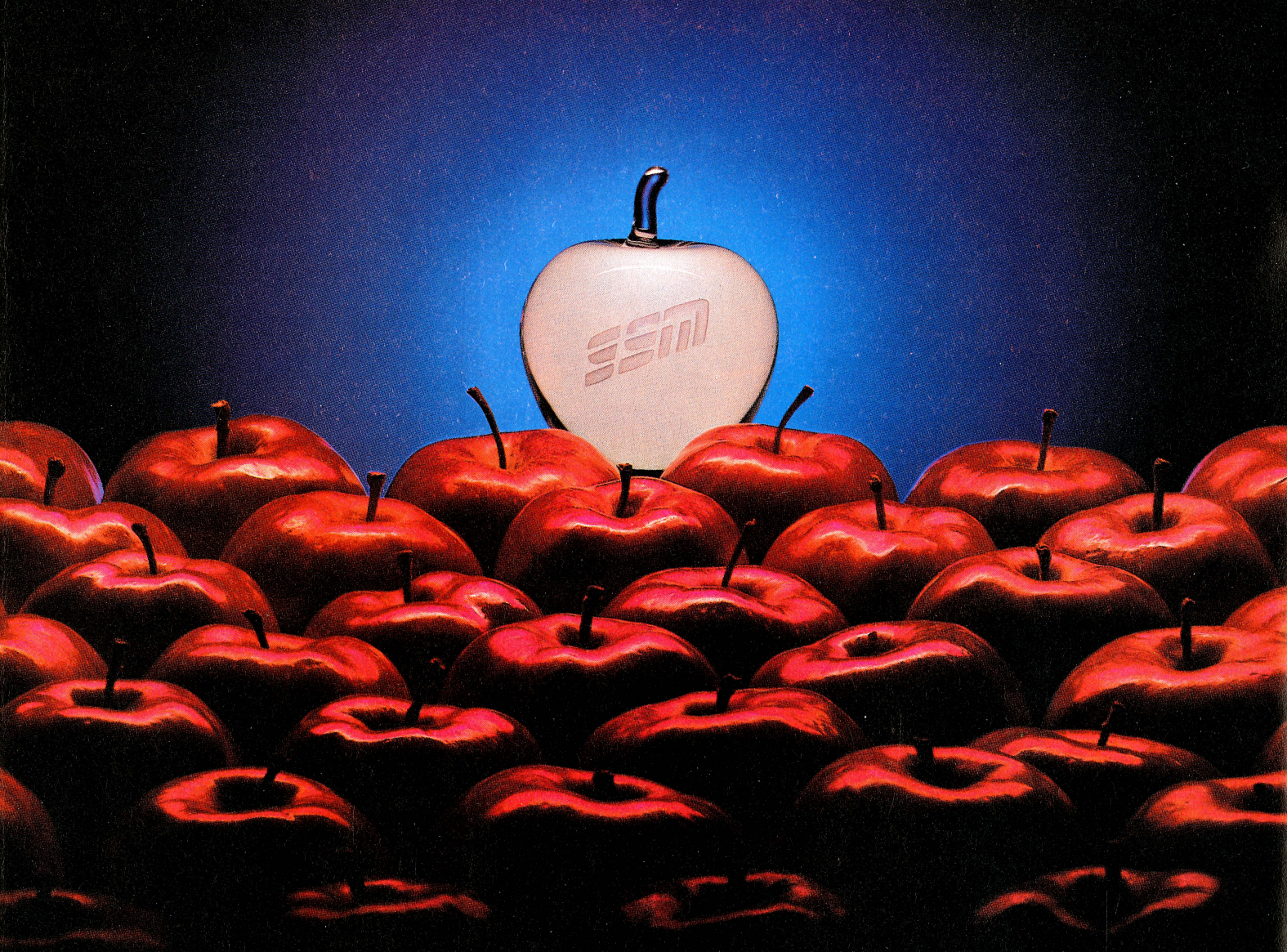

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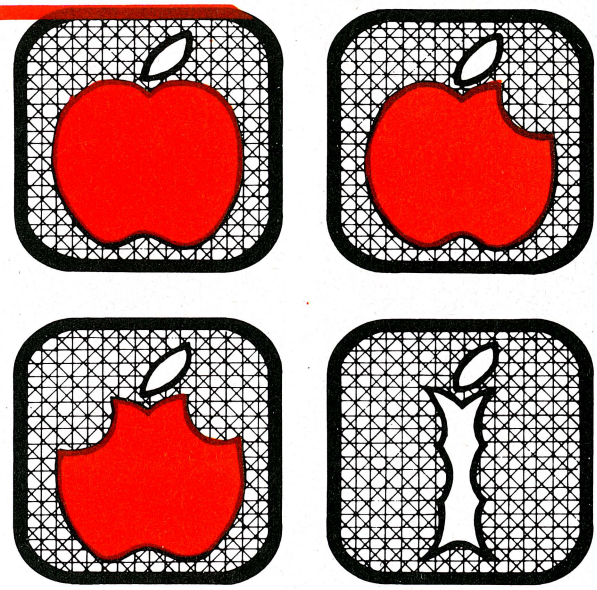

Take a bite...

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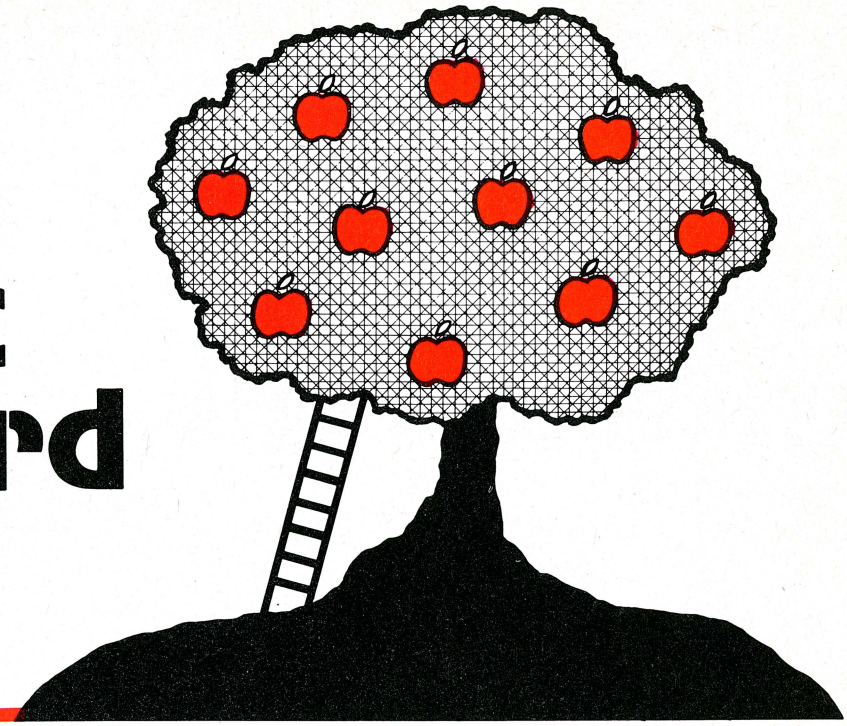

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TEXTFILE

...who said the **Apple Orchard** was dead? Like the International Apple Core, it's alive, well, and living in Santa Clara, California. You hold in your hands the first issue published "in-house," and we're off to a flying start.

This is the first issue to emerge under our bi-monthly frequency; we'll publish six issues this year. All signs point to publication on a more frequent basis in 1983; don't go away.

Between these covers is an introductory article on Computer-Assisted Education (CAI), and the first column by Educational SIG Chairman Ted Perry. The Stock Market SIG also makes its first appearance, thanks to John McMullen. We also have a comparative review by SRI researcher David Harvey on three popular word processors.

The User Group Forum has been attacked by one reader as a too-inbred item. I answer that charge by asking you to view this month's Fieldsian effort. Only a modicum of imagination is required to see the overall possibilities for the club management methods set forth; we earnestly hope that the reader who complained has sufficient imagination.

Other departments are still with us, notably Forbidden Fruit, the most comprehensive compilation of new product information to be found in one place.

And what of the future? We now have a recession from which the microcomputer industry is not altogether immune (largely because some industry managers have had no experience with anything less than heartstopping growth, and have not yet fully perceived the microcomputer's value as a cost reduction tool). Another publication has announced what should have been obvious: paid subscriptions are a requirement if a magazine is to flourish as the **Apple Orchard** has.

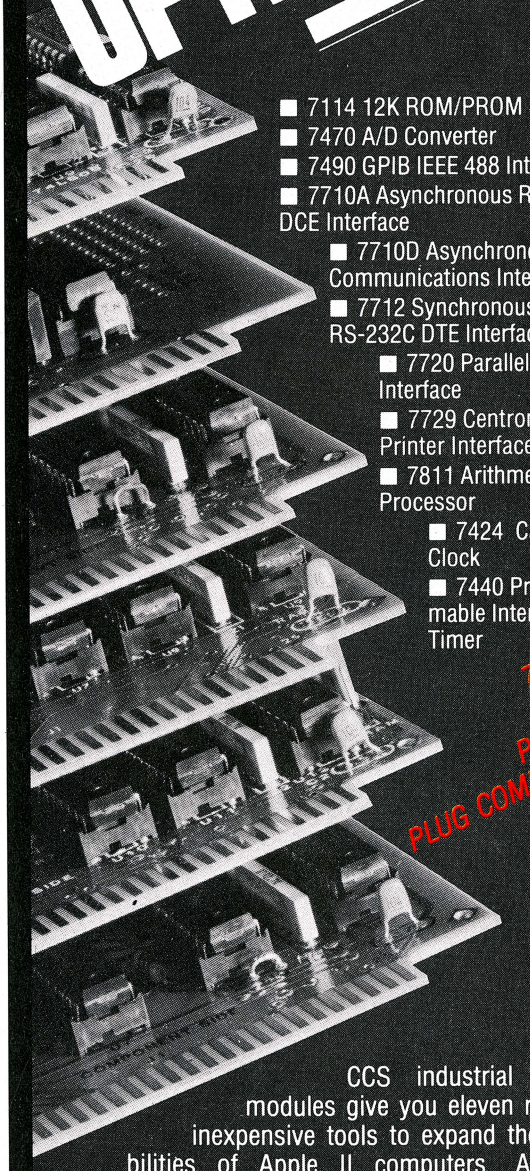
The **Apple Orchard** will continue to attempt a balance between "hard" programs, modifications, and improvements; expanded uses for the Apple, and a perspective on the whole microcomputer phenomenon in society. That's what you'll continue to see.

Now let me tell you what you *won't* see in the **Apple Orchard**. You will be spared the fawning and incestuous biographies of acne-faced software executives (who just co-incidentally are present or potential advertisers); you will not see a play-by-play or box score on what are today's hottest blastem/hokum games; nor will you see the kind of "industry-inside" personal gossip which may be interesting to some whose world ends at the Santa Clara County line. Frankly, knowing who has moved to which new firm, or has been fired, is of no real help to you in getting more use from your Apple computer, however much it may appeal to the vocal locals. We'll tell you about the juicy ones, without all of the boring details.

Finally, what you'll see in the *Apple Orchard* is what *you* tell us you want to see, and/or what *you* contribute. We continue to serve the interests of the user (you) first and foremost, a happy situation enabled by the fact that the **Apple Orchard** is owned by an independent non-profit federation of user groups, not a commercial enterprise.

We go forth together.

APPLE OPTIONS.



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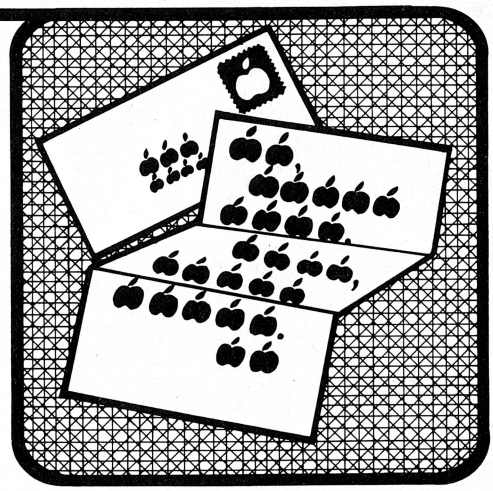
Letters to the Editor



Off Track On Pirates

Sir:

In the old days, sailing ships had problems with pirates. Two great nations used opposite solutions to reduce piracy. Spain increased the cannon and armor on it ships. This increased the weight, cost and slowed down the vessels making them less desirable as a shipping vehicle. England, conversely, did the opposite. It lightly armed its small, inexpensive ships thus making them lighter and faster. They were better at their intended purpose—to trade and deliver cargo quickly. History has shown us that England won, not because they avoided pirates better than Spain, but because they did not let pirates get in the way of good business—in this case—efficient shipping.

This bit of historical fact has great import in the Software Piracy Problem of today. Many companies are spending too much time and money worrying about pirates. They reduce, if not ruin the useability of their products (programs) with locked disks, unlistable programs, secret source code, hidden locks, codes in ROM chips, full page ads devoted to pirates, etc. These devices have made many programs inefficient, costly to produce and support. The buyer is taxed greatly for he cannot make modifications or back-up copies. Often he is inconvenienced by added expenses for back-ups or future modifications. This hurts sales and angers good customers.

There is a better way, as exemplified by our company, Andent, Inc. We produce Apple II software for health professionals (medical/dental systems, appointments, hypnosis, etc.). We have been in business since 1978, which makes us one of the oldest software houses for microcomputers. We are making a profit . . . and always have. We pay our bills and programmers on time. All our software is unlocked and can be copied for back-up purposes. We support all sales offering free replacement of damaged disks. All our software is listable and can be modified by the user. There is internal as well as written documentation.

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Back-ups (our customers make their own)

Updates (we mail out a letter with changes)

Phone calls—documentation and listings tell you how to make modifications.

Changes in DOS (e.g. DOS 3.2 to 3.3)

Hard disk compatibility

Slot compatibility

Printer slot and special character problems

Disk recalls

Equipment compatibility (weird interfaces, old computer models, etc.)

Low cost of programming and debugging

The business community, our customers, like this. They are buying a program . . . not a software lease. They have immediate support since changes and problems can be made over the phone or by the letter. They can back up immediately and for as many times as needed. They like our low prices. Unlocked software is GOOD FOR BUSINESS, our business, your business and the customer's business.

But what about pirates? Large scale pirates, those enterprising souls who copy our programs and sell them world wide, are discovered and given an option to become our dealers and pay us a royalty on distributed software (or meet us in court). As in the old sailing days, reformed pirates (privateers) make the BEST dealers and we don't mind sharing the wealth. For those who don't want to cooperate, we go back in history for the remedy. The English and Spanish both learned that a few executions were good for the morale of the troops. Small time pirates (give it to your friends) can be controlled by low program cost, registration, continuing up-dates and documentation. It just doesn't pay to get our programs second hand.

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Written by James L. Nitchals

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It is time the industry realizes, like the sailing ships of old, that our prime business is producing and distributing a product, not fighting pirates.

E. J. Neiburger
President
Andent, Inc.

Sir:

The RENUMBER utility program supplied with Apple DOS 3.2 and 3.3 has an insidious bug—after you use RENUMBER, your program may still appear to run perfectly, so you may not even notice that your program's operations have been altered! RENUMBER will correctly change all line number references to agree with the new line numbers. Unfortunately, RENUMBER may also alter any number in an arithmetic expression which (a) follows an asterisk (the multiply operator), and (b) has the same value as a pre-RENUMBER line number.

I obtained the corrections for the DOS 3.2 version from the Apple Hotline in May of 1980. I just discovered that the problem still exists in the DOS 3.3 version, and I am still seeing letters in various magazines from perplexed Apple users.

The fixes for the DOS 3.2 and DOS 3.3 versions of the program are similar—they involve swapping two data values in the program, as follows:

	DOS 3.2	DOS 3.3
From BASIC	POKE 4815,172 POKE 4816,171	POKE 4789,172 POKE 4790,171
or		
From monitor	* 12CF: AC AB	* 12B5: AC AB

To permanently correct the RENUMBER program, you must

(a) LOAD RENUMBER

(b) Do the two POKEs for your version of DOS.

(c) SAVE RENUMBER

All Apple owners should take note of these fixes—even if you don't use RENUMBER, you'll be able to help out the next guy, who may not have read about this problem! For your future reference, Apple dealers have a loose-leaf notebook which answers commonly-asked questions—including "What's wrong with RENUMBER?"—you just have to know to ask!

—Robert C. Leedom
Glenwood, MD

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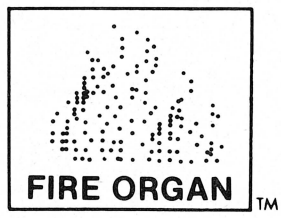

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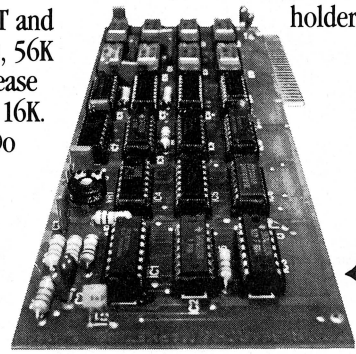

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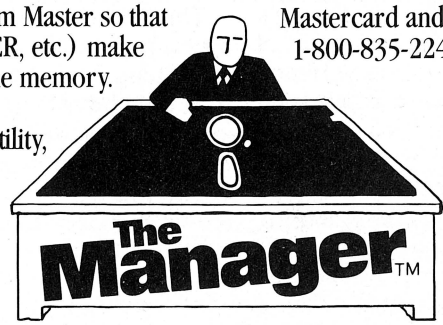

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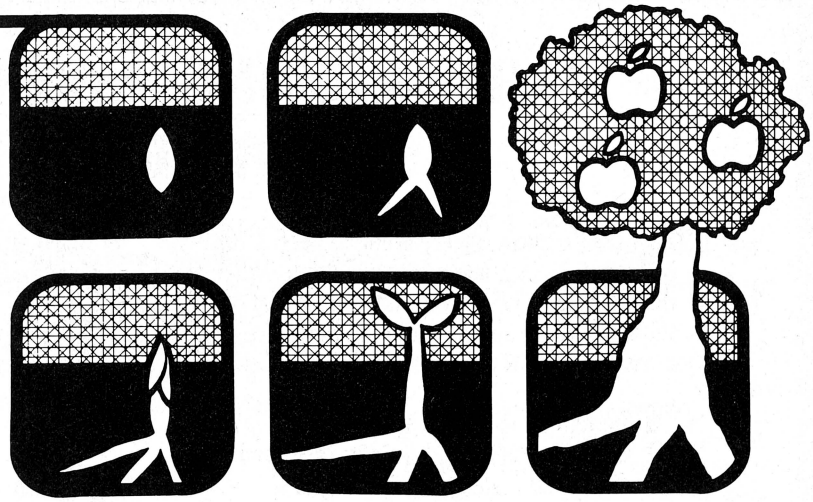
Planting a seed...



THE UNDERWORLD APPLE

As most of you know, we're constantly on the lookout for stories and leads about the many and varied uses to which our favorite machines have been put. We've heard of Apples on oil rigs and in archaeological digs, on farms and in cities; the uses are universal.

So it shouldn't have come as a surprise to read that the police in a medium sized city recently raided what we will call a House of Negotiable Affection, only to find that an Apple was being used by the entrepreneurs involved to catalog and file both the employees and the customers. Rates, dates, times, and results were all on file, presumably with an eye toward forecasting market trends.

Two thoughts occur, one sardonic, the other serious. First, a question: What kind of software were they using? DB Mistress? One of the farm breeding record packages? Maybe they rolled their own programs. By the way, if you have any suggestions along this ludicrous line, send 'em to us; the three or four best will receive a free *Apple Orchard* subscription or extension.

The second thought is the serious one. Given that the Apple is a device for improving business information handling, it's not too much of a leap to see them utilized in support of illegal activities. (We're not talking about disk piracy, Hiram, this is the Big Leagues.) If there's a horse handicapping program, or a football oddsmaking program, chances are that among the users are some who are profiting on a professional basis in areas where the gendarmerie frowns on that sort of thing. One has visions of disk files replacing the "flash paper" allegedly used by numbers bankers, with a bar magnet ready for use in case of a raid. Could it be that amortization schedules are useful to loan sharks? Please don't ask about crop growth programs in California or Colombia.

Well, don't blame the computer; it's only a tool, as we've said here before. It will be used for good or for ill, as its operator is inclined to good or ill.

What is interesting is that local, state, and national law enforcement agencies have become aware of the potential for aid to criminal activities that a microcomputer can provide. At all levels, we're beginning to see police personnel learning about Apples and other computers. Some are computer hobbyists, or have become so; others just see it as part of the job of trying to keep ahead of lawbreakers in the 1980's. The machines are on duty in many police stations, keeping track of and cross-referencing information in the more mundane areas of detective work. (It's interesting that some of these units are the personal property of the law enforcement officers, brought in for their own convenience. It's a result of the kind of bureaucracy that denies official funding, on the grounds that the main large computer should be used . . . but try to gain access to the monster. . . .)

The bottom line is that while Apples are being used in some rotten barrels, it is equally true that those who protect us are benefitting from the existence of our favorite machines. You may even be able to help the agencies in your community to improve their skills, which would be a good thing for everybody. And if you would violate the law with the aid of a computer, you should know that the law enforcement agencies are not unaware of how to do it... and how to find you.



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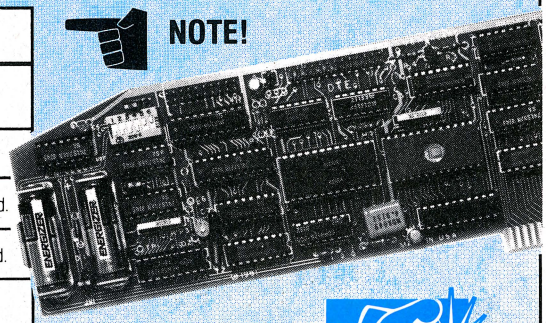

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LET THERE BE LOGIC
A Note on the Evolution of Computer Programming Techniques

by Joe Budge

"A major concern is frequently voiced in connection with very fast computing machines, particularly in view of the extremely high speeds which may now be hoped for, is that they will do themselves out of business rapidly; that is, that they will out-run the planning and coding which they require and, therefore, run out of work."

—John von Neumann, 1949

Modern observers commonly fear that the efforts required by computer programming hobble computer usefulness and form a major stumbling block in future computer development. John von Neumann, the inventor of computers, echoed the same concern thirty-two years ago when only a few computers existed. Today there are millions of computers in the public's hands, and a million score of potential applications exist. Yet good application programs take a year or more to design, write, and debug. The large investment of effort means only a fraction of the programs demanded actually exist. Individualised programs for personal computers are now almost impossible. It is feared that a shortage of programming talent will block the computer's true potential. But the fears of 1949 did not prove true, so what about the fears of 1982?

Similar fears have been present at several times in the history of programming. Each time the concern led to a revolutionary step in programming techniques. At every occurrence the revolution was characterized by a major crisis in two programming aspects: capacity and complexity. Crises in capacity arose when demands for service exceeded supply under then-current methods. Incapacity was always fed by a crisis in complexity, wherein programming problems became too involved for programmers to effectively cope. Many times a revolution in programming techniques has resolved the double crisis. New methods relaxes pressures until applications caught up with the new techniques, bringing on the next crisis. All signs indicate that we now find ourselves in a crisis of capacity and complexity. History shows that we can soon expect a solution. Let us look at the past, then, to examine our present situation.

FROM BEER TO BITS

Programming began with the development of the moveable cam in the 10th Century A.D. The cam itself is an eccentric bump off the side of a rotating shaft. As the shaft turns the cam pushes against a lever, which causes action. Cams first appeared in the third century B.C. in Greece. With cheap labor available mechanisation languished until the Dark Ages. The cam was rediscovered in 890 A.D. at the alpine monastery of St. Gall, possibly during the translation of Greek writings. The monks attached a cam to the shaft of the waterwheel to drive a hammer up and down. This hammer was used to replace the exhausting labor of pounding barley into malt for the monks' ale. This, the trip-hammer, was tremendously popular and quickly spread through the crude industries of Europe. One such industry was textile weaving which used the hammer to texture wool and pound cleaning ingredients. In the tenth century one group of weavers, made prosperous by the new technology, gave thanks by donating a new carillon to their church. The carillon of Mechelen became the world's first music box. Pegs, placed in holes on the surface of a rotating drum, pushed against levers to ring the bells. As holes extended around the drum's surface, pegs could be moved to play any tune. This was the moveable cam.

In the Mechelen carillon we see the first elements of programming. The technique consisted of four steps: creating a tune, translating it to a series of specific instructions for operating the machine, transferring these instructions into a physical pattern which would automatically direct the machine's actions, and debugging. Program debugging was important even at this early stage, for the whole town could hear any mistakes! What pressures or fortuitous events might have brought about this invention can only be guessed at. Perhaps a shortage of trained musicians was the cause. At any rate, the carillon and its immediate descendants did little besides prove their inventor's cleverness.

Music box technology remained static during the next 900 years for the want of practical applications. In the interim other forms of entertainment picked up the principle, using it for animated figures and player organs. Finally, in the seventeenth century the textile industry faced the first crisis of capacity and complexity we shall encounter. Oriental patterns of high com-



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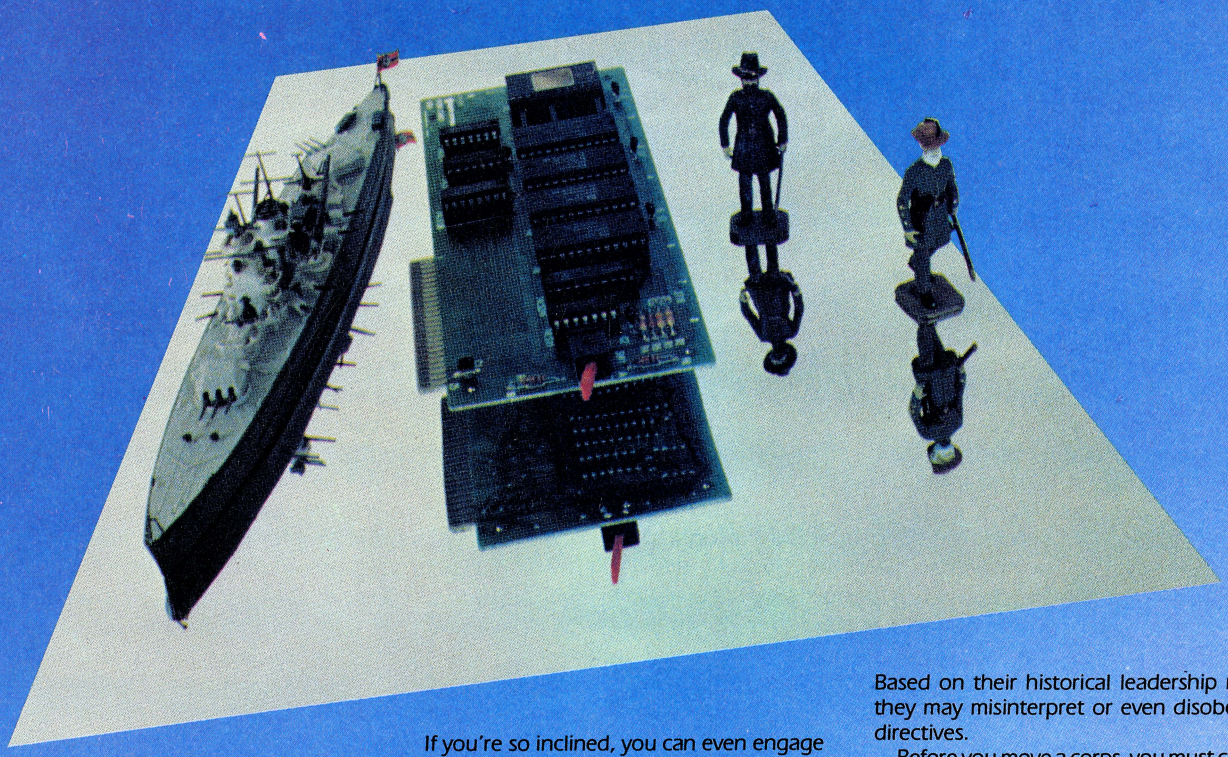

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If you're familiar with **Computer Bismarck** — which has become something of a phenomenon in gaming circles — you owe it to yourself to try this game. Like its older brother, PURSUIT OF THE GRAF SPEE has all the thrill of the chase, heightened by the complexity and richness of detail such as complete ship ratings for speed and strength, fuel restrictions, refueling capabilities, and realistic rules governing sighting and visibility.

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If you're so inclined, you can even engage in combat by using miniatures. Enter the results of your off-line battle and the computer will incorporate them into the strategic game.

This simulation contains two scenarios, all played on a 19-by-19 square-grid map of the South Atlantic displayed in colorful Hi-Res graphics. The first recounts the entire 25-day historic chase, where shadowing, pursuit and elusive maneuvers are your primary concerns. The second simulates the Battle of the River Plate, where the Graf Spee — already located — must deal with three British ships.

Finally, the solitaire scenario lets you match wits against the computer as it directs the Graf Spee. We wish you luck.

THE ROAD TO GETTYSBURG™ takes you even further back in time, to that fateful battle of 1863. This board-assisted computer simulation is designed to let you experience the actual feel of a Civil War command. Like a real Union or Confederate general, you must deal with the slow and frustrating dispatch system — your only means of communication with your troops. Knowledge of troop positions and estimates of enemy strength are only as good as your reconnaissance patrols.

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Again, you can use miniatures to resolve all battles if you so desire.

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plexity were in demand then. Weaving complex patterns was long, difficult work in which one mistake could ruin the entire piece. Basile Bouchon, son of a player organ maker, adapted the programmable music box idea to control the weaving pattern of a loom. Complex patterns could be generated easily and quickly with the new loom. At that time the music and weave patterns were punched in paper which was wrapped around the drum. Pegs were then inserted in the open holes. In 1741 Jaques de Voucanson, a talented maker of animated figures, improved the design by eliminating the pegs. Wires probed into the holes in the paper to determine weave design.

While music box looms were helpful, they still didn't solve the problem for very complex patterns. The pattern was limited to the circumference of the drum. In 1800 Joseph Marlie Jacquard eliminated the drum altogether, replacing it with a belt of punched cards that could be of any length. At a stroke, patterns of any size and complexity could be reliably duplicated. With this success programmable process control, using the old music box techniques modified by infinite program length, swept through the Industrial Revolution. Aided by the need for fast, error free processes in performing complex, variable tasks, the new technology was applied to metalworking and fabrication in many industries.

The second crisis of capacity and complexity occurred in the U.S. Census Office in 1880. Tabulation of that year's census took eight years to complete. During that time the population had grown and Congress demanded additional types of information. The next census was expected to have six times the amount of information, which would take 48 years to finish. This was clearly unacceptable for a ten-year census. Upon a suggestion from his boss an engineer in the Census Bureau undertook the task of adapting Jacquard cards to the processing of information. In 1889 Herman Hollerith published his design for the new tabulating system. Information was represented by quarter-inch holes punched in cards by a keyboard-punching machine. Other machines sensed the holes electrically to drive various counters. Hollerith's system introduced an important new element in programming technique: the translation of information into physical patterns in order to further process that information. This is to be distinguished from earlier techniques which applied the translated information directly to process control.

Hollerith's machines quickly proved superior to non-mechanical methods of information processing. Hollerith was granted the contracts for the censuses of 1890 and 1900. The Hollerith system gained acceptance with other governments and large companies facing similar information processing problems. But because of the expense of the machines and the labor of card-punching, the system was not immediately useful for smaller applications. In financial trouble, Hollerith sold his company in 1911. After merging with other companies, the corporation's name was changed in 1924 to International Business Machines.

OF SPIES AND BOMBS

The theoretical basis for automatic calculating machines was laid by two men. In 1836 Charles Babbage proposed a calculator controlled by two sets of Jacquard cards. One set would contain the numbers to be operated upon while the other set would contain the controlling information. The technology of the time could not build such a machine, so the idea languished. Babbage's work was largely forgotten until the Second World War, by which time it had only peripheral impact. Babbage's ideas were independently rediscovered in 1936 by the mathematician Alan Turing as presented in his paper on computable numbers. Again the technology was not adequate, nor was the need desperate, so Turing's theories remained unapplied until late in World War II.

During the war the British built extensive staff and facilities for decoding intercepted German communications. Spies provided the British with the plans of the German coding machines. For successful coding, the machine's starting position needed to be determined for each message. This could only be found by strategic application of brute force: trying all possible starting positions until one worked. Partial solutions could provide cludes, so the entire set of possible starting positions needed not be tried. Nevertheless the number of possible positions was astronomical. A message could not be decoded manually in time for the end of the war.

The decoding task provided the third crisis in capacity and complexity. In 1943 and 1944 Turing and his associates on the decoding staff built computing machines, named Colossi, to overcome this hurdle. A Colossus machine used two sets of information: a coded message, on punched paper tape, and possible solution keys, in computer memory. Various operations were performed on the data based on a program given to the machine by front panel switches. While the details of programming remain classified, an important technique was evident. This was the first application of programmed information controlling the processing of other information. Machines similar in principle were built by Bell Labs and a Harvard-IBM consortium.

War also provided the fourth crisis in capacity and complexity. Gunnery and bombing ballistics required extensive use of tables to allow for wind, powder load, declination, and so forth. These tables could have been determined empirically, but the Army took a dim view of shooting our own planes for the necessary experiments. In 1946 the U.S. Army commissioned the design and construction of ENIAC to compute ballistic trajectories. John Mauchly, at the University of Pennsylvania's Moore School of Electrical Engineering, provided the theoretical design. ENIAC was the first computer designed for calculations, and the first totally electronic computer. Calculations which would have taken seven man-years to finish could be computed in thirty seconds.

As a calculator, ENIAC was similar in its fundamentals to modern pocket calculators with memory registers. The central processor allowed the four arithmatic functions and registers for the temporary storage of results. ENIAC departed from calculators in the addition of conditional logic to allow comparisons of two numbers and in providing facilities for the automatic control of operations. Central processors of modern computers work essentially the same way.

ENIAC was significant in introducing computing techniques to general problems. Its mechanics combined elements from the past. Operand information was provided on punched cards while the control program was provided by setting up a telephone exchange style plugboard. Banks of jacks were set in the plugboard for each step in the calculation. Appropriate connections would direct the operations for each step. By

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COMPUTER SCIENCE COMES OF AGE

In the late 40's only a handful of true computers existed. These were all giant "brains," custom built for universities and the government. Von Neumann's theories of design and programming were published and quickly adopted because of their obvious advantages. Problems of programming capacity and complexity still continued, however. The main bottleneck was the expression of a computer program. All instructions had to be translated into numeric form before being punched onto tape for feeding into the computer. This translation was both time-consuming and confusing. Once a program was expressed numerically, it could no longer be easily understood by anyone. Consequently errors, either in programming or typing, were difficult to find. Steps to solve this problem were taken by the introduction of assemblers and trace routines.

An intuitive leap was required to realize that by using the power of the computer itself, programming could be significantly simplified. In 1948 M. E. Conway introduced the substitution of English abbreviations for numerically expressed instructions. A computer program, using these abbreviations for data, could then look up the corresponding numeric instructions and assemble the desired program directly in memory. In 1951 S. Gill wrote a control routine which would go through a program one step at a time, displaying the computer status at each step. This, the trace routine, proved invaluable in finding programming errors.

It soon became apparent that computers could be generally useful. In 1952 IBM introduced the first commercial computer based upon von Neumann's principles. With one machine design in the hands of many users, the programming techniques of the computer scientists were quickly implemented. The techniques were propagated by the appearance of SHARE, the Society to Help Avoid Redundant Effort. Once implemented, assemblers, subroutines, and trace routines became generally available.

These programming techniques still required considerable effort, which gave rise to the concerns von Neumann expressed in 1949. While computers had not run out of work to do, they required expensive staffs of highly trained programmers to translate problems into flowcharts and assembly language. A considerable body of subroutines had been built up, but programming still required that the linkages between subroutines be specified in minute detail. During the period between 1952 and 1956 several theoreticians began exploring the concepts of high level computer languages and implementing the results. Languages work like assemblers in substituting words for computer code. But unlike assembler words, a computer language word can stand for one or several subroutines. These words can then be built into semi-English or algebraic phrases to form complex functions. Phrases, in turn, can be put together to build routines and whole programs.

The impact of computer languages on programming techniques cannot be understated. One phrase (or line) can be written in a matter of minutes, and represents several hours of assembly-level programming. Moreover, being more like a natural language, a high level language is more easily learned by computer users. These advantages fostered the rapid adoption of languages among all computer programmers. Unfortunately it is impossible to write a completely general language which is applicable to all computer problems. Different problems can require different terms for their proper expression and solution. As a consequence languages are continually modified, refined, and rewritten from scratch. Due to this evolution, FORTRAN is the only surviving language from the 1952-1956 period. In 1972 as many as 170 different languages were in use, and more have been invented since then.

High level computer languages themselves brought on the seventh crisis of capacity and complexity. With the greater efficiencies languages provided, it became possible to approach more and more complex computer problems. Whereas 1,000 program steps were considered exorbitant in 1946, by 1968 programs of 10,000 lines were routine. Once again the complexity overwhelmed programmers, causing errors and inefficient program production.

To solve the crisis E. W. Dijkstra developed the theory and practice of top-down structured programming in 1968. The theory was based on his proof that any program could be broken down into three fundamental building blocks. These were the sequential step, the conditional branch (If . . .Then . . . Else), and the loop which repeats until a certain condition is met (Do loop). Top-down structured programming was a technique in which a problem solution was first stated in general terms, following which it was broken down into simpler parts that were either primitive elements or statements requiring further refinement. The breakdown continued until the entire solution was represented in primitive elements. At that point the solution could be translated into the high level language. Once coded, any changes had to be carefully documented to aid further debugging and program maintenance. The technique required tremendous discipline, but rewarded programmers with the ability to solve complex problems in fractions of the time previously required. The imposition of discipline slowed the adoption of structured programming, but necessity finally prevailed.

Simultaneous with Dijkstra's work on structured programming, an alternate solution to the complexity problem was developing. As languages had originally been implemented, each word corresponded to a specific group of machine language subroutines. The BASIC programming language is a good example of this. The introduction of ALGOL in 1958 provided a new type of structure. ALGOL was the first of the so-called "user defineable languages." Like other languages, ALGOL gave the programmer words which represented groups of machine language instructions. In addition ALGOL allowed the programmer to build a routine and subsequently refer to that routine with one word. For example, the programmer might design a complex routine to sort a data list. That routine could thereafter be invoked simply by the word "SORT." Thus one word could stand for many others, vastly reducing programming complexity. This feature "takes control of 'what is good for the user' out of the hands of the language developers and puts it in the hands of the users" (Sammet, 1972).

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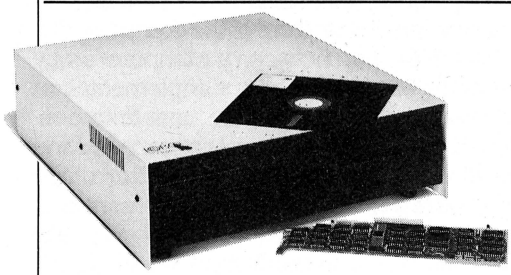

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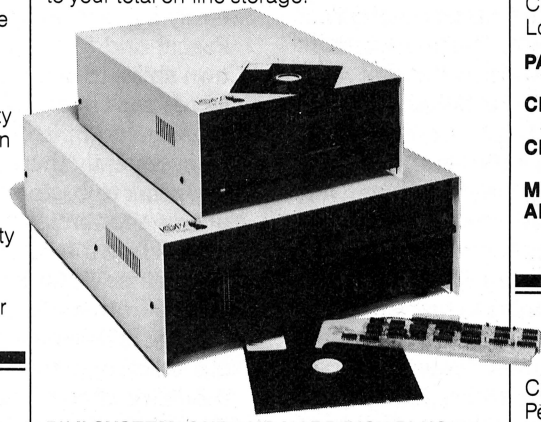

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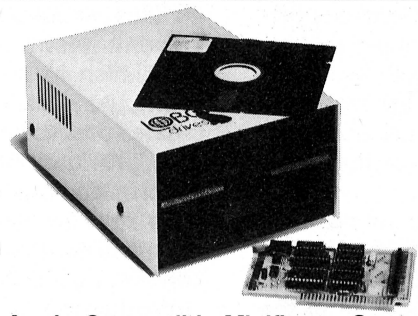

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using a plugboard ENIAC could read its instructions with electronic speed, rather than the slower electromechanical speed of a punched control tape. Similar technologies and techniques were employed by more limited electromechanical calculators developed by Harvard with IBM. These calculators were widely used by business and science in the late 40's, spreading the basic ENIAC programming technique.

While ENIAC was considered a giant "brain," it suffered one severe disadvantage. Once a program was determined on paper, it took roughly eight hours to set up the plugboard. This, for a program which could execute in five minutes! Recognizing this problem in 1946, von Neumann proposed storing the program instructions in computer memory. This new technique revolutionized computer programming in many ways. Its immediate effect was to drastically cut the time for inputting a controlling program into a computer. A new "brain," dubbed MANIAC, was quickly built by the Army to implement von Neumann's idea. MANIAC's primary job was solving the complex equations involved in designing the hydrogen bomb.

Experience with MANIAC soon pointed out unforeseen implications of memory-based programs, bringing on the fifth crisis of capacity and complexity within a year of MANIAC's construction. With the entire program now in memory, process control could jump from one part of the program to another based upon the results of conditional logic operations. The program could even modify itself as its operations progressed. At once computer programs were no longer sequentially organized steps and could not be dealt with by simply listing the operations in order. On top of that, the increased throughput of the machine demanded faster translation of the problem into operating steps and machine code on the part of the programmer.

Von Neumann introduced two new programming techniques to solve the crisis. He invented a new branch of logical science and on this based flowcharting to describe program logic. A flowchart is essentially a schematic diagram of the movement of operations control through the program. Flowchart writing, as a technique, was introduced between the programming stages of defining a problem and specifying stepwise instructions for its solution. The demand for faster programming was partially solved by introducing subroutines. Von Neumann recognized that many programs used identical pieces of code. Rather than re-write and recode these sections for every program, he began to save them on tape. These sections could then be re-loaded into the computer in the appropriate parts of other programs, saving considerable time.

Several languages since ALGOL have adopted the principles of user defineable languages. All contain deficiencies which prevent their widespread adoption. This can be seen most easily by examining two modern user defineable languages: Pascal and FORTH. Both provide the programmer with his own ability to define language words. But in Pascal the defined words can't be transferred from program to program. Routines must be completely respecified in each and every program. Consequently there is a strong tendency for the Pascal programmer to customize his routines for each application. Many of the economies of the user-defineable language are lost. FORTH, on the other hand, provides for the necessary transfer of routines between programs. This language unfortunately suffers from excessive abstruseness, however. Math and data storage techniques are based on Reverse Polish Notation and are stack-oriented. In English, this means the language is modelled after the underlying architecture of the computer. No attempt is made to bridge the gap between a computer's way of thinking and a human's way. As a result of implementation deficiencies, user defineable languages were unable to contribute to the solution of the early 1970's crisis of capacity and complexity. Their flexibility implied defineable structure. Due to this the languages were widely used to complement top-down structured programming, which provided the real solution.

This account brings us up to the present. We have examined seven crises in capacity and complexity. Each brought about a revolution in programming. The first two occurred before computers existed. Demand for intricate textiles led to automated process control. The vast scope of the 1890 U.S. Census provided impetus for the development of automated information processing. The third crisis occurred during World War II, when code breaking forced the construction of one-purpose computers and their control programs. Ballistics studies brought on the fourth crisis. This crisis was resolved by the introduction of general-purpose computers containing memory-based programs. The new computer architecture was the cause of the fifth crisis. A new logical science had to be invented to handle program logic flow. The incomprehensibility of computers generated the sixth crisis, causing the development of assemblers and high-level languages which expressed computer instructions in human terms. Finally, the scope of program applications brought on the seventh crisis. Development of top-down structured programming provided the solution. Poorly implemented user defineable languages also attempted to resolve the crisis, but failed.

THE EIGHTH CRISIS

While based on a solid foundation of computer science, programming techniques remain a highly disciplined art. Skills in the following procedures must be in the repertoire of every computer programmer:

1. Defining the problem
2. Outlining the solution
3. Selecting and representing algorithms
4. Coding
5. Debugging
6. Testing and validating
7. Documenting
8. Program maintenance

(from Schneider, *et al*, 1978)

Of these techniques, only coding can be viewed as reasonably straightforward. Even here, use of the technique presupposes intimate knowledge of the computer language selected. None of the skills are intuitive, so they must be acquired through appropriate training. This training involves education in logic, mathematics, computer languages, writing, and problem-solving. Needless to say, training a computer programmer is both costly and time consuming. While anyone with a computer might become a programmer, few users will have the appropriate combination of time, talent, and interest. Experience with modern computer users indicates that fewer than 10% will acquire the necessary skills.

Once the repertoire of techniques has been assimilated by a programmer, the question then becomes when and where to apply it? As mentioned above, a reasonably useful program can take a year or more to complete. Before undertaking the task, it would be useful to know how extensive is the demand for the solution which the program will provide. This is frequently unknowable, and can only be guessed. In addition the exact length of the programming task is uncertain. Against these risks, the programmer must balance the availability and adoptability of existing programs to the task at hand. As a consequence programming is usually started only when a problem is clearly and commonly perceived, is costly in relation to its automated solution, and is previously unsolved or inadequately solved.

The current state of unsatisfied program demand points to another crisis in capacity and complexity. Capacity is bound by the availability of skilled programmers. Computers have grown in numbers several thousand-fold since the last programming breakthrough, while the number of programmers has only grown slowly. Complexity is bound by the efforts and lead times of program development, forcing general rather than specific solutions. As in past crises, one might expect one or several breakthroughs which will surmount the hurdles. The seeds of these breakthroughs might already be with us.

Two recent developments seem promising and bear future observation. The first of these is the source code generator. As with the development of languages, the power of the computer is being turned to the generation of its own programs. In a source code generator the programmer is questioned by a computer program on the nature of his flowchart. The generator then proceeds to perform the actual coding task. These routines are still primitive, and have not yet resulted in a complete, finished application program.

The second breakthrough comes from the development of an object-oriented language, Smalltalk. Since the days of ENIAC, programmers have had to deal separately with data and the procedures to process that data. Matching appropriate procedures to various forms of data is unquestionably a time consuming art. In Smalltalk a given data structure implies the procedures which may operate upon it. An object is such a data structure with its associated procedures. To manipulate the data the programmer need only specify the desired result. The computer then selects the appropriate procedure and carries it out. Smalltalk was developed by the research labs of Xerox Corporation and released in August, 1981. Consequently its utility for general programming remains to be determined. Despite the uncertainties, both source code generators and Smalltalk hold out hope of breaking the programming barrier.

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CAI: Choosing Hardware and Software

by Ted Perry and Geoff Zawolkow

As computers become more and more useful in the educational setting, the educator is faced with a number of questions, in the two basic areas of hardware and software. It may not surprise you to hear that we consider the more important area to be software, rather than hardware. As you read, keep the following questions in mind: What are my computer needs? Which computer *system* (hardware and software) best meets those needs? How will new programs that I want be acquired or written? In general, what are the alternatives when looking for a system to do educational computing? These questions necessitate careful consideration, and answers should be found before buying a computer system.

SOFTWARE

The discussion and decision as to what type of computer system to purchase is an important one. However, nothing is more important than the amount and type of educational software available for that system. Since software for one system rarely runs on another, care must be taken to insure that appropriate software is available (or can be written) for the machine you choose. Generally, there are three types of software available:

1. Canned Software

The first type is commercially developed, "canned" programs. As with existing textbooks purchased from publishing companies, the content of this material cannot be altered in any way by the local teacher. It must, therefore, be used in the form provided.

The advantages of this type of software are cost effectiveness and ease of use. The material can be sold at a relatively low price per copy, since the software house or publisher expects to sell many copies. To do this, the software must be written in subject areas that are widely taught at a large number of schools. Examples of material with general appeal are drill and practice in math facts, or vocabulary development programs.

This type of program is generally easy to use, since it requires no input on the teacher's part. No special training is required of the teacher; all he or she needs to know is how to turn the computer on, and start the program running.

Most software in this category has the additional advantage of a student management system. The system keeps track of student progress on particular lessons, and in some cases will provide additional work, either on the computer or from other learning aids. Again, this adds to the ease of use of this software.

The weakness of this software is its lack of adaptabvility to specific student needs. This major drawback to commercial canned programs arises when a teacher feels that the software presents information which is inappropriate to the needs of a particular class or student; there's no way to add to or change the material. Either the teacher uses the computer lessons as they are, or the computer is not used.

So, despite their advantages, the canned programs cannot, alone, provide the most effective CAI system for a school or an individual.

2. Teacher Developed Software

The most obvious solution to the problem of software adaptability is to provide programming expertise to the teacher, either by training the teacher to program or by allowing the teacher to work with a programmer. In either case, the teacher becomes the author of new educational software, which can be adapted at the school site.

This kind of software has the advantage that it is written and modified to meet the specifications of the teacher; it's a custom tailored program. New software can be written as new applications are found. Using this approach, software can be written which has all of the benefits of canned software, while having the added feature of changeability to meet specific local needs.

But there are several flaws: time, and money. If you are familiar with computer programming you know that writing new software requires a large time commitment, even for simple programs. The more complex the task, the more time it takes to complete. Unfortunately, teachers today do not have the time to write computer programs and teach as well. And even if they did, the amount of time and training required to learn programming would be prohibitive for most teachers.

Well, programmers can be provided to actually *write* the software as teachers request it. But most schools just don't have the money to hire enough programmers to meet the daily requests of the teaching staff. Since programmers are expensive, it's doubtful that even the "richest" school district could afford to hire a large enough programming staff.

While, on a limited basis, providing programming skills or programmers to teachers can be helpful, it can't provide the complete answer to an effective CAI system.

3. Authoring Systems

A third type of software is called an "authoring" system. It allows a teacher, without programming knowledge, to put individualized lessons into the computer. A computer programmer develops software which provides a "framework" and guides the teacher through the creation of a computerized lesson. An authoring system is a tool used by the teacher to design and build educational lessons on the comnputer, in much the same way that a teacher designs and builds other educational materials like dittos, transparencies, and diagrams for the class.

The advantage of this system is that it puts lesson development *directly* into the hands of the teacher, without the need for extensive training. Once the authoring system has been developed, the programmer is no longer needed, saving both programming salaries and lesson development time. Since the teacher has complete control over the lesson creation process, lessons can be easily written or modified to meet specific student needs.

While an authoring system gives the teacher more flexibility than either canned software or locally developed software, it does have its price. That price, which a teacher must pay, is lesson development time. Remember that in the other two software types, the teacher uses existing programs as is. With an authoring system, the teacher is actually responsible for "authoring" the final product; he or she puts the "meat" on that framework. Yes, it's much easier and faster than preparing a program from scratch, but it still requires the teacher's time.

There are two ways to alleviate this problem. The first is to collect all developed lessons into a library, which can be shared by all of the teachers at a school. Given enough time, a large variety of lessons will be collected and will be available to all of the teachers, assuming that a filing and cataloging system is in place.

Second, aides can be used to actually type lessons into the computer, with the teacher's time utilized in the design and general layout of lessons.

While each of the software types discussed have their advantages and disadvantges, an authoring system provides the most versatility in Computer Aided Instruction, by providing the teacher with flexibility at a low price. It puts lesson development under the control of the teacher and allows for the development of software to meet the individual needs of each student.

HARDWARE

What kind of hardware (the machinery) should be used in an educational system? Not too many years ago, it was an impossible dream. But in the past five years, many changes have taken place in the hardware available to educators. Let's trace the volution.

1. Large Timeshare Systems

This was the "mainframe," or large computer option; timeshare systems consisting of a central processing unit (CPU), multiplexer, disk, drum, or tape storage units, with telephone hookups (modems) providing the link from the computer in the basement to many classroom terminals.

A timeshare computer allows users to share the central processing unit and disk drives, which in the past tended to be the most expensive components of the computer system. Another advantage to timeshare is that it allows all the terminals connected to have access to the same programs from the central disk storage.

Although many large school districts already have a centralized computer system for business functions, the high cost of terminals and telephone connections often prohibit the use of the computer for educational functions.

In addition, the systems' dependence on telephone connections necessitates locating the computer terminals in one central place and running telephone or cable lines to each terminal location. Placement of terminals in individual classrooms is both costly and difficult.

The timeshare system is further limited because the central processing unit's computing power is being used to run multiple terminals, and therefore often cannot provide desired features such as color graphics, voice and sound production, and animation. Difficulties with timeshare systems lead us to investigate the microcomputer; but let's not be too harsh on what we call the computer "dinosaurs" today; it's not too long ago that they were the only game in town.

2. Microcomputers

Recent technological changes have facilitated the development of the microcomputer, a small self-contained computer system that looks like a terminal for an older system, but which

contains its own CPU and storage system. Since it's self-contained, it can be set up in any location. And, the cost is not much more than that of the timeshare system's terminals alone, which makes the microcomputer both adaptable and affordable. And the microcomputer's flexibility also gives the user some features often missing in the timeshare system; graphics and sound.

The main drawback of the micro is that since each computer is independent, it requires its own storage system. Thus, if a school has twenty computers, a copy of each program must be provided to each computer separately to allow all of the computers access to the same information.

Keeping track of student responses to computerized lessons becomes particularly difficult with independent micros; full information on a student is scattered among one or more of the disks in the school. This co-ordination of information, which was accomplished automatically on the timeshare system is more cumbersome with independent micros.

3. Networked Microcomputers

The solution to the problem of access to software and student records is solved by the networked microcomputer system, a compromise between the independent microcomputer and the fully integrated timeshare system. The computers each perform their own processing, but unlike independent units, they share a central data storage system.

Networking not only allows all of the micros access to the same data, but if a school has a large number of computers, it's actually less expensive than purchasing individual disk drives for each computer.

As with any solution, this too has a drawback: loss of some of the flexibility inherent in an independent system. We're back to cables being needed to connect up the system, which reduces portability of the machines.

In an educational setting where a computer laboratory is to be established, the networked microcomputer is ideal. Independent micros are preferred where the units must be shared or moved from place to place.

The best solution, which *has* been worked out for the Apple II, is the unit that is flexible enough to be used either as part of a network, or unplugged for use on its own.

CONCLUSION

Equipment flexibility, reliability and cost are important factors in the hardware selection process, but without the software, the use and benefits will be limited. Educational software that meets the requirements of a given situation is not easy to find, but it is the controlling factor in the success of a CAI system.

Thanks to the large number of software producers involved with Apple II software, there seems to be more good educational software available for the Apple than for all of the other micro brands combined. That software availability, along with the equipment reliability and capability of operation alone or as part of a network, gives the Apple a considerable head start in helping educators to solve the local CAI equation.

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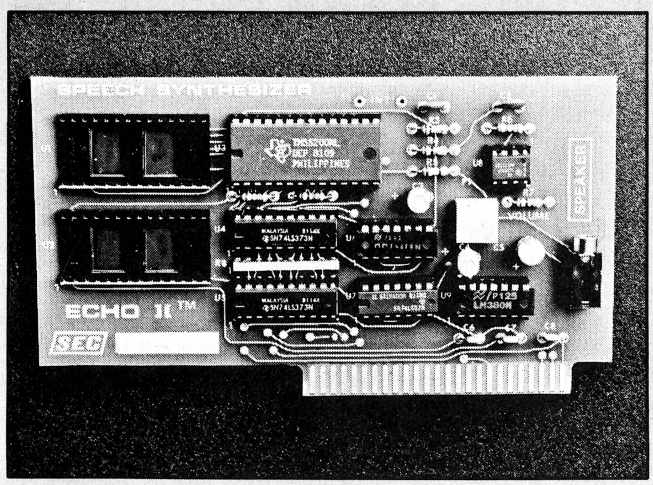

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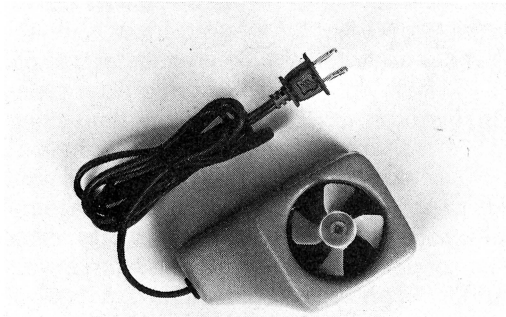

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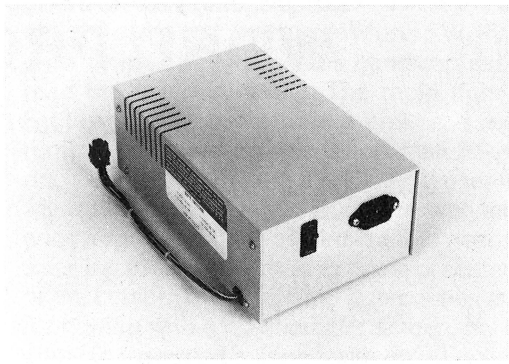

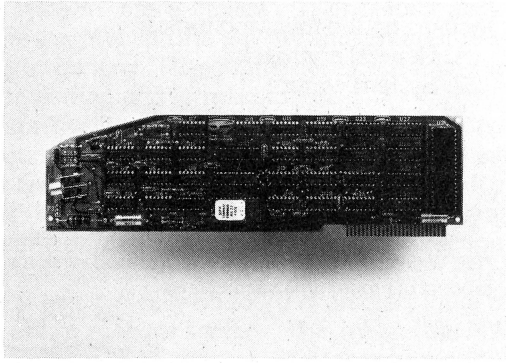

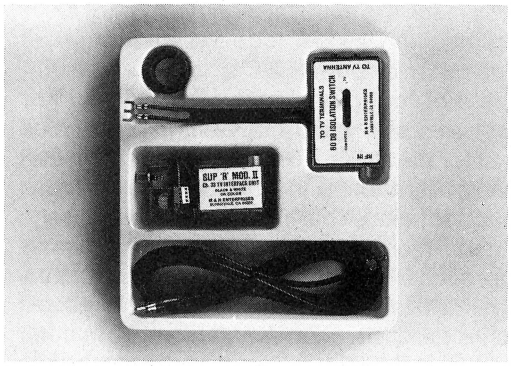

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*Version 2.5

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The SUP'R'MOD II is a wide band black and white or color compatible interface system intended to convert the home TV to a full video display for home computers, CCTV cameras and similar systems which output NTSC compatible composite video. The SUP'R'MOD II is pre-tuned to U.S. channel 33 (UHF), includes a coaxial cable and antenna transformer, and in conjunction with a standard home TV set, insures safe isolation and high performance.

SYMBOL	DESCRIPTION	TYPICAL	UNIT
F_c	Vision Carrier	591.5	MHz ± 0.5
I_{cc}	Supply Current	2.0	Ma
VO (Hi)	RF Output, $V_{mod} = 0$	1.5	Mv
VO (Low)	RF Output, $V_{mod} = 1.5$	-20.0	dB
R_{in}(mod)	Modulation input resistance	700.0	Ohm
V_{osc}(Min)	Oscillator stop voltage	2.0	Volt
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A COMPARISON OF MAGIC WINDOW, EASYWRITER & PIE WRITER* WORD PROCESSORS

by David Harvey

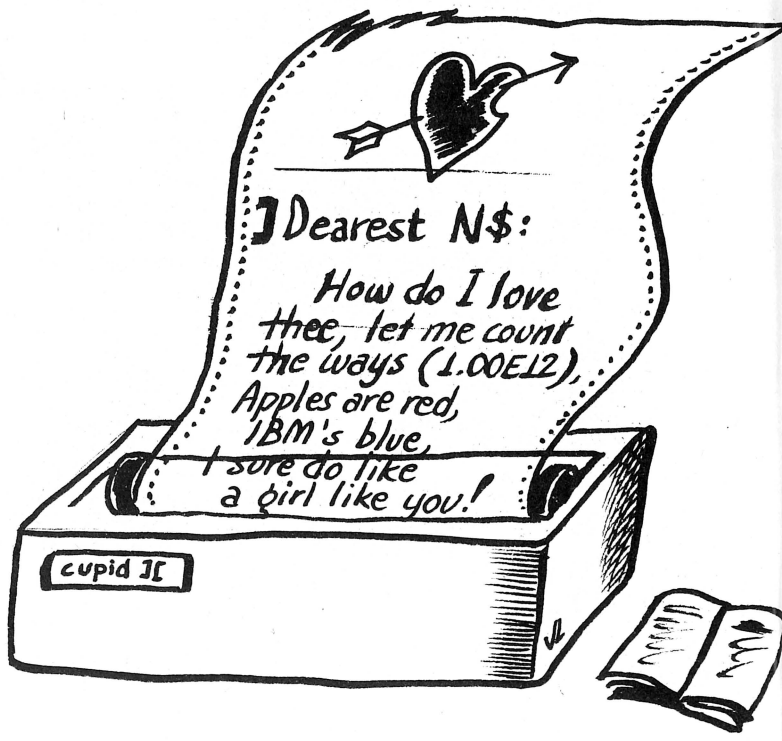
INTRODUCTION

There are nearly two dozen word processing systems currently on the market for the Apple II microcomputer. The task of choosing the one system that is just right for the work that you do could be monumental. Your first thought might be to try out several systems in order to choose the one that works best. Since this approach is both time consuming and expensive, you probably will avoid it if at all possible. The most common approach is to solicit recommendations from other users and to gather as much information as you can, before purchasing and learning a particular system. The problem with this approach is that most people will recommend the system that they themselves use because they know what the system can do. Further, all producers of word processing systems will promise that their systems can do many and wonderful things. Indeed, they probably can! The most common approach, therefore, often leads to a less than optimal choice. Once such a choice is made and the system is used, you are very unlikely to even consider changing word processors. You are, in a sense, captive because you will want to avoid the time and inconvenience required to learn a new system.

I recently decided I wanted a word processing system for my Apple II. Since I was a relatively new user of word processing systems, I had not sure way of sorting through the claims and promises made. I did not want to start with a system without being sure that it was going to be the best choice. I evaluated three systems, Magic Window, EasyWriter, and PIE Writer (referenced in the text as MW, EW, and PW respectively). I compared the systems in two ways, first for the methods and key-strokes used to effect specific editing functions and second, for the relative ease of use when employed to process text materials typical of home and professional settings. The first comparison is a specific, point-by-point, comparison and focuses on the following topics:

1. General approach
2. System control
3. Text editing features
4. Text entry and formatting features
5. Miscellaneous system features

*PIE Writer, by Hayden Book Co., is a revised version of Apple PIE, formerly a product of Programma International.



The second comparison is a general, subjectively weighted comparison of the unique features being offered by these systems when used to process the text material peculiar to my needs.

I used the three systems on two Apple II computers, each equipped with disk drive and Epson MX-80 printer. One was also fitted with a Paymar lower case adapter. But, since neither computer was equipped with an 80-column board, the systems were tested using only the normal, 40 character, monitor screen. I tested the ability of each system to process certain text material, namely, reports, letters, and charts & tables. My evaluation does not extend to do such things as: access foreign files, edit computer programs, form letters, etc.

Part I
SPECIFIC FEATURES COMPARED

1. General Approach: A word processing session generally follows a sequence of operations in which the user:

- boots disk, enters editing mode, types rough draft
- saves draft, prints draft, makes editorial corrections
- recalls draft, edits/formats draft, saves draft
- prints final draft, and repeats above as necessary

Throughout the session, editing text and formatting text are the principal activities, and this is where the system's features and characteristics are most significant. Editing includes cursor control, viewing text, and character/line editing functions. Editing operations are achieved through the use of multiple keystroke commands. While editing commands are all very similar for these systems, there are two very important differences between the way MW and the way PW and EW approach word processing in general. These differences are found in methods used for viewing and formatting text.

The producers of MW liken their system to a typewriter with a small window mounted just above the keyboard through which the user views only a portion of the total page being typed (i.e. 40 characters × 23 lines). The MW user types his text exactly as he would like to see it printed. As they say in their introduction, "What you see is . . . what you get." The user, therefore, must type the full line of text, typically 65 to 70 characters long, or nearly the width of two monitor screens. This means the MW user is unable to view the complete line of text at any time. MW includes what is called a "wrap-around" feature. That is, it sends a carriage return when the line length is reached. The wrap-around feature automatically moves partially completed words to the next line of text. Wrap-around allows the user to type text without paying attention to line length or carriage returns.

The EW and PW user is not concerned with how the text looks as typed, only how it will look when it is formatted and printed. That process occurs during the printing cycle. Both the EW and PW users type on with unfettered abandon, because first, they do not care how the text looks at this stage, and second, when using EW and PW (in paragraph mode), wrap-around occurs at column 38, keeping the entire text on the viewing screen. To set up paragraphs, indents, and other text positioning, the EW or PW user inserts into the text, non-printing format "codes" and visualizes in his mind how the final text will look when it is formatted and typed. Although the paragraph mode is characteristic of both EW and PW, the PW user can opt for a "no-fill" mode. In the no-fill mode, PW is similar to MW with regard to viewing and printing text material. Two additional major differences between EW and PW are first, in EW there is no auxiliary screen; instead, there is word wrap-around when inserting more text than can be handled on a 38 character line, and second, upon scrolling text off the screen, all unnecessary blank characters are deleted to economize on disk storage space.

For viewing text, both the MW and EW/PW approaches have drawbacks. The MW user is handicapped by the inability to read the text very easily. The rapid right-left-right scrolling (using tabs) in order to see and read a full line of text is reminiscent of watching a tennis match while standing at the net. On the other hand, the EW/PW user is able to read text without scrolling sidways. But since everything is in short sentence fragments, he too is limited and needs extensive vertical scrolling to see more than a couple of sentences on either side of the cursor. These viewing approaches are simply methods for coping with a 40 character screen. My comments do not apply to systems equipped with an 80 column board.

As for formatting text, there are again positive and negative features to the two approaches. Formatting text manually with MW takes longer, but it is much simpler and does not require that you remember a long list of format codes needed to format text as in PW and to a lesser extent EW.

2. System Control: Word processors are required to perform at least four basic functions: editing, filing, formatting, and printing. Additionally, most word processing systems provide support programs for interfacing with the user's particular hardware configuration. Table 1 describes the approach used by each of the three word processors to direct the user through their respective systems and subsystems.

TABLE 1—SYSTEM CONTROL FEATURES

Function	Magic Window	EasyWriter	PIE Writer
Editing	EDITOR	Editing	Command—E/R
Formatting	*FORMAT	Format c.i.t.	FORMAT c.i.t.
Filing	*FILER	*Disk filing	Command—DOS
Printing	*PRINTER	*File printing	FORMAT—print
Configuration	*CONFGRTN	*Printer confgtn	SYSGEN P or F
System Control	*SUBSYS MENU	cnt'l P or K	Command—E/R/F

*=menu driven
c.i.t.=codes in text

The primary difference noted for these systems is their respective use of menu-driven system control features, and formatting codes-in-text. In Table 1, it is obvious that MW effects system control almost entirely through the use of menu-driven subsystems. These subsystems are accessed through the main traffic controller, "Subsystem Menu." The approach PW uses is nearly the opposite. There are only two principal subsystems in PW, the Pie "Command Processor" and "Format." The only menu appears when the disk is first booted and the user is given the option of "Pie Editor," "For-

TABLE 2 TEXT EDITING FEATURES

	MW	EW	PW
CURSOR MOVEMENT	fixed cursor		
" UP/DOWN 1 line	^q/^z	^w/^z	^c/^e
" LEFT/RIGHT 1 character	^h/^u or ←/→	^a/^s or ←/→	^s/^f
" directed to LINE nn	--	--	E nn^t
" directed to COL nn	--	--	E nn^f
" directed to END of File	^a	^b	E ^t
" directed to START of File	^e	^r	^t
" directed to TOP/BOTTOM	--	^q (home)	^d/(toggles)
TAB SETS FOR CURSOR MOVEMENT			
Preset tabs	none	yes (8x)	yes (8x)
Settable tabs	S^n	in print mode	Es^a
Tab LEFT/RIGHT	^a/^s	^t (R.tab only)	^a/^g
Tab to END/START of line	--	--	^b/(toggles)
SCREEN AND PAGE MOVEMENT			
Screen Up (cursor→end of text)			
" UP " " 1 LINE	^z	^z	^y
" UP " " 12 LINES	^x	--	E ^y
" UP " " nn LINES	--	--	E nn^y
Page UP " " 1 PAGE	^p→	^x	^r
" UP " " nn PAGES	^p nn	--	E nn^r
Screen Down (cursor→start of text)			
" DOWN " " 1 LINE	^q	^w	^n
" DOWN " " 12 LINES	^w	--	E ^n
" DOWN " " nn LINES	--	--	E nn^n
Page DOWN " " 1 PAGE	^p←	^e	^v
" DOWN " " nn PAGES	^p←nn	--	E nn^v
" DOWN (HOME Cursor & PAGE)	--	--	E ^v
CHARACTER EDITING			
INSERT blanks	^f	--	--
INSERT character "Mode" (in/out)	--	^f/any^char.	^p/^p(toggles)
Character DELETE	^d	^d	^j (gobble)
LINE EDITING			
INSERT line	^i	^g/^g	^i
CLEAR (delete) line	^o	^y	S ^n
CLEAR ALL BLANK lines	--	clears on scroll	E ^b
CLEAR TO END of line	^l	--	E ^j
SPLIT line at cursor	^t (split)	--	E ^i (split)
JOIN (Append) following line	E ^g (glue)	--	E ^k
MOVING TEXT			
Temporary storage buffer size	16 line stack	32 lines	21 lines
Clear line to buffer	^k	--	^k
Clear nn lines to buffer	repeated ^k	scroll text	E nn^k
	adds to stack	t.o.p.^nc/^ns	(push del)
Copy line to buffer	--	--	^l (push)
Copy nn lines to buffer	--	--	E nn^l
Move lines mm-nn to buffer	--	--	E mm-nn^o
Recover line from buffer	^r (recover)	^nr	^o (pop)
Recover nn lines from buffer	repeated ^r	^nr	^o
STRING SEARCH AND REPLACE			
Search forward for string ss	^y (menu)	^v (ss)	E ss^z
" backward for string ss	na	no	E ss^q
Wild card search (i.e. s##s)	--	yes	yes
Insert string ss	--	--	E ss^p
Search for ss1, replace with ss2	--	--	E ss E ss^x
Global search and replace	--	--	E ss Ess^w^x

NOTE: ^ = Control nn = any number
E = Escape ss,ss1, & ss2= any string
S = Shift () = name/function description

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Get 2-byte values	Multiple poke hex	Swap variables
Gosub to variable		

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TABLE 3 TEXT ENTRY AND FORMATTING FEATURES

	MW	EW	PW
CHARACTER SET MODIFICATION			
Upper/Lower Case SHIFT/SHIFT LOCK	E/EE	E/EE	→/→→
Control Characters in Text	--	.u@(ASCI nn)	S^m"char"
User Defined Characters	--	yes (see above)	--
Special Characters not on keyboard	(3)	(11)	(11)
TEXT ENTRY FEATURES			
Page Borders Shown	(4) Sides	none	R. side only
Screen Size (lines x characters)	23 x 80	23 x 39 (2)	screens 21x38
Ditto	E^v	--	--
Line Duplicating	E^v(repeat)	--	^l/Cr/^o
Cursor Wrap-around	at line length	col 38	col 38
Paragraph Mode (fill text in p. form)	--	yes	yes
No-Fill Mode (print what is on screen)	yes	--	yes
TEXT FORMAT FEATURES - ON SCREEN			
Auto Indent Mode	--	--	yes(E^a)
Block Shifting of Text	--	--	yes
Cursor Defined Arguments	--	--	E^f/g/s/a
Centering Text	^j (menu)	see below	see below
Right Margin Justified	^j (menu)	see below	see below
Line Spacing	FORMAT menu	see below	see below
Page Display	yes	--	in no-fill only
TEXT FORMAT FEATURES - IN PRINT			
Right Margin Justified (on/off)	see above	.j1/0	.ad/.na
Centering Text	see above	.c	.ce
Temporary Indent (adjust L. margin)	--	.m nn	.ti nn
Underline Text	on next line	unkwn	.ul
Stop Print for Keyboard Entry	--	--	.gl
Line Break	--	S m	.br
Blank Lines to Format Page	--	(repeat S m)	.sp nn
PAGE FORMAT FEATURES - IN PRINT			
Line Spacing	see above	P menu/.s nn	.ls nn
Page Length Adjustment	FORMAT menu	P menu/.g nn	.pl nn
Text width Adjustment	FORMAT menu	P menu/.l nn	.ll nn
Maximum Text Width (characters)	80 char.	125 char.	132 char.
Left Margin Adjustment	FORMAT menu	P menu/.m nn	.in nn
Top/Bottom Margin Adjustment	FORMAT menu	--	.M1/2/3/4 nn
Head/Foot Titles	^j menu	Head title only	.he/fo aaa
Page Numbering	^j menu	P menu/.n nn	.he/.fo'%%%'
Page Adjustment for "Hanging" Lines	--	--	.ne nn

NOTES:

^ = Control
E = Escape
S = Shift
nn = any number
menu = avail. on a menu
(.) precedes print format code

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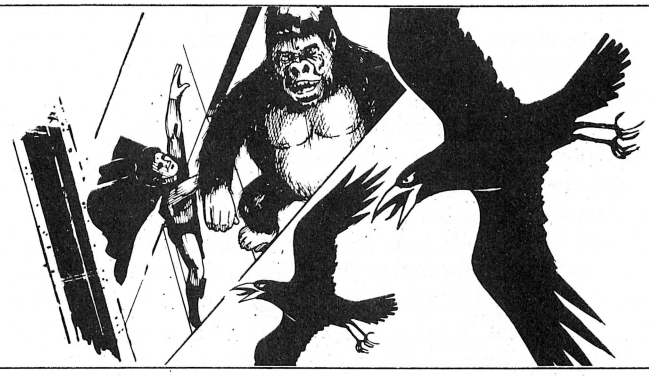

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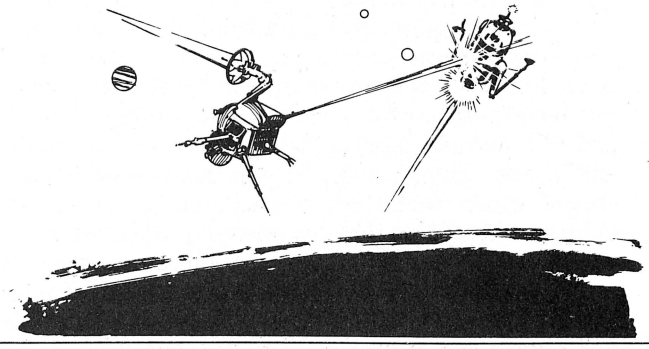

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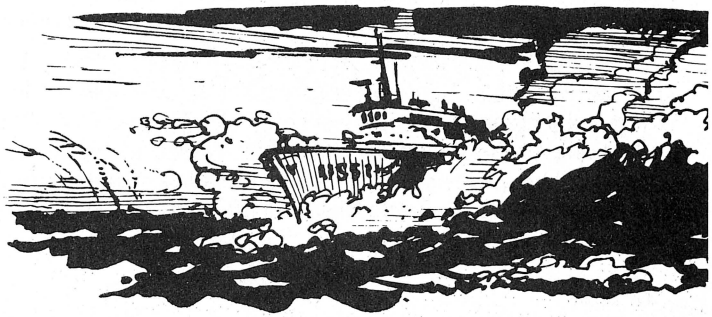

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mat," or "SYSGEN Pie/Format" programs. The latter contain the default parameters for the editing and formating function keys. In PW there is no menu for page formatting since all format instructions are made in the text proper. The remaining functions (i.e., editing, formatting, and printing) are described in the following sections.

3. Text Editing Features: In this section and the section following, the supported features are presented in tables showing the keystrokes used by each of the three word processors. Differences between the systems are easily noted. If a capability does not exist within a system it is noted in the table as "—", or if not applicable for a system it is noted, "na." The note, "menu" means that the feature is available through a menu selection. These tables use many cryptic notations which describe keying operations. Since it is important that these notations are easily understood I will take a moment to describe them in detail.

Word processing systems for microcomputers provide editing functions which are accessed by multiple keystroke sequences usually beginning with: "depressing CONTROL and keying in a letter." These special function keys are often given a second set of names, such as "DEL" or "LTAB," to help the user remember them. The systems use additional function keys such as ESCAPE and SHIFT in combination with the CONTROL key to further expand on the number of functions available. As many as five keystrokes are sometimes needed to effect rarely-used functions. The notation used in the tables below to describe these keystrokes is as follows.

- The character "★" denotes "control"
- Any letter used will be in lower case
- The capital letter "E" means "escape"
- The capital letter "S" means "shift"
- The lower case "nn" means a number (e.g. lines)

Thus, the notation, ES★B, means "ESCAPE pressed and SHIFT & CONTROL held down while pressing the letter "B".

In Tables 2 and 3 following, text editing and format features are grouped into (a) cursor and screen/page movement, character setting, line editing, and (b) text entry and format functions.

4. Text Entry and Formatting: The differences between MW and EW/PW are most graphic in the method used for formatting text. Word processing systems for the Apple fall into two groups: (1) where formatting is done on the monitor screen and the printer prints what is shown, and (2) where the formatting is done internally at the time of printing. MW is an example of the first and EW is an example of the second. The PW user can have it either way, or mix the two within a single body of text. For example, most of this text was written using PW in the "fill" mode. Tables 1, 4 and 5 in this text were composed in the "no-fill" mode. Yet the article was printed as a single text. Text entry and formatting features offered by the three systems are shown in Table 3. This table also introduces the imbedded print codes noted in Table 1 as, "codes-in-text." These codes must start a line with a period (.) followed by one or more letters and often a numerical argument. Both EW and PW systems require a single line for each formatting code. The codes are non-printing and do not interfere with the printed text.

5. Miscellaneous System Features: The above tables provide for a point-by-point comparison of MW, EW, and PW. There are, however, additional features which need to be noted in order to have a complete description of what is being offered by the three systems. Table 4 lists features which the producers claim are available.

TABLE 4—SPECIAL FEATURES COMPARED

	MW	EW	PW
Special Applications Supported			
Used to Edit Basic/Pascal Pgms	yes	no	yes
Electronic Mail Applications	yes	yes*	yes
Page Stop for Form Replacement	yes	yes	yes
Form Letter w/Data File Input	yes*	yes*	yes
Append or Insert Files into Text	no	yes	yes
Linking Extra Long Files	no	yes	yes
Mailing Label Applications	yes@	yes*	yes@
Multiple Disk Drives Supported	no	no	yes
Special System Features			
Reset Recovery	yes	partial	yes
80 Column Board Supported	no	yes*	yes*
Lower Case Adapters Supported	yes	no	yes
Overprinting Supported	no	yes	yes
Proportional Fonts Supported	no	no	yes*
Incremental Spacing Supported	no	yes	yes
Sub/Superscript Print Supported	no	yes	yes
Boldface or Overstrike Supported	no	yes	yes*
Tabs in Print Mode	no	yes	yes*
Selectivity Print Part of Text	yes	no	yes
Mark Page Perforations	yes	no	no
Keypressed Sound Available	yes	no	no
Bell Tabs Available	no	no	yes
System Documentation (pages)	44	64	150
Price (approximately)	$100	$130	$150

NOTES: yes* = with optional version (may be priced differently)
yes@ = by specially configured text

Part II
SUBJECTIVE EVALUATION

The development of a word processing system involves striking a balance between system complexity and features offered by the system. Consequently, some word processors are very easy to use as long as the text material is limited to a certain category, e.g., straight letter text. Others are very detailed and can be effectively used to process a wide range of text involving such items as computer programs, tables, charts and graphs. The word processing system which is appropriate for one user is not necessarily appropriate for another. In Tables 2 and 3 it is clear that PW includes many editing and format features not offered by MW or EW. Whether these features are a boon or a bane depends on the user's intended application. Below, the systems are compared for their respective ease of use for the work I attempted with them.

Cursor Movement: Both MW and EW employ the "arrow" keys to move the cursor laterally. These keys are located next to the "repeat" key which allows rapid cursor movement using two fingers of the right hand. This is clearly an advantage over the PW keying sequence. On the other hand, PW offers "toggle" keys that are very useful for moving the cursor and this tends to lessons PW's disadvantage in this regard.

Text Viewing: For the text that is formatted on the screen MW seems easier to visualize than PW because the viewer is not jockeyed between the primary and auxiliary windows. (Note: EW does not have a "no-fill" mode, which makes formatting on the screen meaningless.) For the text that is formatted when printing (i.e. EW and PW), the difference in viewing text is very minor when entering the text for the first time. However, when editing the text a difference

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develops when inserting words or phrases. In EW there is a word wrap-around which occurs when the insertion generates a line greater than 38 characters. In PW the lengthened line extends into the auxiliary window, and this has both good and bad points.

Char. Editing: The three systems are the same when it comes to character deletion. They differ significantly on character insertion approaches. The approach used by MW is to insert a sufficient number of blank characters then type in what is desired and delete any excess remaining. Although it sounds complicated it is very easy to use. EW and PW have the user enter an "insert" mode and type what is desired directly in place. Both approaches cause the text to be pushed ahead of the cursor.

Line Editing: Line editing involves a number of operations: line insert, line splitting and joining, and moving lines in and out of a temporary memory buffer. Overall for line editing I rank the sytems: MW, PW and a distant EW. The reason for this has to do with methods used for moving lines from one part of the text to another. MW uses a "stack" approach for loading lines into buffer and I found this easy to use and quick for moving short line segments. For larger blocks of text I found the cursor-defined operations in PW to be especially useful. In both cases the procedure for moving text is more controllable than the EW approach which requires that text be moved to the top of the screen before it can be transported to the buffer.

Print Format: This comparison is between EW and PW and their use of imbedded print formatting codes. It is not applicable to MW. I found little difference between the two systems when used to format straight text. There was a considerable difference, however, in the method used for spacing text on the printed page. EW offers a print tab feature that is very handy, but it was difficult to solve all of the spacing problems I encountered with tables like Table 2. Also, since in EW the text is "packed," you are required to place a non-printing, "shift-m" character after each line. PW takes a different approach. When formatting becomes so involved that it is difficult to use the imbedded codes, you can switch to a "no-fill" mode where the system will print exactly what is shown on the monitor screen. In this mode PW is very similar to MW in operation. I used PW in the "no-fill" mode for Table 3 and both PW and MW for Table 2. There was little difference between the two and both were very superior to EW in this application.

System Control: It is difficult to make categorical statements about system control features. All three offer direct, uncomplicated methods for moving from one subsystem to another. The most tutorial of the three is MW which uses five subsystems and five menus. This is a valuable feature for new or infrequent users. PW uses two main programs, Command Processor and Format. It is the most direct approach of the three, where you do everything except printing with the Command Processor subsystem. PW even allows normal DOS file maintenance commands including "catalog" to be accessed directly. The problem with the PW approach is the long loading time required for switching from Command to Format and back. EW uses a menu for filing and printing operations. These are direct and effective. The only problem I encountered was that printing speed was very slow. This might be remedied but I found no reference to this problem in the system documentation.

The following table shows a functional comparison preference chart where I have subjectively ranked each of the three systems with respect to each other.

TABLE 5—FUNCTION COMPARISON—SUMMARY
(Rank Order of Preference)

Function	MW	EW	PW
Text Viewing—formatted	1	3*	2
Text Viewing—in "fill" mode	3*	1	1
Cursor Movement	1	1	2
H/L Case Shift/Shift Lock	1	1	2
Character Set Available	3	1	2
Use with Special Printer Options	3	2	1
Tab Set/Clear	1	3*	2
Editing			
Character Delete	1	1	1
Character Insert	1	2	2
Line Insert	1	2	1
Block Move to Buffer	2	3	1
Recovery from Buffer	1	3	2
Cut & Paste (or equivalent)	1	3*	1
Ditto/Line Duplicating	1	3	2
String Search and Replace	3	2	1
Formatting Text—on Screen	1	3*	1
Formatting Text—in Printed Output	3*	2	1
System Control—for File Maintenance	3	2	1
System Control—for Printing	1	3	2
General Ease of Use—Tutorials & Aids	1	3	2

*not available—ranked #3

If nothing else the above table illustrates the problem of choosing a word processing system. Neither of the three dominated the ranking. In the final analysis more weight must be given to certain functions or features in order to establish an overall preference. From what I learned while conducting this test I would weight cursor movement, character/word editing, and text formatting more highly. Doing so favors MW and PW. Another consideration I found very important is flexibility. Of the three, PW is clearly more flexible than either MW or EW.

The results of the test were conclusive for my needs. It provides a rational basis for choosing any word processor system for the Apple II computer whether or not it is Magic Window, or EasyWriter, or PIE Writer.

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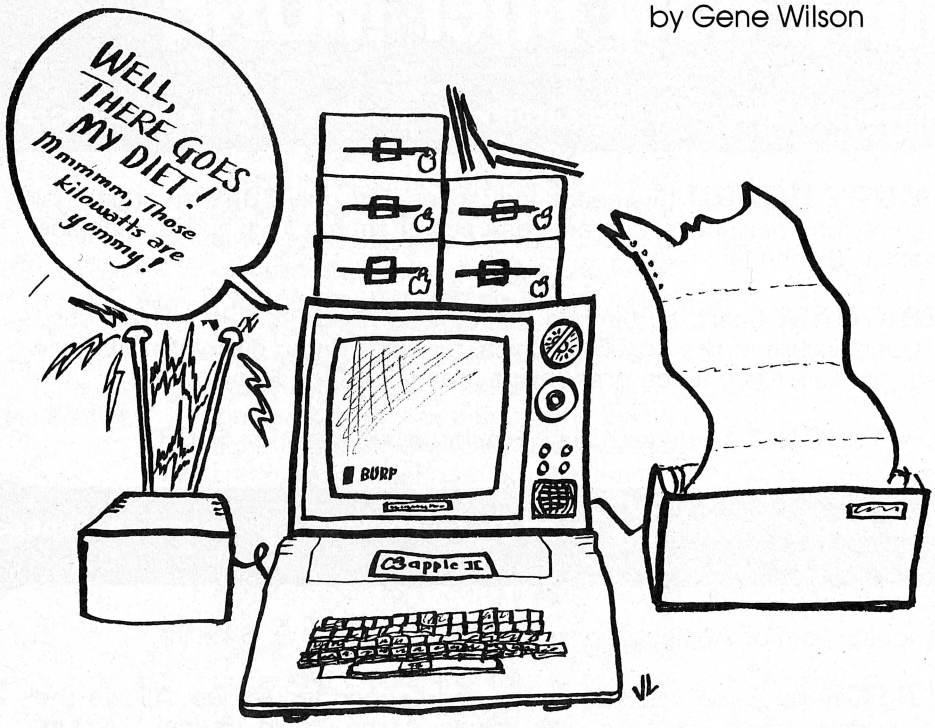
POWER TRIPPING WITH YOUR APPLE II

by Gene Wilson



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Try as you will, the screen performs with absolute perfection, as if to show a total disregard for your feelings of anger and despair. Nothing is amiss; no bits drop loudly into a bucket; no evidence of any problem surfaces. The technician begins to 'eye' you with suspicion.

But *YOU* are keenly aware that something is dramatically wrong in the master/subordinate relationship that you share with *your* Apple. In short, the technical-type behind the counter is certain that the *only* irrational item in the chain of events is. . . *YOU.* No solution!

What usually happens is a simple fact of life called heat build-up. The machine works well for hours and then suddenly goes nuts. The screen display has strange characters, or the disk drive won't catalog the diskette that you've worked with all evening. One or more chips has gotten warm enough to have an occasional problem, and although you are absolutely certain that there is a 'gremlin' hiding beneath the keyboard, the tech. at the local computer store will give up and write you off as being simply 'neurotic'.

"In the beginning. . . " Apple IIs were not subject to heat problems. The earliest models had no cooling vents on the sides, but they typically had 4K to 16K of RAM, and there was nothing to stick into those eight peripheral slots.

Evolution. Apple IIs have five, six, and in some cases, even eight slots filled with cards that do incredible things. Every single card draws current from a power supply that was designed long before any of the plug-in cards was available. Not only is the Apple's built-in power supply overloaded in a typical configuration, the heat created by all the current doesn't get away—it merely builds until the weakest link in the chain breaks (or merely bends a little).

So it appears, without looking further, that Apple II owners have a dilemma. Either use the Apple II for short periods of time, or keep the cards in a desk drawer. Neither of these simplistic answers is a real world solution.

Solutions abound; the easiest is to buy and install a fan to 'draw out' the heat. (The M & R SUP 'R' FAN does the job nicely.) If you have an early 'revision' Apple II case without side slots you can buy a cheap fan and set it behind the machine. This solution worked for a long period with generally good results on my Apple (Serial # 144), and the air blowing up through the keyboard kept my fingers warm.

A better solution is to take the primary source of heat away from the scene of the crime. The power supply can sit behind (or, in some cases, be hidden below) your Apple II.

In some cases, more radical solutions are required. If the power supply gives up (as mine finally did), there are several weeks of agony while your local shop sends the 'dearly departed' to Cupertino for R & R (removal/restoration). Depending on the severity of the malady, this problem can take three hundred dollars to cure, and who'll guarantee that the same thing won't happen again under the same load that 'killed' it the first time? Does the word 'RECURSION' seem appropriate here?

Evolution of solution. There had to be a 'better' solution to the combined problems of inadequate power supply and excessive heat build-up. The 'plug in less hardware' answer simply doesn't address 'real-life'. What was desperately needed was an 'external' power supply that could keep all those cards going (without a technician booking occasional travel reservations for your power supply for two week vacations to Cupertino—with all expenses paid by you).

Enter the "SUP 'R' SWITCHER" by M & R Enterprises. Less than three hundred dollars buys a power supply that plugs-in in seconds, looks very much like a disk drive, fits right into your disk drive 'stack', and provides more than twice the power of the supply it replaces, with none of the side effects. The following chart compares the two units:

	Apple II Supply	Sup 'R' Switcher Supply
+5V	2.5A	6A
+12V	1A	1.5A
	(2.5A Intermittent)	(3.5A Intermittent)
−12V	250mA	1A
−5V	250mA	1A

The numbers tell the story. An elegant solution to a problem that grew as the Apple II evolved. The unit works perfectly and not only provides power that can't be matched by the 'factory standard', but sits away from the little chips of silicon (thus allowing them to better keep their 'cool'). The hole left by the no longer needed 'factory unit' allows greater access for the air being pushed by my little 'sit-behind' fan. (I won't tell you where I got the fan, but the store chain has over 5000 outlets nationwide).

My thanks to M & R Enterprises for providing a 'choice' to Apple II owners. Their line of fine products is certainly enhanced by the addition of the SUP 'R' SWITCHER. One look at the 'numbers' was enough for me—I no longer worry about leaving my machine on for hours at a time, and there have been absolutely NO heat problems since *I SWITCHED.* The only thing I would change would be to make the power cable twelve inches longer, to allow a little more flexibility in placement of the unit. (Being left handed I'm very 'sensitive' about products that give me no choice of which hand to use. I would prefer to place the SUP 'R' SWITCHER to the right of my Apple II, stacked with drive #3, and two disk drives stacked to the left.) *(A later check with M&R disclosed that shortness of the cable is important with a switching power supply; the southpaw would have to settle for a reduced power output. How much reduced was not stated.—PCW)*

When the strange characters invade your screen, remember that the problem is "evolution" (Darwinism anyone?), and the solution is SUP 'R' SWITCHER.



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EPISODE 2

THE APPLE NOBODY KNOWS

by Alan Anderson

The Apple Nobody Knows, eh? That title alone is a measure of how much progress Apple has made with the Apple /// in the past few months. Since that article appeared in the Fall 1981 issue of *Apple Orchard*, a great deal has happened in the Apple ///'s world.

One of the most serious problems referred to in that article was the acute lack of application software needed to make the /// into a viable product. That problem has, to a significant extent, been overcome. Many of the major applications are now available for the Apple ///. For example, Apple announced Apple Writer /// in December, an excellent word processor which bears little resemblance to its text editor predecessor. In addition, at least three other word processors for the Apple /// have appeared from outside vendors. Other applications now covered by software for the /// included telecommunications, financial modeling, graphics generation, and data base management.

Pascal for the /// appeared, as promised, at the end of the summer. It's a spectacular package, including four manuals (real ones—not "preliminary") and includes many enhancements and additions to the Pascal language as implemented on the Apple II. However, one of Apple /// Pascal's best features is its compatibility with the Apple II version. Apple II diskettes may be used virtually anywhere in the Apple /// Pascal system. Many Apple II programs may be used on the /// just by recompiling. (Warning: the ASCII command characters are different, because the /// Pascal is consistent with the characters used by SOS.)

Probably the most significant new product announcement for the Apple /// in the past few months was not software, but hardware. Apple is now shipping ProFile, a five megabyte hard disk system for the Apple ///. ProFile is a complete package, containing a head-disk assembly built by Seagate Technology, controller and analog electronics, and a power supply. ProFile also accesses data at about 10 times the speed of a conventional mini-floppy disk drive. With the addition of ProFile and software to make use of it, the Apple /// has blossomed into a fascinating system. (ProFile will, it is rumored, be available for the Apple II later in 1982.)

Apple has also announced a memory upgrade for the Apple /// which brings it to a massive 256K RAM. This upgrade involves a simple swapping of memory boards.

In order to help Apple dealers alleviate some of the mystery surrounding the ///, Apple has sent out the Apple /// Dealer Information Binder. This thick but handy book contains a lot of various technical and product information about the /// which Apple has produced over the past year or so. In addition, it contains several extremely helpful diskettes, including a program which will convert Apple II DOS textfiles into Apple /// SOS textfiles, a new version of the Apple II Emulation Mode diskette, and various other goodies.

In addition to all the new software and hardware, Apple has been busy bringing the old software and manuals up to speed. All of the software included in the original Information Analyst package has been updated, along with the manuals, which are no longer preliminary. If you are an Apple /// owner you

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should now have the new versions of Apple Business Basic, VisiCalc ///, and the System Utilities. Apple started sending these out in December at no charge. You should also have received the Apple /// Confidence Program, and, if necessary, received a new Apple /// system as per the Confidence Program documentation. If all of this upgrading stuff sounds alien to you, contact your full-service dealer to get in on the fun.

What can we expect of Apple /// in the future? The next big change in the Apple /// world should be in the form of software from non-Apple manufacturers. As more and more software manufacturers realize the power available in the /// and the number of ///s in the field increases, writing software for the Apple /// will become an extremely popular business.

Memo to those who read the last article's information about the monitor and the registers: while writing about some of the special features of the /// such as bank switching and the environment register, I did an inadequate job of mentioning the hazards in playing around with this stuff. While it is quite true that no monitor command will cause your Apple to blow up, it is important for us to realize that SOS has set up certain conventions for doing things, and if these conventions are not respected, the entire system may come crashing down and nothing will work as it should. Of course, when you're in the monitor, there is no system to crash, so this becomes a superb environment for hacking around and learning about the ///. However, when we're talking about creating serious software for the Apple ///, there are certain things we learned to do with the Apple II which are strictly taboo on the ///. This is not due to a lack of power or capability on the part of the ///, but rather demonstrates the need for users of a sophisticated and powerful system to respect the integrity of the system.

What are some of the things the programmer "shouldn't do" on the ///? Well, in general, it's a bad idea to try to modify memory locations which are used by the system software. Why? For flexibility, the Apple /// treats its memory as one big virtual space; i.e., much of the system is designed to load into whatever memory is currently available and is not locked to any fixed memory space. This allows you to add and remove device drivers, write assembly language programs without worrying about finding a space for them to load, update to a newer version of the operating system, or add memory to his computer. So, for example, you shouldn't write a program which modifies a certain part of memory where the .PRINTER driver is, since that driver may not be at that memory location the next time!

If the programmer loses this capability, doesn't that limit the power of the system? Not at all, since SOS has several features designed to allow the programmer to modify the way the system works. The key is that these changes are done not by the programmer directly modifying memory, but by calling SOS. Since SOS knows where all the important stuff is, it will take care of the details.

Of course, the restriction in altering memory doesn't apply to a program's own data or to things which are specifically documented as being locked to a certain location. In general, SOS has enough interfaces built-in to let you do just about anything you would want to do.

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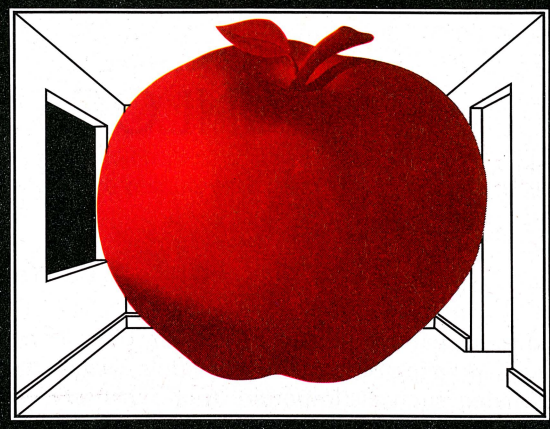

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UNLOCKING APPLE ///

by Alan Anderson

What's so special about the Apple ///? Why does it have a Sophisticated Operating System? Why is Apple always talking about SOS being such an important tool? This article will address the reasons why the Apple /// and its operating system are important to the programmer and also demonstrate some of the fabulous things you can do with it.

OUR APPLE II HERITAGE

Anyone who has spent more than a few hours programming the Apple II is familiar with, to some extent, having to interface with the machine at its own level. In BASIC, this usually takes the form of POKE, PEEK, and CALL statements. Many Pascal programmers are familiar with the free union variant, or "tricky" record, used to access specific memory locations. Of course, the assembly language programmer deals with the machine level constantly.

Moving over to the Apple /// presents some fascinating new problems which the programmer must deal with. For example the Apple /// gives you: memory which can be bank-switched, thus leaving your program in the Twilight Zone; a virtual memory system, in which device drivers may be loaded almost anywhere; a zero page and a stack which can move around in memory; a microprocessor which can run at two different speeds; memory which can be write-protected; a character set which is defined in RAM and can be changed on the fly; and the ability to handle lots of interrupt driven devices. With all of this stuff going on, the old method of going straight to the hardware just doesn't cut it any more. In order to control all of these features and to give the programmer an interface through which he can gain access to the system's resources, SOS was born.

Simply stated, SOS is the program which acts as a sort of clearinghouse or central command post for everything that happens in the Apple ///. The parts of SOS are appropriately named "managers," since they manage and control the system.

THE PIECES OF A PROGRAM

Any bootable diskette on the Apple /// consists of at least three files. They are named SOS.KERNEL, SOS.DRIVER, and SOS.INTERP. SOS.KERNEL is the operating system as supplied by Apple. We'll discuss it in more detail shortly. SOS.DRIVER is the group of device drivers used to control various Apple /// devices, such as the keyboard, printer, speaker, ProFile hard disk drive, etc. SOS.DRIVER files are usually created by the System Configuration Program on the System Utilities diskette. SOS.INTERP is a machine-language program such as Business BASIC, VisiCalc, or Apple Writer ///. A diskette which does not contain files with these names will not boot, and an appropriate error message will appear if you try to boot it.

One of the definitions of "kernel" is "the nucleus, essence, or core." From this we get SOS.KERNEL, the nucleus of the operating system. As mentioned earlier, the kernel consists of parts called mangers which control and serve various aspects of the system. The main parts are: the Memory Manager, which allocates and keeps track of usage of the system's main memory; the Device Manager, which handles communication between the system's various devices through the device drivers; the File Manager, which works with the Device Manager to handle the flow of information between the system and its physical devices; and the Utility Manager, which handles certain miscellaneous tasks, such as reading the joysticks and preparing the system for a cold start by clearing memory.

What makes the Apple /// so special from a programmer's point of view is the job SOS does of managing the system. In fact, the programmer rarely has to worry about switching memory banks, where the stack is, where the device drivers are, or, in most cases, even where his program is located in that vast expanse of memory.

Some of the more hardened assembly language veterans among you must be simmering in your skepticism by now. How, you say, can the programmer take advantage of calling the operating system if he doesn't know where anything is? The answer is simple: let SOS find it. When a program wishes to call SOS, it isn't done with the traditional JSR. In fact, since you don't know where the operating system is, it's impossible to JSR to a fixed location. Instead, the Apple /// takes advantage of the 6502's software interrupt capability, better known as the BRK or Break instruction. When this instruction is executed, the Apple jumps to a memory location pointed at by two bytes in the high part of memory. SOS then takes over and executes the routine, returning control when it's done. How does this look in practice? Read on.

A call to SOS actually consists of three items. The first, already mentioned, is a BRK instruction. Following tht comes a SOS call number. Each user-accessible subroutine (or SOS call) within the kernel is assigned a one-byte identifying number. The third item in a SOS call is a two-byte pointer to a table of parameters. Each call has certain parameters associated with it. By passing SOS a pointer to these parameters instead of the parameters themselves, the programmer can use the same table more than once. In addition, the numbers of parameters can be changed in future versions of the operating system with minimized effect on the user's programs. The first byte in the parameter table tells how many parameters are in the table. SOS compares this to the number of parameters it is expecting for that call, using this byte for error checking. In using the Apple /// Assembler (part of the Apple /// Pascal system) a typical SOS call would look like this:

```
BRK
.BYTE <call_number>
.WORD <param_table>
```

The .BYTE pseudo-op generates a byte of the value of <call_number>. The .WORD pseudo-op generates a two-byte pointer to <param_table>.

Each of the four managers listed above contains certain SOS calls. For example, the File Manager includes calls to create, destroy, rename, open, close, read, and write files, among other things; the Device Manager has calls to find, request, and release chunks of memory, as well as other functions. Each SOS call has a unique set of parameters associated with it.

After a SOS call, SOS returns an error code in the 6502's accumulator. If no error occurred, a $00 is returned.

Because of the flexibility of the SOS call mechanism, the assembly language programmer can think of SOS calls as extensions to the 6502's instruction set. The SOS call system does a superb job of uncomplicating sophisticated programming at the mahcine level.

CALLING ALL SOS

Let's go through a hand-on example of a SOS call and how it would be generated. For demonstration, we'll use the simplest of all SOS calls, one called COLD_START. If you have the Apple /// Pascal system, you can try this example on your Apple. This call, a part of the Utility Manager, is used to provide a neat, clean exit from a program. It clears out memory, displays "INSERT SYSTEM DISKETTE AND REBOOT" on the screen and waits for a CONTROL-RESET to be pressed. You may have noticed that certain applications, such as VisiCalc /// and Apple Writer ///, use this method to exit. Here's how it's done in assembly language:

```
BRK                 ;To signal a SOS call
.BYTE COLD_START    ;Tells which call
.WORD PARAM_TABLE   ;Points to the parameters
```

Now we have to define our labels. First, COLD_START is defined:

```
COLD_START    .EQU 65    ;COLD_START's number is $65
```

Now the parameter table for COLD_START is defined. COLD_START's parameter table is uniquely simple:

```
PARAM_TABLE    .BYTE 00    ;COLD_START has no params
```

That's it! Now, let's make the program work by assembling it an using it. First, here is a complete listing of the whole file to be assembled. This should be created in the Apple Pascal editor.

```
               .PROC RESTART       ;Standard heading for
                                   assembly language
                                   (see Apple /// Pascal
                                   Program Preparation
                                   Tools manual, chapter
                                   2)
COLD_START     .EQU 65             ;COLD_START's
                                   number is $65
               BRK                 ;To signal a SOS call
               .BYTE COLD_START    ;Tells which call
               .WORD PARAM_TABLE   ;Points to the
                                   parameters
PARAM_TABLE    .BYTE 00            ;COLD_START has no
                                   params
               .END                ;Tell the assembler
                                   we're done
```

Once you have entered this file in the editor, quit the editor and save the file on disk, then assemble it and save it into a file called RESTART.CODE. Return to the editor and enter the following Pascal program.

```
program example;
procedure restart; external; (*Tells Pascal that restart is an
                                assembly language procedure*)
begin
  restart;
end.
```

Exit the editor, save the file, compile it, and save it to a file named EXAMPLE.CODE.

Now enter the Linker. When the Linker asks for your Host file, use EXAMPLE; for the Lib file, use RESTART, which contains the Assembly language program. Press <RETURN> when asked for another Lib file and when asked for a Map file. For your Output file, answer REBOOT.

Finally, when the Linker is done, you should have an executable file (REBOOT). So execute it! Voila—if you've done everything correctly, you should get the "INSERT SYSTEM DISKETTE AND REBOOT" message. What a thrill, eh? If you don't get the message, double check your work. If you don't yet feel comfortable with the Apple Pascal system, you should probably spend some time learning it if you're going to use Assembly language on the ///, whether it links with BASIC, Pascal, or stands alone.

Well, that's just great. But what if you have aspirations of doing things other than just restarting the system? All right, we'll take a look at some other slightly more sophisticated SOS calls.

DEALING IN VOLUME

One of the calls within the file manager is VOLUME. This call tells us the name of the physical volume within a given mass storage device, the total number of blocks on that device, and the current number of free blocks on the volume. If we wanted to find out this information for the built-in disk drive, the parameter list would look like this:

```
PARAM_TABLE    .BYTE 04            ;Number of parameters
                                   in table
               .WORD DEVNAME       ;Pointer to the device
                                   name to examine
               .WORD VOLNAME       ;SOS returns the name
                                   of the volume at the
                                   address pointed to by
                                   this field
               .BLOCK 2            ;SOS returns the
                                   number of free blocks
                                   in this field
DEVNAME        .BYTE 03            ;Length of device name
               .ASCII ".D1"        ;Device name itself
VOLNAME        .BLOCK 10           ;SOS puts volume
                                   name here
```



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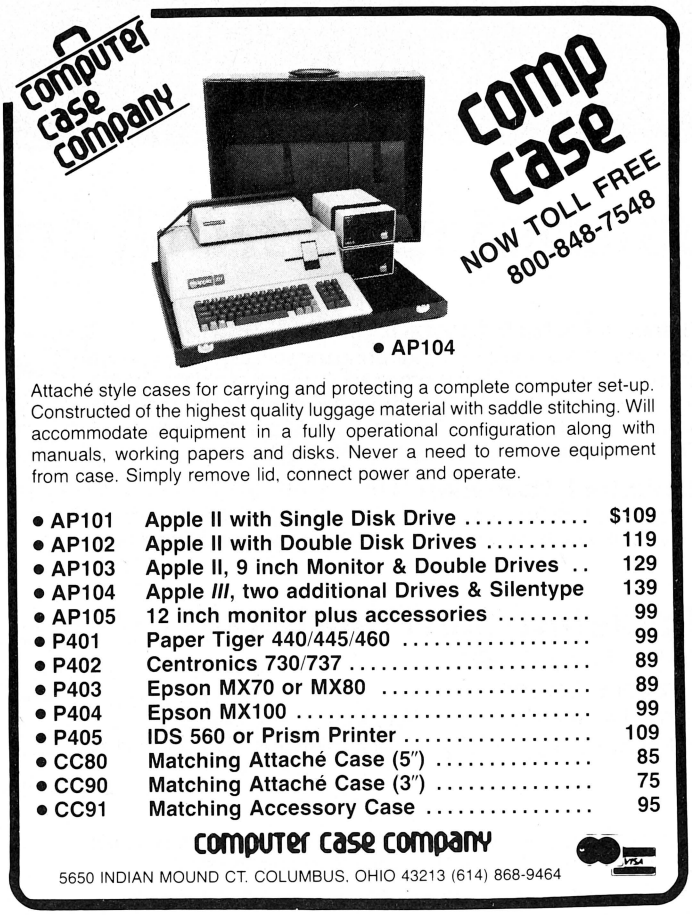
There are several important new concepts included here. First of all, note that variable length parameters like device names are not included in the main parameter list. Instead, the list contains pointers to the actual locations of these items. This furthers the philosophy of standardization: since the pointers are always two bytes long, the length of the parameter list always stays the same.

Second, notice that the device name, .D1, is preceded by a byte indicating its length, three characters. This is a standard for all pathnames you pass in all SOS calls: the name itself is preceded by a byte indicating the length of the name.

Third, notice that some parameters are supplied by the caller (us); an example of this is the device name. These are sometimes called input parameters. Other parameters are returned by SOS in places we provide; for example, the volume name. Note that we, the caller, provide the place for this parameter, but we don't fill it in—SOS does. This is known as an output parameter. There is a third type as well, the input/output parameter, in which the caller passes something to SOS, and SOS passes something different back in the same place. Input/output parameters are pretty rare in SOS calls.

Now that we've got the parameter table all set, we need to add the SOS call itself. It looks like this:

```
VOLUME      .EQU $C5                ;Define VOLUME
            BRK                     ;SOS call
            .BYTE VOLUME            ;Call number
            .WORD PARAM_TABLE       ;Pointer to params
```

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This time, it would be a good idea to add some error checking. Remember, SOS returns error codes in the accumulator; $00 means no error has occurred. So all we need is something like this:

```
            BNE ERROR_HANDLER ;Non-zero, an error
                                occurred
```

. . . assuming, of course, that we later write a routine with a label ERROR_HANDLER.

After executing this call, the designated areas in the parameter table would contain the number of total blocks and the number of free blocks on the volume, and the area pointed by the VOLNAME pointer in the parameter table would contain the name of the disk in the built-in drive (.D1). We won't make this into a complete procedure, but instead will leave it as the ever-popular exercise for the reader.

Two SOS calls controlled by the Device Manager are worth mentioning here. Their names are D_STATUS and D_CONTROL. These calls, known more simply as just STATUS and CONTROL, allow the programmer to change the way a driver or device does things. Many of the things we did by POKEing and PEEKing on the Apple II are accomplished on the /// with these calls. For example, you can tell the .CONSOLE driver to use a different character set by sending it a CONTROL call; you can ask the .RS232 driver what kind of handshake it's using with a STATUS call. In general, STATUS inquires about the state of a device; CONTROL causes the device to perform a certain function or to set a certain mode. Each device can handle different CONTROL and STATUS calls. If you're interested in what kind of STATUS and CONTROL calls are available for each device driver, check out the new edition of the Standard Device Drivers Manual.

The CONTROL and STATUS calls are so important that Pascal has a built-in interface to them, called UNITSTATUS, and the Business BASIC Version 1.1 diskette includes an invokable module called REQUEST which allows the BASIC programmer to use CONTROL and STATUS. Documentation for UNITSTATUS is on Pages 211-213 of the Apple /// Pascal Programmer's Manual Volume 1; the BASIC module is documented on the master disk in a file called REQUEST.DOC.

At this point some of you may be wondering what manual provides all of this great documentation. The answer is that it's a new book—so new that it's not out yet. The manual is apparently called the Apple /// SOS Reference Manual. It's mentioned several times in the new Standard Device Drivers Manual, so one may assume that it will in fact exist. As for now, Apple has been working with serious software developers to provide information they need, mostly in the way of special classes.

As for now, I'd like to begin a service of answering questions dealing with any aspect of the Apple ///. If you have questions about the /// that you'd love to get answered, try sending a letter to:

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Next issue: —The Big Event (SOS Event mechanism)
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. . . and more. Okay, everybody, time to hit the SOS!

APPLE GOES TO THE MARKET

by John F. McMullen
Chairman, Stock Market SIG

This is the first of a series of semi-regular articles which will appear in the *Orchard* devoted to the many uses of the Apple Computer in relation to investment activities. By way of introduction, I'm Vice President of the New York area consulting firm McMullen & McMullen, Inc. and have over twenty years of data processing background, of which the vast majority has been spent in the financial community. (Prior to forming McMullen & McMullen, I was Morgan Stanley & Co.'s (Apple's underwriter) Director of Data Processing and previously was an officer of BTSI (Control Data's brokerage subsidiary) and Dean Witter & Co. Barbara E. McMullen, the President of McMullen & McMullen, has a similar background with previous positions at Bache Halsey Stuart Shields and the New York Stock Exchange. Further, the present client base of McMullen & McMullen includes a number of individual investors as well as Morgan Guaranty Trust Co., Merrill, Lynch, Pierce, Fenner & Smith, L. F. Rothschild, Unterberg & Tobin, The First Boston Corporation and J & W Seligman—firms all utilizing the Apple for varied investment related activities.

In the time since I worked with Ken Silverman and Dave Gordon in setting up this Special Interest Group and determining its charter, I have spent considerable time reviewing available software currently in the marketplace (and about to come to market). It seems to me that the software has, within the last year, evolved from a number of programs which, although providing tools not previously available to many investors, were fairly immature both in their capabilities, "friendliness," and scope to a large universe of constantly improving mature investment aids. Examples of this evolution include the introduction of superior new versions of previously marketed programs (ex., Investors Software has released a new version of PORTFOLIO MASTER which incorporates automatic price-fetching (not in original version) and expands the maximum number of positions per portfolio from twenty-five (25) to one hundred; RTR software in conjunction with Dow Jones has developed THE DOW JONES MARKET ANALYZER which is an improved version of the popular RTR technical analysis software previously marketed in various versions under the names STOCK TECHNICIAN, EASY CHARTER & MARKET CHARTER) as well as the introduction of systems to provide capabilities not previously available (ex., MUNIDEBT, a system to calculate and solve municipal debt repayment schedules has recently been made available by B.A. Nicholson & Co., Inc.; THE MONITOR which brings the New York Stock Exchange ticker into an Apple for on-screen display is marketed by First Flight Systems). The systems have reached such a sophistication that brokerage firm account executives supported by such products as PEAR and BROKER I are utilizing Apple to manage all of their client portfolios. Less than a year ago, such power was not yet available.

In the next few months, I will publish reviews of the various securities related software presently available and will also report on the activities of the individual Stock Market SIGs of IAC Clubs (ex., the Big Apple User Group (BAUG)'s SIG is currently, though the use of VISICALC, developing a model which it feels will be a definitive portfolio analysis report. It will then judge other systems based on this model.)

Additionally, I will attempt to review all of the security-related areas in which a micro-computer system can be of assistance. Due to the wide exposure that portfolio management and technical analysis (including commodities) receive, one can very often overlook the benefit an Apple can bring to other segments of the financial community. The ability of the Apple to function as a terminal to the large data bases such as Interactive Data Services, Data Resources Inc., Bridge Data Services and Warner Computing as well as the more well known data bases for the micro (Dow Jones, Source and Compuserv) has made the Apple an important tool for the fundamental analyst. Our own client base includes investment research departments whose prime interest is in using VISICALC to manipulate fundamental data. The recent introduction of a program, the CONTEXT CONNECTOR, which allows the editing of text files directly to VISICALC format has opened the door to greatly increased capabilities in this area. The whole subject of data availability, cost and ease of use will be a subject of a separate discussion. Other areas to be considered are option and bond analysis and swapping, modern portfolio theory and econometric modeling. I will attempt to give proper attention to these areas.

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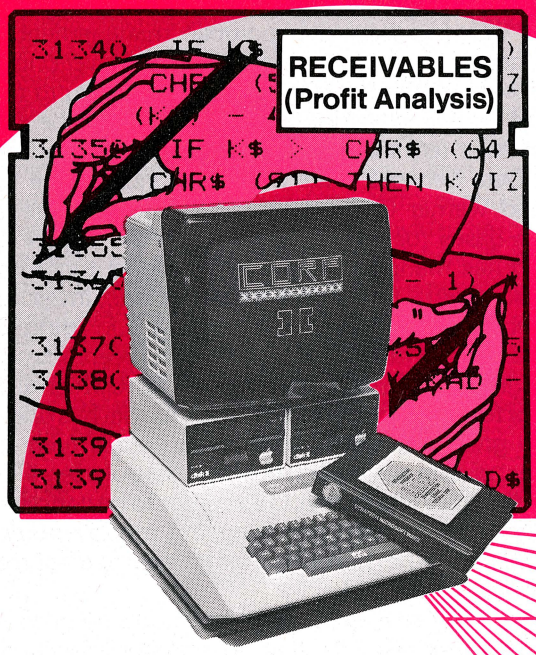

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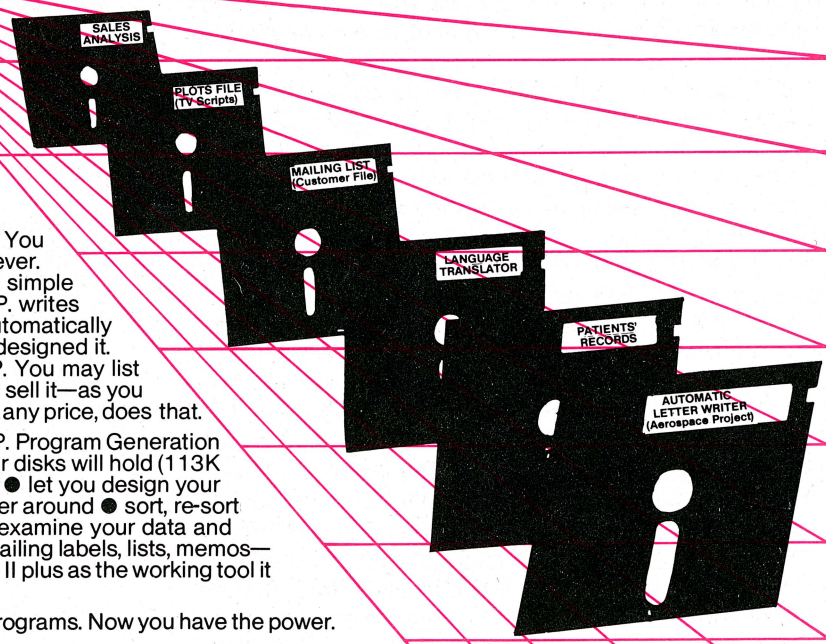

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B 012 DRIVER.S
B 002 DRIVER.B
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B 003 HI-RES DUMP.B
B 009 HI-RES DUMP.S
I 008 APPLE TYPER
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T 002 COLORS
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A 002 SHAPING UP
I 002 EPROM CODE FOR LOWER-CASE MOD
I 002 TO APPLE-WRITER
B 010 ASCII $4000 $800
B 010 HIRES ROUTINES

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A 006 MENU BY DAVIS & FREEMAN
A 009 PROGRAM LISTER WRITER
A 003 HI-RES GRAPHICS DISPLAY
T 011 PROG.LIST
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I 007 SLIDE SHOW VIII
T 001 PROG. FILE
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I 014 DISK ACCESS UTILITY
B 002 SILENTYPE BOLD PRINT
I 003 BOLD PRINT DEMO
A 003 REM STRIPPER INFO
B 033 SATELLITE
B 033 SATELLITE1
B 034 ORBIT
B 034 SMALL HOLE
T 002 LISTER
A 008 CATALOG MANAGEMENT
A 027 CATALOG MANAGEMENT—EDIT

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I 002 IAC DISK #3 DOS 3.3 GAMES
A 006 MENU
B 080 ALIVADER
I 012 LUNAR-LANDER
I 015 DEATH STAR
I 033 HI-RES DRAGON MAZE
I 014 AIR FORCE BOMER
I 020 AIR ATTACK!
I 021 SUBMARINE
I 018 SPACE-WAR V
I 018 CARRYING-BALLOON
I 020 NEW FLY KILLER
A 004 NOTES ON PROGRAMS

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I 002 IAC DISK #4 DOS 3.3
A 006 MENU
B 080 SHOOTING ALIEN
B 080 ASTEROYDER
B 016 COMP-X II
A 006 EQUIPROBABLE
A 005 MONTE CARLO
A 009 CHECK BOOK BALANCER
A 012 GAMBLER'S RUIN
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A 023 SPIRAL2
A 005 CYCLOID
A 005 ROSETTE
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A 026 BARN
A 017 SURFACE
A 006 LISSAJOUX
A 003 TRAINGLE ILLUSION
A 011 RADIOACTIVE
B 034 RADIO

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I 002 IAC DISK #5 DOS 3.3
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B 002 INT LINE X-REF (CALL2048)
A 016 GRANDAPPLE
A 004 HIGHER HIGH-RES
I 008 JANE'S TIMER
A 006 MEMORY INTERPRETER
I 015 ADDRESS2
A 009 RAM TEST 48K
B 002 FIND
B 002 DFIND
A 003 FIND AND DEFIND INSTRUCTIONS
A 005 HIRES TV PATTERN GENERATOR
B 003 TELWORDS
A 059 GREAT CIRCLE
A 004 POKES
A 022 ASTRONOMY-EXPOSURES
I 003 PULSAR-INTRO
B 010 BPULSAR1
B 010 BPULSAR2
B 010 BPULSAR3
B 010 BPULSAR4
B 010 BPULSAR5
B 010 BPULSAR6
B 010 BPULSAR7
B 010 BPULSAR8

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I 002 IAC DISK #7 DOS 3.3
I 007 HELLO1
T 008 Z PROG.LIST
A 016 A DISK SUMMARY
A 015 SKYWRITER
A 025 SKYWRITER (INSTRUCTIONS)
A 003 SKYWRITER (ONELINER 1)
A 003 SKYWRITER (ONELINER 2)
A 013 SKYWRITER (SNOOPY)
A 021 INSULTS
A 013 ERROR HANDLER
A 043 APPLESOFT LINE WRITER
A 012 DPRING
A 041 GEN LEDGER
A 031 PRINT G/L
T 004 G/L DATA

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A 004 CAT INIT
T 004 CAT
A 002 SYDNEY GROUP AUSTRALIA DISK 1
A 014 HGR DEMO!
A 064 BIORHYTHM
I 007 TARGET SHOOT
A 020 LUCY
T 132 LDATA
T 006 LWORDS
I 003 CALCULATOR START
A 031 APPLESOFT SHAPE MAKER
A 021 MASTERMIND
B 003 MASTERMIND CORE (A$1C00/L$11C)
I 009 CALC1
A 003 INFO
B 003 TALK
B 057 NUMBERS
A 005 BACH

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A 017 CALCULATOR
A 010 REACTANCE CALCULATIONS
A 005 TRANSISTOR PARAMETERS
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A 017 METRICS AREA
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B 098 N.BIN
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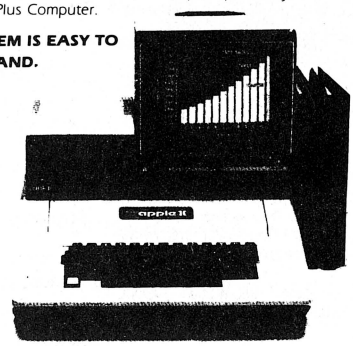

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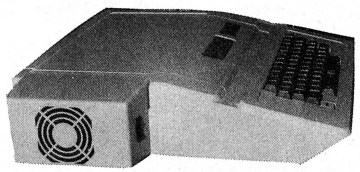

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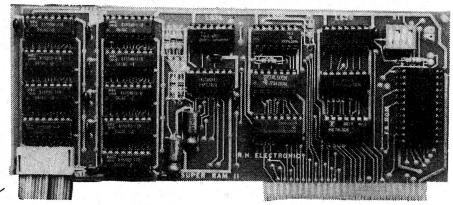

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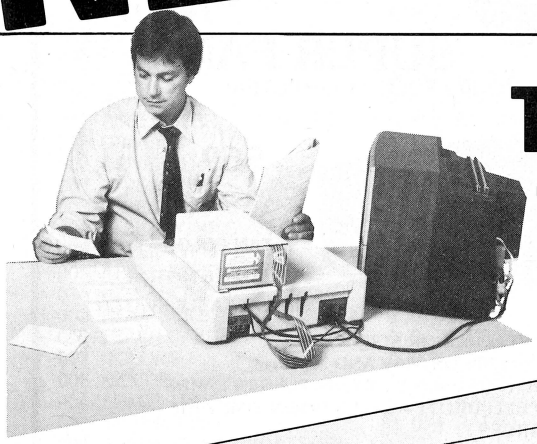

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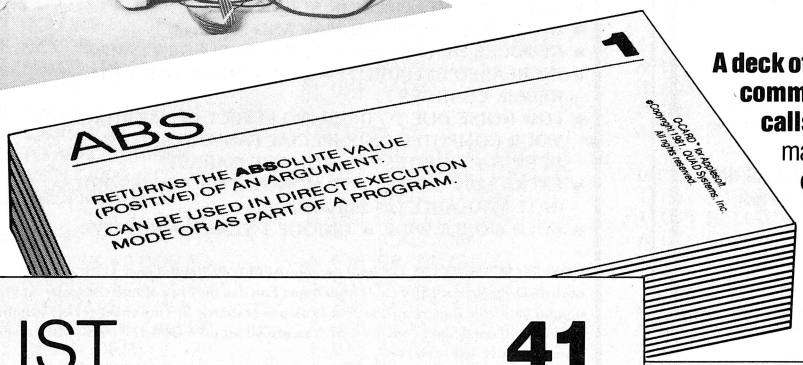

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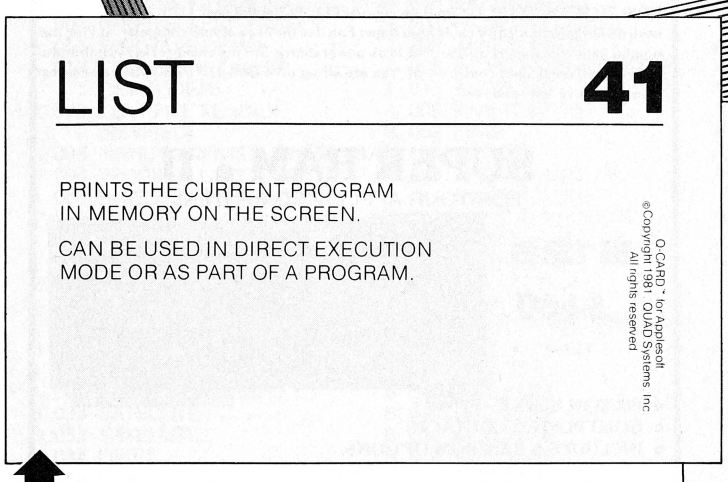

LIST
PRINTS THE ENTIRE PROGRAM.

LIST 15Ø
PRINTS LINE 15Ø

LIST–15Ø
PRINTS FROM THE BEGINNING OF THE PROGRAM UP TO LINE 15Ø

LIST 15Ø**–**
PRINTS FROM LINE 15Ø TO THE END OF THE PROGRAM.

NOTE: TO STOP A **LIST**ING PRESS *CTRL S*
TO RESTART PRESS *S*

On the front side: Each command is boldly displayed, along with a description of what the command does. The large index number in the right corner allows for easy filing and reference.

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On the Farm...

Meeting Jerry Maltby at the Bovine Test Center, Oakdale, CA, for the first time it would be easy to imagine him charging about the range roping steers from horseback, or throwing bulls single handed. I believe he's an expert at both, but he's also an unusually innovative ex-farmer.

Jerry was brought up on his father's farm in the Sacramento Valley, growing rice and raising pure-bred Hereford cattle. He majored in animal husbandry at Chico State College, then took over the family's 1350 acre irrigated cattle rance in Oregon. After several years Jerry bought a new 4200 acre ranch in Alturas, CA, where for seven years he raised pure bred Charolais cattle. During this time he served on performance and research committees of the American International Charolais Association, and took the Presidency of the California Charolais Association.

After all this it would be a pretty safe bet that Jerry knows beef! And he does! That doesn't mean he accepts all the established or traditional principles of beef production.

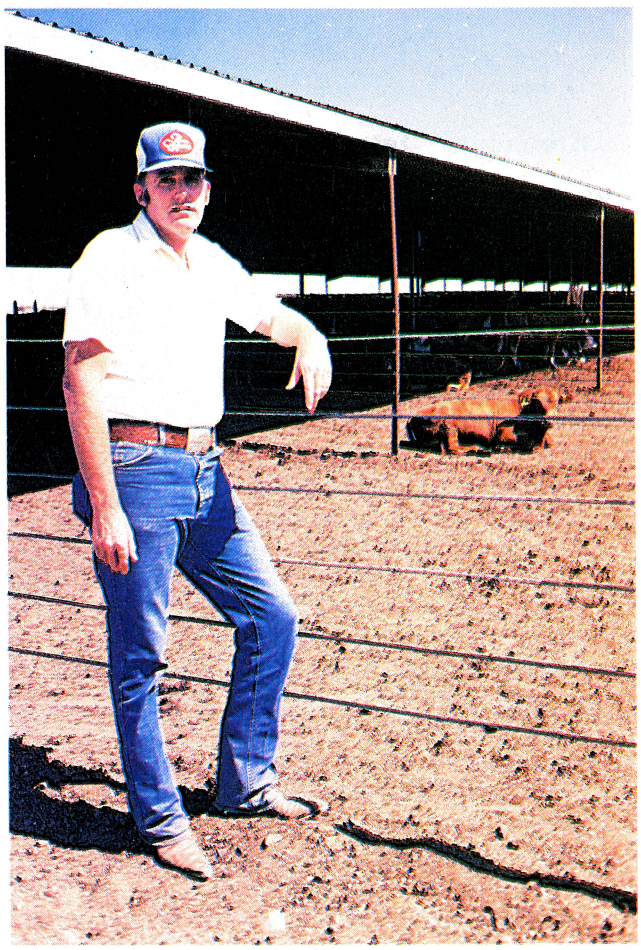
Three years ago Jerry sold the Alturas ranch and after extensive research designed and built the Bovine Test Center.

So what's innovative about that?

Well, with Jerry's personally designed handling pens and fences one man on horseback can handle the full complement of 1000 bulls. Most other stations in the U.S. can take only around 200 head.

And there's more to it than that. The bulls at Jerry's test center arrive from beef ranches in Nevada, California, Oregon and Arizona for a $350 six-month vacation during which their weight gain capability and fertility are closely monitored and compared with the rest of the herd's performance.

Non-farmers may not appreciate that both weight gain potential and fertility are inherited characteristics and are of enormous significance, not only in selecting a bull for breeding purposes, but in valuing the animal. With top class bulls selling for thousands of dollars that's pretty important!



What's all this farm talk doing in a microcomputer magazine?

Every month all the bulls on the station are weighed. Until last June the results were stored and analyzed and the herd reports printed by a computer bureau service. Not surprisingly the turn-around time was longer than Jerry would have liked, so off he went to the local computer store and bought an Apple II, with an assurance that it could do the same job. Three weeks later, after working with a popular Database system designed for the Apple, he discovered it couldn't quite do the job. Nor could any other system the store knew about.

Then Jerry heard about Farmplan, a software company based in San Jose specializing in agricultural programs and with years of experience in English speaking countries worldwide. It turned out they had recently launched a powerful and easy-to-use database (Sup'r'filer) which with minor modifications could meet Jerry's requirements perfectly. A week after visiting Farmplan he was up and running!

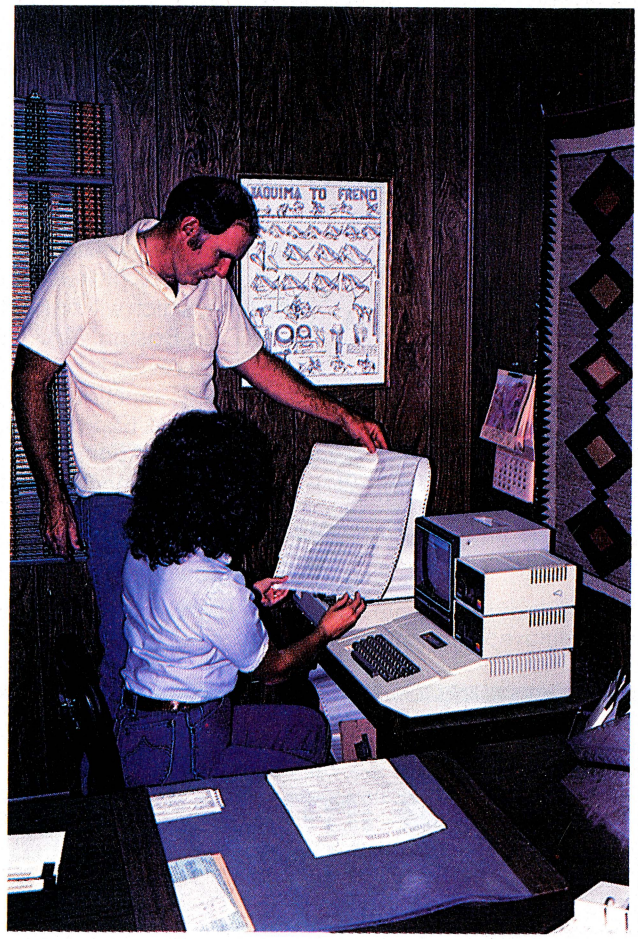
Predictably Jerry appointed his wife Sherry as chief computer operator. After a little initial fright (understandable—she had one week to get the first reports out) she was soon rattling the keyboard. Now she says she just keeps on inventing new applications for the system. Before long Jerry decided he had better learn how it all worked so now it's a battle between Jerry, Sherry and the three kids to get to the keyboard first!

Jerry comments about Micros—"It's going to do for agriculture what the tractor did, except that it will probably create more profit. With narrowing margins and unpredictable price changes it's getting harder and harder to keep things straight, and it's commercial nonsense to rely on gut feeling any more. Crucial decisions must be made by logic based on facts."

"Farmers are necessarily big gamblers—investing thousands of dollars against the chance that the weather will be right at harvest, or market prices will stay stable. This is creating a tendency for farmers to diversify more, and that means more complex administration in which the computer can assist in a big way."

"Of course it's not only about bookkeeping and decision making. Intensive enterprise control is a big development area."

"Most farmers so far don't know what they're missing because they have no exposure, but this has to be handled carefully. The computer without software is useless unless you're a programmer and few farmers are going to learn to program. So software is the key, but nothing will be more destructive to the potential agricultural market for micros than the wrong programs. Get it wrong and you've probably lost the farmer for good."



"The problem is that typical agricultural requirements are way beyond the capability of most computer dealers to define or support. It's going to take specialist software companies like Farmplan supporting and working with the dealers to satisfy the market."

Jerry's interests don't just stop at weighing bulls. He and Sherry run two or three one week Artificial Insemination classes for cattlemen each year, they are active members of the National Association of Animal Breeders, the California Cattlemen's and Feeder's Associations, and they have recently incorporated an AI stud.

His next venture is researching the concept of embryo transplantation. Jerry sees this as the key to genetic development with enormous social consequences in poor countries which otherwise would not be able to develop herds capable of supporting their needs. Jerry's Apple will be playing a major role in monitoring this operation!

In the meantime the Bovine Test Center is showing potential for becoming the Agricultural Software Test Center as well. Jerry is now testing Farmplan's Least Cost Ration Program on his innovative feeding methods and with Farmplan is setting up a computer demonstration at his annual Fall sale of stock. They are also planning a full scale 'Computers in Agriculture' seminar sometime in the new year.

—Peter Jones

President's Message

Ken Silverman
President, International Apple Core

In the Winter 1982 issue of **Apple Orchard** the International Apple Core announced the opening of its new office in Santa Clara, CA. We would now like to give you the new telephone number: (408) 727-7652. If you have a question about the International Apple Core or the **Apple Orchard** the office hours are 9 AM to 5 PM, Pacific time.

In my last message, I noted the catalog listings of the IAC disks currently available. These are printed in this issue.

The IAC has picked the date for its 1982 Annual General Meeting, which will be held in conjunction with the "APPLE-FEST" in Boston, MA. The dates are May 14 through 16, 1982. This event is being sponsored by the Boston Computer Society, sanctioned by Apple Computer, Inc., produced by Northeast Expositions, Inc., and co-sponsored by the International Apple Core (with a cast of thousands). The IAC's Annual Meeting will be held on Saturday morning, exact time to be announced. We will be co-sponsoring seminars on Saturday and Sunday, with the Boston Computer Society. As the schedules develop, we'll keep you informed.

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Prompts only for the information required by the selected form.

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Multiple part printouts can be specified for single part form use or reduce print time with multi-part forms.

Form numbering user specified or automatically incremented.

Defaults for input wherever possible to reduce entry time.

Invoice - Calculates back order quantity, extended price, sub-total and total. Separate prompts for discount, sales tax, and shipping cost. Prints multiple pages - "Page 1 of 2", "Page 2 of 2", etc. - if required. Option to print corresponding "packing list". Up to three lines (86 characters total) available for each item description.

Sales Receipt - As above but includes prompt for amount tendered. Calculates "Change" or "Amount Due."

Statement - Includes ageing of entries and multiple pageing if required.

Purchase Order - Calculates extended price and total. Multiple pageing. Space for purchasing agent signature.

Packing List - Prints "xxx.xx" instead of dollar amounts. Indicates number of boxes shipped. Multiple pageing. Can be printed separately or as part of an invoice.

Debit Memo - Single page includes up to eight total lines for debit items and three lines of "Reason for Memo".

Credit Memo - As above with space for authorizing signature.

Speed Memo - Printed memo area of thirteen lines by sixty characters. Convenient edit feature.

Blank forms - Generates Invoices, Sales Receipts, Purchase Orders, or Packing Lists with field and column headers only for later completion by hand or typewriter.

Optional title - User defineable form title to be used with any existing form format for "Picking List", "Work Order", "Sales Memo", "Expiration Notice", "Department Requisition", bill for professional services, etc.

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The Consolidator will also print out VisiCalc commands, formulas, and the locations to which they apply. In the past, programs that did ONLY that have sold for as much as The Consolidator alone.

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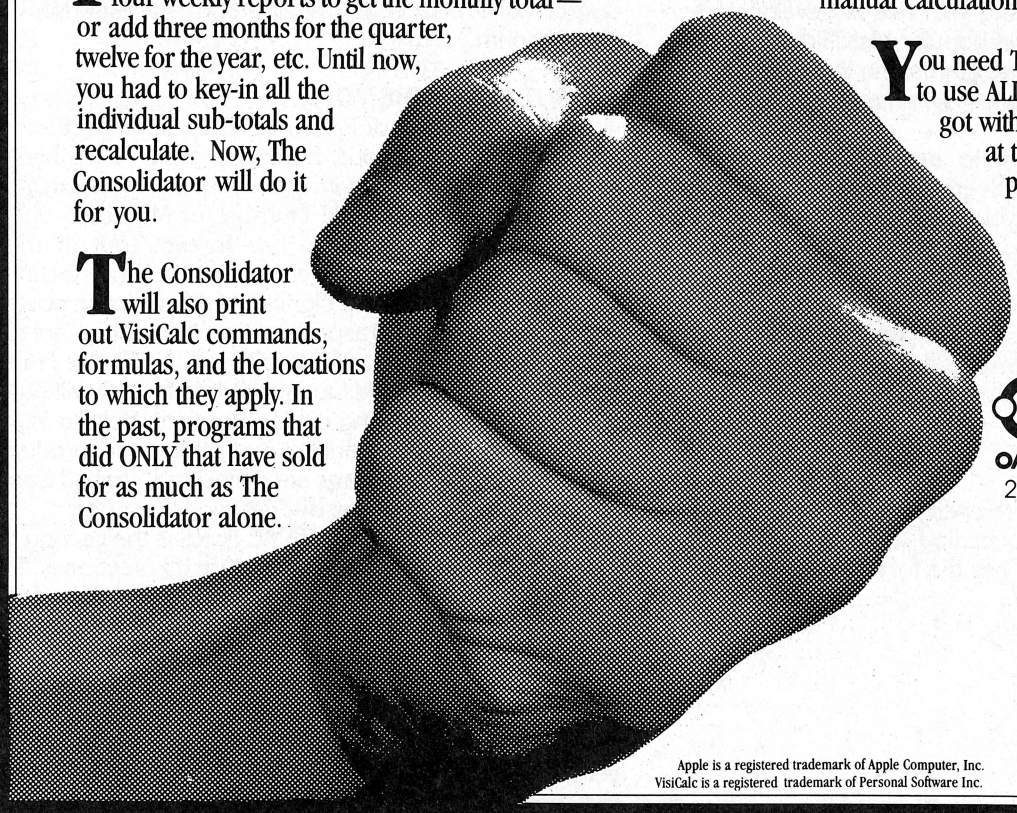

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USERS' GROUP FORUM

A Financial Budgeting Model with Comments

by Randy Fields
Chairman, Users' Group Committee
Past President, San Francisco Apple Core

IN THE BEGINNING

Recently, I was asked to be a consultant to the "Original Apple ///'rs," a user group which was formed in late 1981 to support the Apple ///. (Not that I needed any more volunteer activities.) I agreed because this would give me a unique chance to observe and guide the development of a "sample" user group—for the benefit of all.

IN THE MIDST

The "Original Apple ///'rs" has about 30 members and is growing at the rate of about 5 new members per month. Sound familiar? Policies evolve as issues are raised. But, the money in the treasury is starting to mount up, and the need for a sound financial footing is becoming apparent.

To meet this need, two independent, but ultimately related, functions are in process. The Treasurer, working with a member accountant, is developing the accounting system which records where and how much money has been received and spent. The Treasurer, working with me, is developing a budgeting system using the ever-popular VisiCalc program. The accounting system looks backwards, the budgeting system forward, and the two together provide the means to make reasonable financial decisions.

There is a subsidiary benefit to developing either the accounting or budget system (both are financial models), and that is, as you construct them, you are forced to look at the details of each of the user group functions. So, what follows is both the VisiCalc model and a brief description of the elements which make up this model.

This VisiCalc model—supplied in Template (formulas without values)—will be available to user group Treasurers at a nominal cost in the near future. Refinements will be made as time permits.

A FINANCIAL OVERVIEW

The Budgeting model is developed on a monthly basis starting with January 1982 proceeding through December 1982 with a Totals column, and has the following parts:

1. Physical Data or Parameters
2. Financial Data or Parameters
3. Revenue by Function
   a. Total Revenue
4. Cost by Function
   a. Total Cost
5. Profit/Loss by Function
   Total Operating Profit/Loss
6. General & Administrative Expenses
7. Profit Before Taxes
8. Taxes
9. Net Profit

Within some of these parts are the various functions of the user group:

1. Membership
2. Newsletter
3. Products Sold to Members
   Diskettes of member-contributed software
   A manual or other printed materials
4. Extra
5. Equipment Purchases
6. General & Administration

The interrelationship of the above is shown in figure 1—the Titles in the Budget Model.

The Budget Model is designed to reflect ESTIMATED (expected) or actual cash receipts and cash expenses during a given month.

TAKE IT FROM THE TOP!

PHYSICAL DATA or PARAMETERS is the section to enter "how many" of various functions. Here "Membership" is divided into: New Members in the month, Renewing Members per month, and the Total Number of Members during the month. If your user group has foreign (out of the USA) members, you should sub-divide the total members into US and non-US to reflect the significant difference in postal rates. Also, here the physical aspects of the "Newsletter" are detailed. We have included Issue Printed? (Y=1, N=0), the Number of Pages per Issue and the Quantity Printed which will be used to ESTIMTATE the printing costs. "Products Sold to Members" and "Extra" physical quantities for both amount produced and amount sold, as necessary, are delineated. "Extra" is included to make expansion of the Budget model simpler.

FINANCIAL DATA or PARAMETERS is the section to enter "how much per unit." The first entry in this section is "Postage Rates" because it impacts both the Membership and Newsletter activities, at the least. The next entry is "Membership," as above, but here the "Dues per Year" and the "Printing Cost for Applications" and the "Printing Cost for Membership Cards" are entered. The "Dues per Year" are entered in each month and can be different to reflect an increase in dues during the yera, and also, can be divided into US and non-US members if the dues are different for the two classes. The "Printing Cost for

APPLE CLUB BUDGET WORKSHEET V1.4

DATE: 1-21-82 REVISED

MONTH >>>	JAN 82	FEB 82	MAR 82	APR 82	MAY 82	JUN 82	JUL 82	AUG 82	SEP 82	OCT 82	NOV 82	DEC 82	TOTAL 82
PHYSICAL PARAMETER	PHYSICAL PARAMETER		PHYSICAL PARAMETER		PHYSICAL PARAMETER		PHYSICAL PARAMETER		PHYSICAL PARAMETER		PHYSICAL PARAMETER		
MEMBERSHI													
CURRENT	30	32	34	36	38	41	44	47	50	54	58	62	30
NEW	2	2	2	2	3	3	3	3	4	4	4	5	37
RENEWALS	0	0	0	0	0	0	0	0	0	0	0	0	0
NO. MEMB	32	34	36	38	41	44	47	50	54	58	62	67	67
LOCAL	32	34	36	38	41	44	47	50	54	58	62	67	
OUT-OF-A	0	0	0	0	0	0	0	0	0	0	0	0	
FOREIGN	0	0	0	0	0	0	0	0	0	0	0	0	
NEWSLETTE													
ISSUE (1	1	0	1	0	1	0	1	0	1	0	1	0	6
PAGES/IS	4	4	4	4	4	4	8	8	8	8	8	8	
QUANTITY	50	50	50	50	50	60	60	60	60	70	70	70	
PRINTED M													
MANUAL													
EXTRA													
GENERAL &													
FINANCIAL PARAMETER	FINANCIAL PARAMETER		FINANCIAL PARAMETER		FINANCIAL PARAMETER		FINANCIAL PARAMETER		FINANCIAL PARAMETER		FINANCIAL PARAMETER		
POSTAGE													
1ST CLAS	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
BULK MAI	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	
FOREIGN	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	
MEMBERSHI													
DUES/YEA	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	
APPLICAT	10.00												
MEMBERSH	15.00												
NEWSLETTE													
COST/PLA	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	
COST/PAG	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
DISKETTES													
PRINTED M													
EXTRA													
GENERAL &													

REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	REVENUE BY CENTER	
MEMBERSHI	50.00	50.00	50.00	50.00	75.00	75.00	75.00	75.00	100.00	100.00	100.00	125.00	925.00
NEWSLETTE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DISKETTES													0.00
PRINTED M													0.00
EXTRA													0.00
TTL REV	50.00	50.00	50.00	50.00	75.00	75.00	75.00	75.00	100.00	100.00	100.00	125.00	925.00

COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	COST BY CENTER	
MEMBERSHI													
POSTAGE	0.40	0.40	0.40	0.40	0.60	0.60	0.60	0.60	0.80	0.80	0.80	1.00	7.40
APPLICAT	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
MEMBERSH	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00
EQUIPMEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEMBERSHI	25.40	0.40	0.40	0.40	0.60	0.60	0.60	0.60	0.80	0.80	0.80	1.00	32.40
NEWSLETTE													
PLATES	13.00	0.00	13.00	0.00	13.00	0.00	26.00	0.00	26.00	0.00	26.00	0.00	117.00
PRINTING	10.00	0.00	10.00	0.00	10.00	0.00	24.00	0.00	24.00	0.00	28.00	0.00	106.00
MAILING	2.56	0.00	2.88	0.00	3.28	0.00	3.76	0.00	4.32	0.00	4.96	0.00	21.76
EQUIPMEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NEWSLETTE	25.56	0.00	25.88	0.00	26.28	0.00	53.76	0.00	54.32	0.00	58.96	0.00	244.76
DISKETTES													0.00
PRINTED M													0.00
EXTRA													0.00
GENL. EQU													0.00
TTL COST	50.96	0.40	26.28	0.40	26.88	0.60	54.36	0.60	55.12	0.80	59.76	1.00	277.16

PROFIT/LO BY CENTER	PROFIT/LO BY CENTER	PROFIT/LO BY CENTER	PROFIT/LO BY CENTER	PROFIT/LO BY CENTER	PROFIT/LO BY CENTER	PROFIT/LO BY CENTER						
MEMBERSHI	24.60	49.60	49.60	49.60	74.40	74.40	74.40	74.40	99.20	99.20	99.20	124.00	892.60
NEWSLETTE	-25.56	0.00	-25.88	0.00	-26.28	0.00	-53.76	0.00	-54.32	0.00	-58.96	0.00	-244.76
DISKETTES													0.00
PRINTED M													0.00
EXTRA													0.00
GENL. EQU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OPERATING PROFIT	-0.96	49.60	23.72	49.60	48.12	74.40	20.64	74.40	44.88	99.20	40.24	124.00	647.84
GENERAL & ADMINISTR													
MEETING R													
ACCOUNTIN													0.00
LEGAL SER													0.00
CLERICAL													0.00
MISCELLAN													0.00
TTL G&A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PROFIT BEFORE TAXES	-0.96	49.60	23.72	49.60	48.12	74.40	20.64	74.40	44.88	99.20	40.24	124.00	647.84
TAXES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET PROFIT	-0.96	49.60	23.72	49.60	48.12	74.40	20.64	74.40	44.88	99.20	40.24	124.00	647.84

ASSUMPTIONS:

A. PLAN TO DOUBLE MEMBERS
B.
C.

The International Apple Core and Randy Fields are happy to announce that the "SOURCE" (TCA 030) will be available for Users Group officers and directors to ask questions and receive answers concerning the start-up and/or management of your User Group. Randy intends to leave the questions/answers on the Source until they are published in the *Apple Orchard*, so that the User Groups can interact. Remember, TCA 030.

ZOOM PLUS
GRAF-PAK

for

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```
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DATE: 1-21-81

MONTH >>>

*****************************
PHYSICAL
PARAMETERS
*****************************

MEMBERSHIP
 CURRENT
 NEW
 RENEWALS
 NO. MEMBERS

 LOCAL
 OUT-OF-AREA
 FOREIGN

NEWSLETTER
 ISSUE (1=Y, 0=N)
 PAGES/ISSUE
 QUANTITY PRINTED

PRINTED MATERIALS

MANUAL

EXTRA

GENERAL & ADMINISTRATIVE

*****************************
FINANCIAL
PARAMETERS
*****************************

POSTAGE
 1ST CLASS
 BULK MAIL
 FOREIGN

MEMBERSHIP
 DUES/YEAR REVENUE
 APPLICATION COST COST
 MEMBERSHIP CARD COST COST
```

NEWSLETTER
 COST/PLATE
 COST/PAGE

DISKETTES

PRINTED MATERIALS

EXTRA

GENERAL & ADMINISTRATIVE

****
REVENUE
BY CENTER
****

MEMBERSHIP

NEWSLETTERS

DISKETTES

PRINTED MATERIALS

EXTRA

==========
TTL REV
==========

****
COST
BY CENTER
****

MEMBERSHIP
 POSTAGE COST / NEW MEMBERS
 APPLICATION COST
 MEMBERSHIP CARDS
 EQUIPMENT PURCHASES

MEMBERSHIP

NEWSLETTER
 PLATES
 PRINTING
 MAILING
 EQUIPMENT PURCHASES

NEWSLETTER

DISKETTES

PRINTED MATERIALS

EXTRA

GENL. EQUIPMENT

==========
TTL COST
==========

****
PROFIT/LOSS
BY CENTER
****

MEMBERSHIP
NEWSLETTER
DISKETTES
PRINTED MATERIALS
EXTRA
GENL. EQUIPMENT

==========
OPERATING
PROFIT
==========

****
GENERAL &
ADMINISTRATIVE
****

MEETING ROOM EXPENSES
ACCOUNTING SERVICES
LEGAL SERVICES
CLERICAL SERVICES
MISCELLANEOUS

==========
TTL G&A
==========

****
PROFIT
BEFORE
TAXES
****

****
TAXES
****

****
NET
PROFIT
****

ASSUMPTIO

A. PLAN TO DOUBLE MEMBERS
B.
C.

Applications" and the "Printing Cost for Membership Cards" are entered as the specific costs are incurred, probably once a year or so. The next entry is "Newsletter" and reflects various elements of the printing process. Set the "Cost per Plate" to Zero (0) if your club is xeroxing your newsletter. (Feel free to modify the Budget Template to reflect how your club does business.)

NOTE: Once you have entered the appropriate data in PHYSICAL DATA or PARAMETERS and FINANCIAL DATA or PARAMETERS sections, your data entry is finished—the remainder is automatic(!)!

REVENUE by FUNCTION is the section which shows the cash inflows by combining appropriate elements from PHYSICAL DATA or PARAMETERS and FINANCIAL DATA or PARAMETERS sections. All of the data in the REVENUE and ALL following sections is derived—the results are calculated for you. The "Membership" revenue is derived by multiplying the number of renewals in the month by the dues per year since each renewing member sends in his/her annual dues during the month. For the "Newsletter," the revenue is zero (0) unless it has advertising or is sold at news stands. Although not shown, "Diskettes" revenue could be derived by multiplying the number of diskettes sold per month (PHYSICAL DATA) by the charge per diskette (FINANCIAL DATA).

Total Revenue is calculated by adding the appropriate Total Revenue by Function.

VisiCalc Note: Use the VisiCalc MOVE (/M) and the INSERT ROW (/IR) commands to build up the REVENUE and COST BY FUNCTION. For example, if your club decides to sell "Diskettes," above the cell "DISKETTES," you would use /IR twice. Once for "Number of Diskettes Sold," and again for "Diskette Price." The "Diskette" Revenue is "Number of Diskettes Sold" times the "Diskette Price." Sum (ISUM(.) and replicate (/R.:..) appropriately. Now, use the MOVE command to "Number of Diskettes Sold" to the PHYSICAL DATA section. And again for "Diskette Price" to move to the FINANCIAL DATA section. Follow the same procedure for "Diskette" cost. If you need some parameter from either the PHYSICAL DATA or FINANCIAL DATA sections to build up your Revenue or Cost sections, use MOVE to bring it down, and when finished, use MOVE to take it back to its original location.

COST by FUNCTION is the section which shows the cash outflows by combining appropriate elements from PHYSICAL DATA or PARAMETERS and FINANCIAL DATA or PARAMETERS sections. All of the data in the COST and following sections is derived—the results are calculated for you. The "Membership" cost is derived by deriving the postage cost for mailing membership cards to renewals in the month plus the printing costs for applications and cards, if any. Also, if "Equipment Purchases" are made for membership (e.g., postage machine, etc.), the total cost of the equipment is entered here.

Total Cost is calculated by adding the appropriate Total Cost by Function.

PROFIT/LOSS by FUNCTION shows the combined impact of cash inflows and outflows by combining appropriate elements from REVENUE BY FUNCTION and COST BY FUNCTION. In other words, Profit/Loss by Function equals Revenue by Function less Cost by Function. The "Membership" function should show a profit, the "Newsletter" should show a loss unless it has advertising or a news stand cover price. The "Printed Materials" and "Extra" can show either a profit or loss while "General Equipment" is typically a loss.

What the PROFIT/LOSS by FUNCTION shows is that the membership pays for the newsletter, and possibly, some of the other user group functions. What this means is that the Membership function is critical to the success of the club.

Total Operating Profit/Loss is calculated by adding the appropriate Total Operating Profit/Loss by Function.

GENERAL & ADMINISTRATIVE EXPENSES is the section where expenses which benefit the user group as a whole are entered. This includes: Accounting, Legal and Clerical Services, and costs for meeting rooms, etc. Generally, if the expense cannot be assigned to one function or cannot be easily allocated to more than one function, put it in General & Administrative Expenses. However, to keep the Budget Template from becoming cumbersome, enter the appropriate data in the PHYSICAL DATA and FINANCIAL DATA sections which are then automatically carried forward to the "General & Administrative Expenses" section. Again, use the MOVE command technique to simplify the process.

Total General & Administrative Expenses is calculated by adding the appropriate Total General & Administrative Expenses by Function.

PROFIT BEFORE TAXES is simply TOTAL OPERATING PROFIT/LOSS less GENERAL & ADMINISTRATIVE EXPENSES.

TAXES are the Federal, State and local taxes which the user group pays depending on the legal status of the club. Check with your group's attorney (or get legal advice from a qualified member) on the taxes your club is obligated to pay. In most states, newsletters are not taxed, but diskettes and other products sold by the group may be subject to sales tax. Again, to keep the Budget Template from becoming cumbersome, enter the appropriate data in the PHYSICAL DATA and FINANCIAL DATA sections which are then automatically carried forward to the "Taxes" section.

NET PROFIT—the bottom line—is PROFIT BEFORE TAXES less TAXES. This section shows how your user group should do during the year. If a full year's operation is a LOSS (as shown in the "Totals" column), then obviously the financial plan should be revised. A high total NET PROFIT can be reduced by buying necessary equipment, etc. for the user group, or to pay members for their various contributions. If after adjusting the Budget, your club still has a high total NET PROFIT, think about reducing the yearly dues.

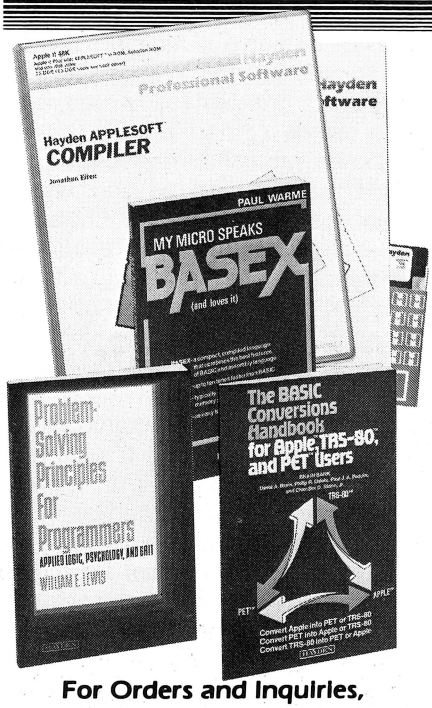
ASSUMPTIONS and other information needed to clarify various entries are listed at the bottom of the Budget Template. If you enter the Assumptions as the Budget is developed, other members of the user group will be able to understand and comment on the projections.

MY BOTTOM LINE

The Budget Template, combined with an understanding of your club's actual operations, will provide the club's leaders and members with a sound basis to make both operating and financial decisions. As some of you probably already know, making decisions in a "financial vacuum" is not very satisfying.

Finally, as the months pass by, enter the Actual data for each month, and review the Budget for any necessary changes in your plans. Hopefully, your Actual revenues will be above your Budgeted revenues and your Actual expenses will be below your Budgeted expenses. Above all, take your time and check all entries.

In following issues of the *Apple Orchard*, I will discuss various functions in the user group and modify, as necessary, the Budget Template. Please feel free to write at the IAC office or call me at(415) 775-7965 to ask questions or suggest various changes.



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SOFTWARE REVIEW—"THRESHOLD"

by Al Azose

What brings Threshold out of the normal or mundane category and into new, lofty realms of arcade gaming is the variety, quantity, and quality of the aliens. There are plenty of them, as you'll see; they are all unique in design and in "personality." Anyone with enough practice can zap the first "brigade" of four types of aliens, who attack in swarms of twelve at a time. First, there are white birds, flapping their wings in beautifully animated motion, dropping those ever present bombs at random. After they are disposed of by your ship's laser (with soul-satisfying sound and visual effects), the next group immediately appears, consisting of tricky flying saucers. Again, they are dropping their bombs at random because they really can't "see" your spaceship. When these twelve flying saucers first appear, they're brave enough to venture towards the middle of the screen where they make easier targets. But as their numbers diminish, they take on new evasive characteristics, darting in and out from the sides and the top of the screen.

Next, there are swarms of fish-like creatures swimming rapidly from right to left across the top half of the screen, droppin their bombs as they zoom by. Actually, there are no more than twelve on the screen at any one time, but they scroll by so rapidly that they give the illusion of hundreds. Here, the temptation is to fire rapidly at will since you feel that you're bound to hit some of the densely packed critters. You soon learn, however, after overheating your laser (and dodging bombs with your paddle while waiting for it to cool down) that a more deliberate approach to shot selection is called for.

I can remember back in the not too distant past (2 years ago) when "Invaders" was king of the Apple arcade games. For its time, Invaders was a unique, advanced, fun-filled game with an almost hypnotic attraction. The joy of evading those wriggly little bombs and then zapping those monsters with your tank laser (and hearing a delicious "squish" when they exploded— was the purest of sensual delights.

We soon became jaded, though, when ever more advanced games came on the market, each with their own style of "zapping the aliens." Nothing, however (with the possible exception of "Space Eggs"), has really come close to supplanting the lure and attraction of Invaders. That is, until now. For now we have "Threshold," a new Invaders-style arcade game written by Warren Schwader and Ken Williams of On-Line Systems, which is destined to become the new king-of-the-hill.

Threshold provides you with five little spaceships which are launched with a roar from their vertical stacking area on the right side of the screen, nestled between the laser temperature gauge and the fuel gauge. The objective (what else?) is to zap as many aliens as possible and to rack up the points while doing so. Your spaceship, as in Invaders and Space Eggs, can only maneuver horizontally on the bottom of the screen, and you must avoid their green bomb/droppings (and the aliens themselves), lest you be done in by them. As usual, the game is played against a background of moving red and blue stars. Now granted, there's nothing new or unique in all of this . . . but read on.

The next group consists of deadly, twirling snowflakes, falling toward the bottom of the screen using their bombs as a shield. But the usual rule still prevails: Zap or be zapped.

By this time, if you (a) haven't lost all your ships, (b) haven't run out of fuel, and (c) have managed to zap all the snowflakes, you then get to see a beautiful and inspiring Mothership come floating serenely down from above (clearly inpsired by a Cadillac hood-ornament), lovingly cradle your ship in her gentle pincer-arms, give you points for unused fuel, and then refuel you to the top of the gauge. And then, just as serenely, the Mothership departs leaving you to do battle with the next group of four.

I should add that you are also given the option to go into a "Time-warp," where, if you toggle the Space Bar, the aliens go into slow motion while you still retain your normal speed and zapping power. Although this feature applies once for each ship, it lasts for only 20 seconds, so you have to consider carefully how it fits in with your overall strategy.

The next group of four is completely different in design and maneuvering characteristics from the first group. You are almost tempted to stop and admire the unique and complex formations and movements of each new type of alien before realizing that the objective here is to obliterate these fascinating creatures. The second group of four consists of: (1) Castle-like creatures arranged in three vertical rows of four each, moving in a jerky circular motion, all in unison. (2) Gear shaped aliens, roughly oval, moving freely at random throughout the entire screen. (3) Small, square shaped monsters with a bar across the middle, twirling on their axis, and every so often gathering in a single, horizontal file across the top of the screen. (4) Deer-like creatures reminiscent of Santa's reindeer, moving in curving sweeps single file from right to left.

Again, if you manage to destroy this second group of four (not likely for a novice, and difficult for the expert), Mother again floats down to refuel you, as she does after every round of four aliens is disposed of.

If you've survived to this point, your point total is now in the tens of thousands, and it's at the 50,000 point mark where the game allows a bonus of an additional ship. You will certainly need it to get much further, because as they point out in the ads, "there are more monsters out there than we expect you'll ever see." Word has it that there's somewhere between 20 and 30 monsters to deal with. Personally, I've only reached to the 14th monster after a tremendous struggle, and I haven't come close since.

The first four monsters alone, simply from an imagaination/creativity standpoint, would be a marvelous accomp ishment for any arcade programmer. How anyone can dream up, much less actually create 20 or more complex and unique monsters for one game is completely beyond me. It's very fortunate for us arcade game fans that the authors weren't aware that you simply cannot DO something that involved on the Apple.

To sum: Threshold is a fascinating and mind-boggling game, destined to become a classic of the genre. Its influence on other arcade games will undoubtedly be felt for a long time to come.

utility city

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by Bert Kersey — 48K Applesoft ROM

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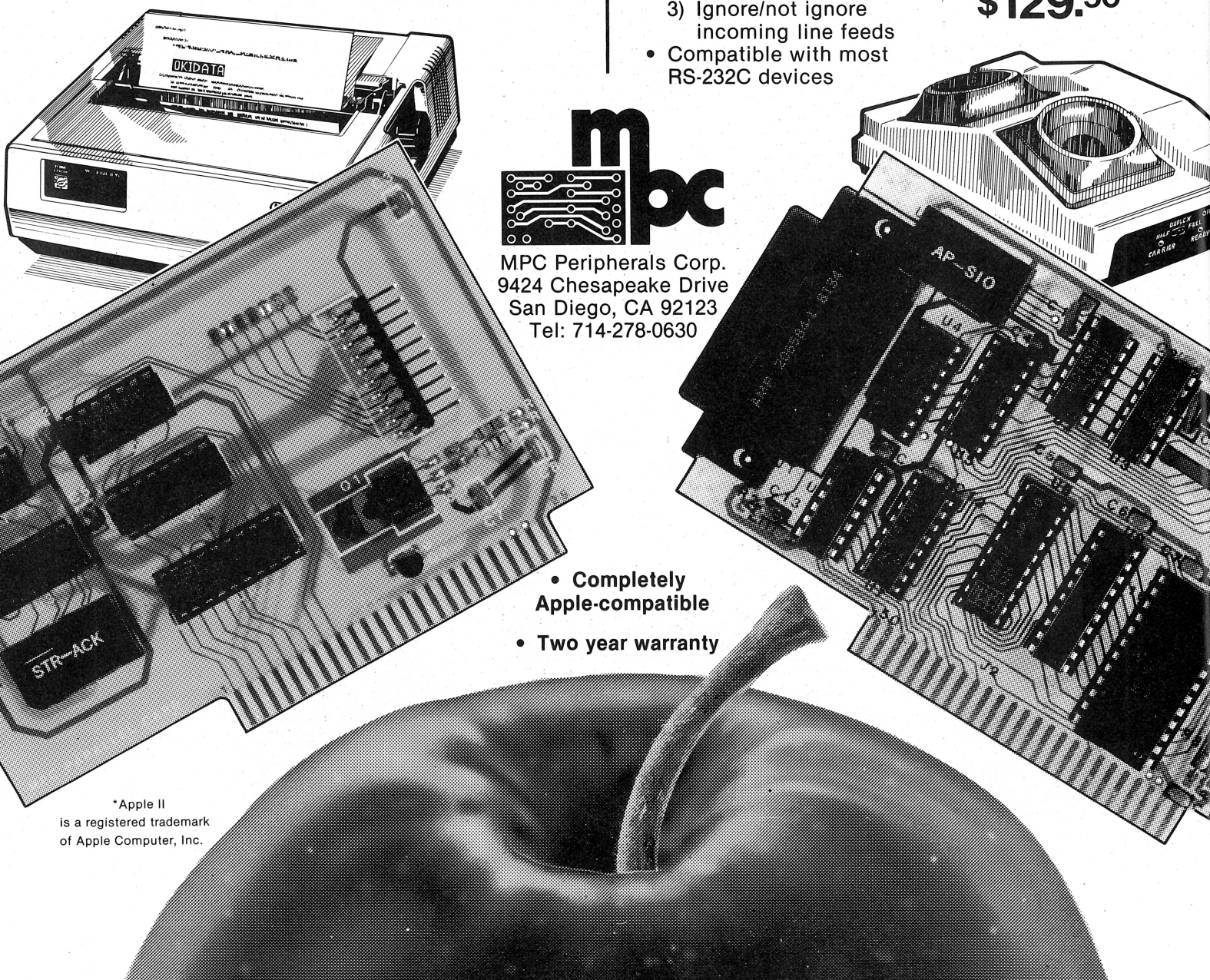

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PASCAL/MT+ NUTS AND BOLTS

by Gene Wilson

Some months ago, I purchased the PASCAL/MT+ package, which included a 'technically' oriented (but user friendly) manual and two eight inch diskettes of 'required and elective programs'. There was even a group of programs and utilities for use with the AMD9511 board for those people needing fast (really fast) number crunching applications. The package is Z-80 based, and works with the CP/M system and the Mircosoft Softcard.

The first problem was to get the eight inch diskettes 'shrunk' to fit into my five inch drives. This is still not as easy as it sounds, and very few stores are set up to handle the transfer. Several attempts were fruitless. Finally, Glen Hoag (Computerland of Belmont, CA) was very interested in the package; he was successful at transferring the information onto three five-inch diskettes.

After many hours of trial-and-error, I finally decided that the package might work on some computers, but the Apple II wasn't on the list. A letter to the MT Microsystems people (in Cardiff-by-the-Sea, CA.) brought to light that there was a 'bug' in the latest version of CP/M, and the authors/owners/distributors of PASCAL MT+ were trying to obtain information from Digital Research (D.R. had been so far not at all helpful). A 'local' dealer in the SF Bay Area was suggested for further assistance.

The long sought fix was finally obtained from Bob Christianson of Prometheus Products (4509 Thompson Court, Fremont, CA 94538). Bob was not only helpful, but also showed me several products including their 'VERSAcard' (4 functions on one card: SERIAL, PARALLEL, REAL TIME CLOCK/CALENDAR, BSR; all working simultaneously, and fully compatible with Apple Pascal, CP/M, etc.), 'Memory Expansion Module-1' (16K RAM board that works with everything I can think of). Bob also offered to sell PASCAL MT+ direct with the RAM board at a price that is as low as some boards without any 'extras' (a steal, but you'll have to contact him on your own). Prometheus is also working on a 'hard-disk' and controller card for the Apple II.

For those of you who've bought the MT+ package and don't seem to get anywhere with a 'fix', Bob has allowed me to give it to you through this column:

Important Notes Before You Use PASCAL MT+ On Your Apple:

Before trying to compile any program with Pascal MT+ it is necessary to fix a bug in the CP/M 56K operating system. By following these easy procedures you will be able to easily modify your disk. An example of the following instructions can be found in Figure 1.

1. Make a 44K backup copy of your 16 sector Apple CP/M master disk. A good way of doing this is with the COPY command found on your Apple CP/M disk. Place this backup copy in Drive B. This is the disk that we will modify. Place a 56K CP/M master in Drive A and boot it.

2. Type >DDT(cr)
   –LD6D2(cr)

This will disassemble the code starting at D6D2(hex). You will see the following disassembled code.

```
D6D2   DCR    C
D6D3   DCR    C
D6D4   JNZ    D169
D6D7   PUSH   PSW
```

The correct way the code should read is:

```
D6D2   NOP
D6D3   NOP
D6D4   LXI H,O
D6D7   PUSH PSW
```

If your code disassembles like the correct listing or in any other way differs from the first line, DO NOT MODIFY your code. The only exception to this is if the JNZ address at D6D4 should differ from that shown above. Whatever the address change it to LXI H,O. Proceed to use PASCAL MT+ as normal. Should you have difficulty in LINKING the demo program CALC (provided on your master disk), call PROMETHEUS. If your list looks like the first listing continue with Step Three.

One last note. Should you have a program that was compiled under the old code you should recompile it. The bug in CP/M effects the compiler, not the linker, even though it seems as if the compiler works correctly.

3. Put your 44K backup disk in Drive B and your 16 sector master disk in Drive A. Do the following:

Type >DDT CPM56.COM(cr)

This gets the 56K disk update program so we can modify it.

-L20D2(cr)

This should be the same code you found at D0D2 in your 56K system disk.

*A20D2(cr)

Type in the following code:

```
20D2    NOP(cr)
20D3    NOP(cr)
20D4    LXI H,0(cr)
20D7      (cr) To exit the
        assembler.

*L20D2(cr)
```

Make sure the code is the same as you typed in. Once you've done this proceed to Step 4.

4. Type *©**C** (a Control C) This will cause a warm boot in CP/M and leave the modified contents in RAM unchanged.

Type **A**>SAVE 60 MCPM56.COM(cr)__

This will save the modified CPM56 file on disk under the new name.

5. Now run MCPM56.COM by typing >MCPM56 B: (cr)

Follow the instructions as if you were creating a new 56K CP/M master disk. Once this is done reboot the new disk (a power-on boot) you've created and check at addresses D0D2 to D0D4 to see if the correct code is there. If so, you're all set and ready to start using PASCAL MT+ with your new system disk. If not, start over at Step 1 since you must have made a mistake.

You can use MCPM56 in the future to create any other system disks. In no way does this modification affect the normal operation of your CP/M system.

Thanks, Bob.

Let's look at the operational aspects of the PASCAL MT+ package. I use three diskettes, but it is possible to use a 'WAIT' command to 'switch back and forth'. I've arranged the distettes in the following fashion:

A: Workdisk. All source and completed files go here.
B: Compiler overlays 1..4 (as a minimum).
C: MTPLUS, LINKMT, plus required linker files.

Use the EDitor to create a simple program (Mine is called SAMPLE).

(*I've called MTPLUS [the Compiler] on Disk C:. Relocatable file will be placed on Disk A:, overlays can be found on Disk B:, and I've additionally asked for the 'Z' switch to compile in Z-80 code. The system will supply all this information, then compile the selected source program and give complete information on what action was taken. A file SAMPLE.ERL will be placed (where directed) as a final action. Many other switches are available.*)

(*Next the LINKER is invoked. Usually files for RandomIO, FPReals, RealIO, etc., in addition to PasLib are included, but our program is very simple and doesn't require much. LINKMT is found on Disk C:. The file SAMPLE is on A:. PASLIB is on C:. /S directs the linker to only take those routines from PASLIB that are required for program execution. /L asks for a Listing of modules as they link, /M asks for a Map of all entry points in tabular form. Many other switches are available to give total control. A file SAMPLE.COM will be placed (where directed) as a final action.*)

That's the whole thing. A finished program is ready to be run. This package is not for the novice. An experienced programmer interested in development work will find a very sophisticated product; a tool with great power and potential. It should be noted that many of the 'nice' features of Apple II Pascal such as the 'Applestuff' and 'Turtlegraphics' Units aren't available here. It's up to you to create only those elements that you desire for your particular application. Interaction with the CP/M system can be done at machine level through assembly routines. The Compiler allows the user to create Z-80 assembly files from "higher level languages" (in this case Pascal). Created files are larger (require more memory) than 'P-code', but run speeds can be increased dramatically. Use of "math function processing boards" such as the AMD9511 can solve number crunching problems that had been solved only with 'mainframes' in the past.

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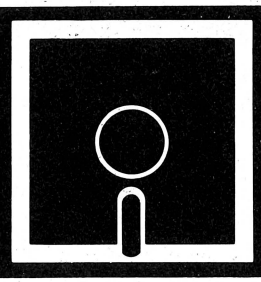

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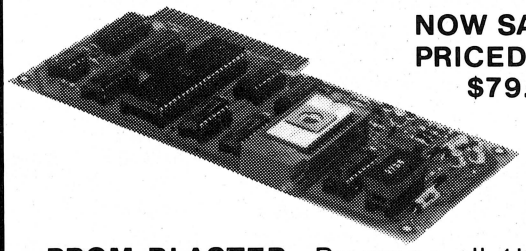

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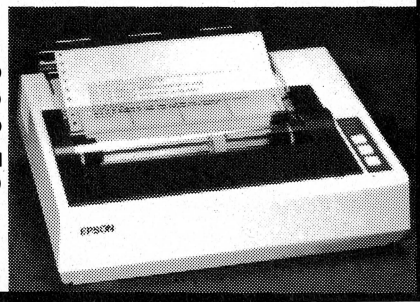

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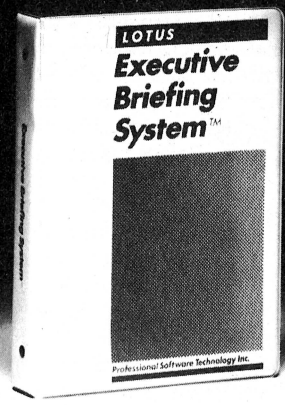

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are supported—$379. Kmega Microsoftware, 3375 Scott Blvd., Suite 312, Santa Clara, CA 95051 (408) 727-6805.

Dual Thermometers. The Strawberry Tree Dual Thermometer interface card with two complete thermometers and sophisticated software turns your Apple][into a valuable laboratory tool to measure, datalog, and analyze temperature without programming or wiring. Display time, temperature, maximum and minimum temperature, and the temperature difference between the probes. Store the data on a disk, or print it at times you specify. Sound alarms at any temperature. Install up to seven Dual Thermometer cards with 14 probes in one Apple. Measures from -55 to 125 degrees. C. Accuracy is better than 0.4 degrees C from -20 to 50 C and better than 1.0 degree C outside that range. Extend the probes up to 500 feet with no loss of accuracy. Requires a 48K Apple][with Applesoft in ROM or RAM and one disk (13 or 16 sector). $260 from Strawberry Tree Computers, 949 Cascade Drive, Sunnyvale, CA 94087 (408) 736-3083.

Buffered Parallel Card. The Microbuffer][is a buffered parallel printer interface for the Apple][computer with 16K characters of memory (user expandable to 32K). It accepts data as fast as your computer can send it, allowing you to use your computer while the Microbuffer][is in control of your printing. It is compatible with Applesoft, CP/M and Pascal and comes with complete print formatting features as well as advanced graphics dump routines for most popular graphics printers. The Snapshot option permits you to dump the text screen or graphics picture to the printer while any program is running—without interruption. The 16K version is $259, 32K—$299. The Snapshot option is $69. Practical Peripherals, Inc., 31245 La Baya Drive, Westlake Village, CA 91362 (213) 706-0339.

Epson/Apple Interface Card. The EP12 interface card for the Apple][and Apple /// computers and Epson MX70, MX80, and MX100 printers is astonishing. All the features you've ever seen in printers for the Apple are included plus some new ones. All in firmware for the first time, so no more disk juggling to do a graphics print. Provides 3 varieties of screen dumps: Hi-Res graphics with 24 different formats, Lo-Res graphics with a 16 level grey scale, Text—printe exactly what's on the screen. Special graphics feature plots at a resolution of 960 x 2160 points on a page with a 16-level grey scale print mode. Variable line spacing and page length, variable line length and tabs for indentation and column printing. Indication on screen if paper runs out. At your local dealer or contact: Interactive Structures, Inc., 112 Bala Avenue, P.O. Box 404, Bala Cynwyd, PA 19004 (215) 667-1713.

Keyboard Enhancer. The Enhancer][can help your Apple][']s keyboard become more sociable by remembering words or phrases which can be entered into the Apple by the mere touch of a key. The Enhancer][can remember what you typed while your Apple was busy talking to your disc (or doing other things). Naturally it knows the difference between upper and lower case letters and what shift keys are supposed to do. It even auto-repeats any key held down. Replaces the encoder board making installation simple—$149. Videx, 897 N.W. Grant Avenue, Corvalis, OR 97330.

Double Hi-Res Card. Double your graphics capability from 280 x 192 to 560 x 192. Compatible with Apple /// Super Hi-Res graphics. Now you don't have to spend a lot of money to get super resolution. Two levels of grey scale for filling forms or other shading applications. It can display 80 x 24 characters as well as graphics. Allows you to define your own character set with the Define Font program (included). Unique character features include: slant (italics), underline, multiple character sets as well as graphics on the same screen and proportional spacing. Automatic video switching—no need for switch plate or re-cabling. 32 pure Hi-Res colors on a color monitor or TV without alternating color dots. Uses Hoolor, Hplot with Applesoft for plotting. Uses both Hi-Res pages simultaneously to produce flicker free display. Includes BASIC disck, character defining program, demo programs—$295. Spies Laboratories, P.O. Box 336, Lawndale, CA 90260 (213) 644-0056.

80 Column Board. Wizard-80 lets you see exactly what you will get when typing 80-column format. It gives you a full 80-column by 24-line display with all these features: Fully compatible with the Apple][and][Plus, compatible with most word processors, micro-modems and PROM programmers plus all current Apple][expansion boards. Lists BASIC programs—Integer and Applesoft. Fully compatible with Pascal. Uses software to switch between 40 and 80-column formats. Displays 7 x 9 matrix characters—lower case with true descenders. Uses ESC key for cursor movement and editing. Crystal controlled for flicker-free character display. Low power consumption for reliable operation. 2K on-board RAM. 50 or 60 Hz operation with Inverse video selection standard—$345. By Wesper Micro Systems. At your local Apple dealer.

Touch Screen. The High-Resolution Touch Screen makes it possible to access a data base by simply touching the screen. The Touch Screen consists of a thin transparent curved panel that mounts on the front of most standard CRT displays, and an electronic board that is connected to the panel with a cable. The screen is offered in 12- and 15-inch models—$775 and $825, respectively. TSD Display Products, 35 Orville Drive, Bohemia, NY 11716 (516) 589-6800.

MEMORY

ROM Card. With Andromeda's new ROM Board, you can plug many useful utility programs into your Apple][and access them instantly without having to load them from a disk. The ROM Board comes with a utility ROM, which gives you five powerful options to apply to your Applesoft programs. With it you can do automatic line numbering, control a program list in a page mode, restore a crashed Applesoft program in memory, alphabetize a disk catalogue and create a disk without DOS, giving you an extra 8K on your disk. Any of Soft Control Systems' other ROMs can be used, such as the Dual DOS in ROM, and 'Your'ple ROM. You can install 2K PROMS, 4K PROMS, or even 2K RAM chips in each of the two memory sockets. You can even have the Read-Write capability of RAM to develop PROM Programs yourself, or just have an extra 2K RAM for your machine language programs. Two 2732 PROMS allow a total of 8K of memory on the Board—$125. Computer Data Services, P.O. Box 696, Amherst, NH 03031 (603) 673-7375.

16K Expansion Board. The Ramex 16 RAM Board just plugs in. It's simple, reliable, and does its own memory refresh, with no additional connections. It is not necessary to remove a RAM chip or install a strap, etc. Run Pascal, Fortran, FP, INT and other alternate languages, 56K CPM with a Z80 Softcard, increase usable memory for VisiCalc by 16K. Close-track engraved, epoxy sealed—$139.95 with a one year limited warranty. At your local dealer or order direct: Omega Microware, Inc., 222 So. Riverside Plaza, Chicago, IL 60606 (312) 648-1944 or toll-free (800) 835-2246.

32K RAM Card. This Apple memory card provides the Apple][user with an additional 32K bytes of RAM memory organized in two pages of 16K. The addition of this card will increase the total RAM of the Apple][to 80K. Included with the card is a disk containing the CTA Memory Executive program which is an enhanced version of current software employed by various 16K memory expan-

sion cards. A disk supplied includes both Applesoft and Integer versions. The software operates by moving the second language to one page of the card and the DOS to the second page giving the user in excess of 47K of free memory. Also it can be installed in any available slot of the Apple. Compatible software includes Integer and Applesoft BASIC, Pascal, the Microsoft Z80 Softcard, VisiCalc, Fortran, Lisa version 2.0 and more. Cards are made of computer grade epoxy glass, fully socketed, solder masked with gold plated contact fingers—$274.95. Computer Technology Associates, 118 Castellano, El Paso, TX 79912 (915) 581-3500.

128K Memory Card. MetaCard has up to 128K bytes of onboard memory with parity. Adding MetaCard to your Apple's existing 64K bytes of memory gives you three times the capacity, and opens the door to applications never before possible on your system. This card is designed to handle all computing tasks at greatly increased speeds. The Intel 8088 operates at the full 5Mhz, running most applications at least 4 times faster than the Apple's 1Mhz 6502. Gives you multi-processing capabilities, allowing both the 8088 and 6502 to run simultaneously at full speed. Run CP/M-86, which is included with the card at no extra cost. Also offered is UCSD Pascal 4.0 and the operating system for the IBM Personal Computer as options. Full parity checking, power-up diagnostics and a 48 hour burn-in will insure the reliable performance of your MetaCard—$980 for the 64K configuration. Metamorphic Systems, Inc., P.O. Box 1541, Boulder, CO 80306 (303) 499-6502.

304K RAM Card. The App-L-Cache provides 304 K RAM for the Apple][computer. The trick is disk emulation: App-L-Cache is a 256K memory card that is treated as a diskette by software resident on the card itself. Contact Sorrento Valley Associates, Inc., 11722 Sorrento Valley Road, San Diego, CA 92121.

POWER CONDITIONING

AC Line Conditioner. These new VOLTECTOR series 6 AC Line Conditioners protect Word Processors, Minicomputers, Microcomputers, Data Communications, Medical, Scientific and other Microprocessor-controlled equipment against destructive voltage spikes, surges and transients as well as against Radio Frequency Interference (RFI). This power line pollution can cause program errors, memroy loss, and so-called random, or unexplained component failures. Protects against 500 Ampere surges having 10 microsecond rise times and 1,000 microsecond half-amplitude decay times, representative of induced lightning effects. Attenuates RFI between 1 and 1,000 MegaHertz in both the common and transverse modes by more than 60 db. A neon indicator light indicates that it is functioning correctly. 5 models are available from 1 to 10 amperes $79.50 to $119.50. Pilgrim Electric Company, 29 Cain Drive, Plainview, NY 11803 (516) 420-8989.

PRINTERS/PLOTTERS

Wide Carriage Printer. The all new Model MP150 printer from MPI features a heavy duty printhead rated for continuous duty. It has an expected liftime of over 100 million characters and forms characters bidirectionally in a logic seeking mode to optimize system thruput. Provides true descenders and underlining capability. The MP150 can print a full 136 character line at 10 characters per inch or, by selecting either the 12 or 16.7 character per inch density, up to 226 columns may be printed. Double wide characters can be software selected as well. A 7 x 9 matrix font is used for high speed date printing while an 11 x 9 serif style matrix font is

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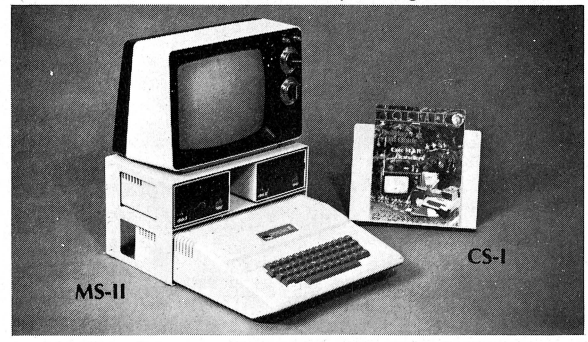

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used for applications requiring high quality correspondence printout. A standard 96 character USASCII set with four strap selectable foreign fonts are standard in each unit. Special fonts may be either down-line loaded into RAM memory, or permanently located in ROM memroy. High resolution dot addressable graphics capability is included for those applications requiring plotting, printing of screen graphics, drawing of illustrations, and producing special characters or identification marks. Other standard features include forms handling with eight selectable forms lengths and perforation skip, a microprocessor controlled interface with a 1K buffer (expandable to 8K), baud rates up to 9600, optional IEEEto-Centronics interface adapter card, ribbon cartidge, optional front console panel, sound shielding. MP150 printer, complete with graphics capability—$1095. MPI, 4426 South Century Drive, Salt Lake City, UT 84107 (801) 263-3081.

IBM Typewriter Interface. The Electronic Typewriter Intelligent Interface can now connect an IBM Electronic Typewriter Model 50, 60 or 75 to practically any computer made using an RS-232C Serial Interface. The unit provides for TRS or BUSY signals, plus XON/XOFF and STX/ETX communications protocols. No mechanical changes or additions to the typewriter are required (installation consists of plugging a cable into the typewriter's internal logic board), plus the typewriter is designed to print at full speed. Also available is a Centronics compatible parallel version of the Mediamix ETI. Both versions of the ETI feature a 2000 character text buffer and a library of over 39 special commands that provide a complete and versatile interface to the typewriter. Serial version—$595, Centronics parallel—$495. Mediamix, P.O. Box 67B57, Los Angeles, CA 90067 (213) 475-9949.

Color Matrix Printer. The Prism Printer transforms dull statistical data into crisp, colorful output. Your text, charts and graphs will come to life in full color. Letter-quality printing is standard with proportional spacing, super- and sub-scripting, dot-addressable graphics and full forms control. Sleek styling with visible printing area. Parallel of RS-232 serial input compatible with Apple Parallel and Serial cards and most others. Integral Data Systems, Inc., Milford, NH 03055 (603) 673-9100 or call toll-free (800) 258-1386.

MISCELLANEOUS

Laboratory Data Acquisition/Control. A new low-cost interface card designed for use with the Apple][computer, controls or collects data from most scientific instruments, including chromatography systems, spectrophotometers, pH meters, strip chart recorders, temperature controllers, etc. The APPLAB hardware interface features a 12-bit A/D and a 12-bit D/A converter, each having four jumper-selectable voltage ranges (+0.5, +1, +2 or +V). The dual slope integrating A/D converter smoothes out noisy signals at up to 20 voltage readings per second. True differential input and automatic zeroing enhance the A/D accuracy. The digital I/O subsystem features 8 bbits each of input and output, versatile handshaking signals, interrupt circuitry, and TTL-compatible signal levels. A 32-bit real time clock displays time in hours, minutes, and seconds and permits timing of events to an accuracy of 0.1 second. Software included permits writing control programs in BASIC. Easy-to-understand manuals explain every facet of APPLAB hardware and software. A comprehensive demostration program on disk and many examples in the manual will introduce the powerful capabilities of APPLAB. Package price of $495 includes card, software on disk, three cables, a self-text adapter board, diagnostic software, and two manuals. Additional software and hardware accessories are also available. A complete laboratory system, including a 48K Apple][Plus, disk drive, monitor, graphics printer, one APPLAB interface card and software is available for less than $3,500. Interactive Microware, Inc., P.O. Box 771, State College, PA 16801 (814) 238-8294.

Computer Assisted Instructional System. The International Institute of Applied Technology, Inc. (IIAT), announces the availability of a single integrated mircocomputer system which includes an Apple][microcomputer, single diskette drive, color monitor with built-in touch panel, DiscoVision Associates Model II Videodisc player with custom IIAT controller card, Z-80 Card, and PILOT plus (an authoring language). The introductory price is $5,995. International Institute of Applied Technology, Inc., 20010 Century Boulevard, Germantown, MD 20767 (301) 428-9010.

Video Micro-Keyer. The VB-3 Micro-Keyer allows the Apple][to be used as a versatile video production and training tool. With its use, Apple graphics can be keyed over any interlaced video signal. Comes with many features that will appeal to the professional video producer. The sofrware provided allows a person with no technical knowledge of video or computers to take full advantage of the broadcast features built into the system. Features include compatibility with VTR's and video disc without a TBC, inverse screen, full screen, genlock synch generator, proc amp, full screen color background matte, broadcastable NTSC keyed video output, colored key fill, adjustable Apple saturation (100 or 50%), adjustable Apple hue (360 degrees), adjustable matte hue, luminance and saturation, adjustable horizontal and burst phase. Built-in power supply and software provided. Video Associates Labs, 2304 Hancock Drive Suite 1F, Austin, TX 78756 (512) 459-5684.

Double DOS Booter/Mini ROM Board. The Double 'D' Booter is a programmed 2716 ROM. After installating this in your Apple][you will have the capability of booting DOS 3.2 as well as 3.3 disks without having to first boot a BASICS disk. Of the many systems around today, the Data Shift Double 'D' Booter is by far the easiest to use. It is a simple menu driven ROM which, when used in conjunction with the Data Shift mini-ROM board, gives you access to either DOS at the touch of a key—$19.95. Requires DOS 3.3. The Mini-ROM board is a double-sided high quality board employing fast low power IC's and a quality 24 pin socket for a single voltage 2716 EPROM. For the Apple][of][Plus—$29.95. Data Shift, Inc. P.O. Box 123, Pompton Plains, NJ 07444 (201) 831-0381.

Real Time Image Processing System. The IVS 200, features up to 768 x 512 x 8 bit resolution, realtime (60 Hz) digitization and image storage, a high speed interface to a desktop computer, and a variety of software and peripheral options. Output channels for controlling external devices are also available and it is compatible with most video sources. Image manipulation software is provided. The IVS 200 can be programmed in assembly language or BASIC. IVS, Inc., 34 South Road, Bedford, MA 01730 (617) 275-5569.

Tabletop Robot Arm. The Minimover-5 robot arm can be used for research, education, and pure enjoyment. Use in the lab or classroom or even in a commercial environment simulating industrial robots. Interfaces with the Apple][and other microcomputers. It has .013 inch resolution, allowing precise control of the arm's position. The gripper end point (its "finger tips") may be positioned in the front half of a sphere with a radius of 17.5 inches. Speed ranges from 2 to 6 inches per second, depending upon the weight of the handled object. The Minimover-5 is ideal for robotics instruction—$1,695. Doring Associates, 1744 Rte. 9, Clifton Park, NY 12065-2497 (518) 371-9499.

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computer's video screen. Measurement is taken using the Galvanic Skin Response technique (GSR). Uses two Velcro wrappers for your fingers. Software included as BASIC printouts includes the Relaxation Trainer which establishes a baseline GSR then allows you to bdevelop rapid and controlled relaxation. A "lie detector" program plots the GSR of the "victim" as he or she is presented with a question, picture or situation. Can be connected via an asynchronous RS-232 port. Requires no external power and it plugs right in to the standard 25-pin D-type connector. Operates at 300 or 1200 baud. BIOCOM with manual, software as described and "Personal Growth" booklet—$125. Cassette/diskette—$15 (specify system). Total Digital Engineering, 210 Daniel Webster Hwy., Nashua, NH 03060 (603) 883-0991.

Fast Floating Point Board. Now any Apple equipped with a 16K RAM Board can take advantage of the increased speed of transcendental function calculations of this FFP Board in existing Applesoft BASIC programs. The user simply has to install the patch, supplied by Computer Station, for using FPBASIC (supplied by Apple Computer with DOS 3.3). The patched version (referred to as Applefast) is then loaded into your RAM card upon booting. Applefast is designed to utilize the AM9511 arithmetic processor as configured on this board. New 3.3 utility software makes the use of the FFP Board simple and transparent. The new 3.3 Applefast may be purchased by registered owners of the Computer Station FFP board for $25. The FFP Board complete with software for utilizing it with Applesoft, Pascal and Fortran now sells for $475. Computer Station, 11610 Page Service Drive, St. Louis, MO 63141 (314) 432-7019.

Transfer Switches. This new transfer switch allows users to increase the number of terminals, printers, and modems connected to a single CPU without the expense of rewiring or the inconvenience of having to change or juggle cable connections. Switches up to six peripherals. Prices range from $175 (2 ports) to $260 (6 ports). Inmac, 2465 Augustine Drive, Santa Clara, CA 95051 (408) 727-1970.

Software

COMMUNICATIONS

RTTY Transceiver. Transmit and receive RTTY without any expensive interface hardware. The Apple cassette ports connect directly to the transmitter/receiver—no additional hardware required. The Apple generates and decodes the RTTY tones. Program capabilities include 60, 67, 75 and 100 WPM Baudot and 110 Baud ASCII, unique receiver tuning using the Hi-Res graphics, type-ahead buffer, break without dumping the type-ahead-buffer, canned messages, save received text/pictures to disk, automatic C.W.I.D., game port driven, push-to-talk and more—$39.95. W. H. Nail Co., 275 Lodgeview Drive, Oroville, CA 95965.

IBM 3270 Terminal Emulator. The Micro Plus hardware/software package called the 3270 Emulator permits the Apple][to function as an IBM 3270 terminal with binary synchronous (bisync) protocol over leased or dial-up communications liones. It enables the Apple][to communicate with IBM 360, 370, and 303X central processing units or with any non-IBM device equipped with remote BSC3270 communication capabilities. Includes a synchronour communications adapter plus the software (on diskette) necessary to implement the code conversion and communication protocols. The emulator software supports standard 3270 display terminal features such as a 1920 character screen with a 25th line for status display, 12 program function (PF) keys, 3 program access (PA) keys, upper and lower case characters, insert mode, and shift lock. It also permits the user to attach an optional RS-232 serial or parallel I/O printer to emulate the 3284 local printer option. It provides the additional convenience of a "HELP" screen—a quick reference table of the 3270 functions and their Apple kay codes, accessible to the user at any time during program execution—$795. Micro Plus, Inc., 2832 LaPort Drive, Minneapolis, MN 55432 (612) 786-4514.

Amateur Radio HAMLOG/Code Trainer. HAMLOG is the ultimate personalized amateur radio information system. Permits 2,000 entries per diskette with either 1 or 2 drives and a printer. Entries include call, name, date, GMT, band, mode, power, RST, QTH, gear used, QSL info, text lines. Sophisticated multiple criteria permits rapid searching in seconds—$47. APPLECODER is the only way to master the Morse Code. Screen or printer displays of all code sequences produced. Perfect code with selectable tone, speed, word length (even random), characters, and more—$19.95. Both may be purchased for $58. Ceco Inc., 7654 Royce St., Annandale, VA 22003.

Data Communications. Transcend 1 permits Apple to Apple communications, as well as Apple to mainframe or "information utilities" (such as "The Source"), and allows the user to send and receive messages, data files, etc., using a modern and a phone line. Transcend 2 performs the same functions as Transcend 1, but has a larger file handling capacity, and can detect errors in transmission. If an error is detected, Transcend 2 will automatically retransmit the data for verification. Transcend 3 combines all these features, but adds electronic mail capabilities, making the Apple a total communications machine. It has the ability to utilize a 1200 baud rate. Contact: SSM Microcomputer, 2190 Paragon Drive, San Jose, CA 95131 (408) 946-7400.

Pascal Mainframe Communications. DataLink provides an instant access telephone directory so that one keystroke sets the communications environment, dials, and logs the user into the host computer system. In addition, any sequence... up to 1000 characters . . . can be recalled and transmitted with one command. Thorough documentation makes the system ideal for fast start-up. Beginners can begin "communicating" after reading the first nine pages of the manual. Permits up to 1200 baud over phone lines and 4800 baud computer to computer, with full error-checking for accurate transmission. Eighty-Column boards and terminals running under Pascal are automatically compatible. Also compatible are the Hayes Micromodem][, the Apple bCommunications Card, the California Computer Systems 7710A Asynchronous Serial Interface Card, the SSM A10 Card and the Novation Apple-Cat][. All Link software is hard disk compatible. Suggested retail price of $100 for the Apple][. Available soon for the Apple ///. Link Systems, 16555 26th Street, Santa Monica, CA 90404 (213) 453-1851.

EDUCATION

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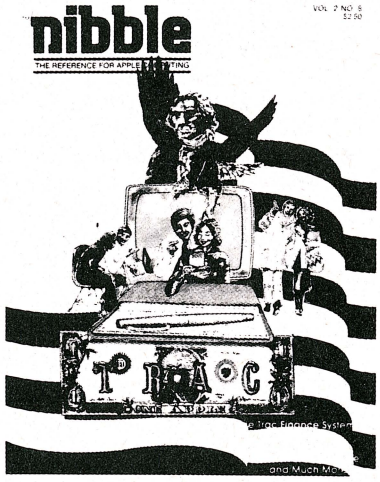

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local dealer or contact: Synergistic Software, 5221 120th Ave., S.E., Bellevue, WA 98006 (206) 226-3216.

Authoring System. The Blocks Author Language for the Apple][computer has been updated. This authoring system was developed to allow the average teacher to develop his or her own computer assisted instruction lessons within an easy to use structure. The Author Language has been piloted in more than 35 school districts and colleges with extremely favorable results. Students respond to the graphic capabilities of the system while teachers enjoy the ease of use and the automatic data collection program. The Teacher Authoring Program allows the teacher to make use of the graphics library to combine graphic images with text for presentation to the student. The teacher also inputs the correct and incorrect answers and feedback appropriate to each response. This program is utilized only when writing a lesson. The Student Presentation Program presents the lesson to the student and allows a student to interact with the previously authored program. It asks the questions and gives the appropriate feedback for each response. The Graphics Development Program develops graphic images for the graphics library. It enables the author to quickly create new images, utilize portions of old images or combine images. It can quickly fill an irregular shape with color and gives the author billions of colors and patterns to choose from. A Data Management Program keeps track of student progress and is actually a computerized lesson planner which enables the teacher to set up a sequence of lessons that matches the individual needs of each student. For information please contact Ted Perry, Computer Assisted Instruction, San Juan Unified School District, 6141 Sutter Avenue, Carmichael, CA 95608 (916) 944-3614.

Courseware Development Tool. The Eureka Learning System can be mastered with the use of the Teacher Guide, which is a tutorial as well as a complete reference guide. A Demonstration Package containing a disk with three sample lessons and a copy of the Teacher Guide is available for $25. This system provides a means for creating CAI material without any programming knowledge. Graphics and special characters may be used along with textual material. The system allows for presentation to students, practice, and testing. Hardware requirements are a 48K Apple with Applesoft in ROM. Basic system license—$495. Eiconics, Inc., 200 Cruz Alta, Taox, NM 87571 (505) 758-1696.

Weather and Shore Features Tutor. This package provides a programmed presentation of lesson material with branching, review, full color, Hi-Res illustrations and tests. Weather Fronts includes front characteristics, frontal movement, and weather characteristics of different fronts. Shore Features teaches about beaches and shorelines, berm, dunes and low and high tides—$24.95. TYC Software, 40 Stuyvesant Manor, Geneseo, NY 14454.

World and State Capitals. To test your knowledge of world capitals this program was designed to eliminate a teacher's supervision and encourage student's spelling accuracy. Consists of a 100-word nation/capital and 50-U.S. state capital test. Both tests display a low resolution graphic which animates dripping square-dots to fill the shape of the capital building. Right, wrong, total score points plus a bonus feature triggers this animation. Features a simple single-key stroke answering system (except the spelling test). The score results are retrievable for teacher's use only (by date and name, stored score order sequence). In addition to this, the teacher can produce his or her own test, using the same features and format for up to 100 questions—$25 on diskette. American Avicultural Art & Science, Inc., 3268 Watson Road, St. Louis, MO 63139.

FINANCIAL

Personal Finances Data Base System. The Accountant Version 4.4 has new features giving you more flexibility and ease-of-use than earlier versions. The capability to enter transactions out of sequence has been added. This new version automatically takes advantage of the extra memory made available by a 16K RAM card in slot zero. Names of accounts or code names may be reviewed or printed as needed. Another new feature permits you to "group" accounts so that the sum of the balances of a group of accounts can be displayed. One of the most powerful additions to The Accountant permits multiple automatic transaction files to be specified. A split transaction mode allows you to split one transaction into several different ones to correctly record where "lump" sums were spent, etc. Standard features of The Accountant include automatic Double Entry, natural language dialog, Balance Sheet, Flexible Query system, Fast Retrieval, Data Compression, Integrated Files, Memory Management, on-keyboard Calculator, Scroll and Page modes, Automatic Transactions, Monthly Summaries and output formats for either screen or printer. Complete documentation in attractive binder with demonstration data base, tutorial and command summaries. Requires an Apple][with Applesoft in ROM and 48K of memory—$99.95. DBCALC is an interface program that is designed to extract information from The Accountant's data base and create a VisiCalc file according to your specifications. VisiCalc can either load the file thus created or overlay the data to a pre-formatted screen. You specify the accounts and codes for which you would like information output and the column and row for each actual and projected value to be inserted in the VisiCalc File—$20 (Requires VisiCalc). Decision Support Software, 1438 Ironwood Drive, McLean, VA 22101 (703) 241-8316.

Personal Accounting System. The Financial Partner is an accounting system specifically for the household budget manager or small business with a gross yearly income of up to 1,000,000. One very important aspect of this program is that it teaches you simple accounting. All the necessary "how-to" is detailed in a well written reference manual which has uncomplicated accounting instructions. You get all the advantages of UCSD Pascal without having to purchase a Pascal Language System. Requires a 48K Apple][with DOS 3.3—works with almost any 80-column printer—$245. The Denver Software Company, 14100 E. Jewell Ave., Suite 15, Aurora, CO 80012 (303) 750-9980.

Financial Modeling. Micro-DSS/Finance, the financial modeling software package written by Ferox Microsystems, Inc., of Arlington, VA, now has virtual matrix capability. An expanded work area of 32,000 cells is available to accommodate the largest modeling tasks. That is equivalent to a 10 column model with 3,200 rows or any other multiple of rows and columns that equal 32,000. Micro-DSS/Finance has all the power of large time-sharing systems at a fraction of the cost. It sells for $1,500 and runs on the Apple][with 64K and Pascal. It is distributed by Addison-Wesley Publishing Company of Reading, MA. Financial analysts and managers find Micro-DSS/Finance a cost-effective way to do such tasks as new venture analysis, financial statements, budgets, and "What If" financial analysis as well as many others. The system comes complete with full scale report generation, command files, and color graphics. For more information contact: Richard N. Hykes, Vice President of Marketing, Ferox Microsystems, Incorporated, 1701 N. Ft. Myer Drive, Suite 611, Arlington, VA 22209 (703) 841-0800.

Stock Market Tracking System. Market Tracker can be used by anyone trading in American stocks or stock options. The program creates a composite index of six popular, technical market indicators to determine intermediate bullish and bearish swings in the Dow Jones Industrial Averages. Market Tracker's generalized buy and sell signals are designed to assist the trade in maximizing profits of

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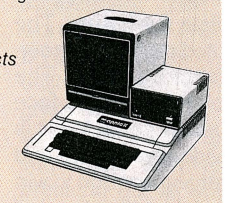

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trades generated on individual securities with its companion program, Stock Tracker. While the program requires the trader to give it some judgement decisions, it is easy to use and takes only about five minutes a day. Includes the Market Grapher program which displays or prints various graphs of the data. Other advanced features include error trapping to avoid program "crashes," list-selectable commands which are easily aborted or repeated, automatic calculation of profits, and fully editable disk data files. Detailed 50 page instruction manual included explains how to use the program in an easy-to-follow conversational format showing what the computer does. Contact H & H Trading Company, P.O. Box 549, Clayton, CA 94517 (415) 672-3233.

Dial-Up Financial Market Information. Users can dial Remote Computing Corporation's network over normal telephone lines, log on and automatically retrieve data on commodities, securities and options. Features the largest collection of time-shared data on commodity features, including open, high, low, close, volume and open interest for all commodities on all major exchanges. The program will also supply all New York and American Stock Exchange closing prices including open, high, low, close, volume and uptick volume, and all currently traded option prices including the above plus open interest and the closing price of the underlying stock. Programs are menu-driven with easy-to-follow directions. The Apple][data files are compatible with statistical software packages available from other sources such as Compu-trac and Orion. Merlin DIAL/DATA, 1044 Northern Blvd., Roslyn, NY 11576 (212) 895-3810 or (516) 484-4545.



SIMULATIONS/GAMES

Escape From Arcturus. You are in command of the Space Fortress in orbit around Arcturus. The two part player action begins with commanding the Space Fortress. Your fortress guards the hyperspace entrance to the system. Attacking Griplems have surrounded you with the largest and deadliest fleet in the galaxy. You must fight off powerful attacks of photon torpedoes, fighters, cruisers, and deal with the force fields. In the second phase of the game you pilot Arcturon ESCAPE evacuation ships. A variety of invading Griplem landing craft must be fought while you try to ESCAPE into hyperspace. This is a High-resolution Arcade style game with color and sound effects—$35.00. Requires an Apple][with Applesoft firmware, 48K, DOS 3.3 and paddles. At your local dealer or contact Synergistic Software, 5221 120th Ave., S.E., Bellevue, WA 98006 (206) 226-3216.



Odyssey: The Complete Adventure. The Sargalo Sea is a haunted realm of sea serpents, dragons and fabulous beasts. The mysterious islands which break its surface each have uniquely deadly perils. Yet, it is a land which can provide great wealth and power to the warrior strong enough to win it. In your crusade to defeat the dreaded Caliph of Lapour and win the golden sceptor of power, you will cross the great sea and explore the jungles, swamps, and mountains of the islands. You will search ancient tombs and tamples and the dreaded Caverns of Mordril. Your journey will be on foot or horseback across the high-resolution map of an island until you win enough treasure and gather the crew required to buy and man a ship. Detailed graphics and animation effects. Five separate detailed maps and three programs interlink to bring you an unendingly varied apventure uniquely different each time you play. Requires 48K Apple][with DOS 3.3, Integer or Applesoft—$30. At your local dealer or contact: Synergistic Software, 5221 120th Ave., S.E, Bellevue, WA 98006 (206) 226-3216.

Flight Simulator With Scenery. The AIRSIM-1 Flight Simulator for the Apple][is a realistic simulation of the thrills and challenges of airplane flight. It has three-dimensional scenery along the New England coast from Boston, MA to New York City. There are 6 distinct airfields that you can use for landing and takeoffs. You can accumulate scores for successful landings at the three "home" fields. The airplane can be transported instantaneously to any desired location by computer command. AIRSIM-1 is aerobatic, being able to do inside and outside loops, rolls, and even Immelmann turns. Instrumentation includes Radar, and Artificial Horizon, a Ball-Tank Indicator, and a Horizontal-Situation Indicator (HSI). There are VORs at three fields, and you can use them and the HSI to make instrument-landing approaches. The manual includes flying lessons so that even a novice can learn to fly AIRSIM-1. Written completely in machine language, it requires 48K RAM, 1 disk drive, and the Applesoft ROM—$40.00. Mind Systems Corporation, P.O. Box 506, Northhampton, MA 01061 (413) 586-6463.

The Green Plague. The fifth release in the exciting Swordthrust series is "The Green Plague" by Donald Brown. An epidemic is sweeping the nation, with hundreds of green bodies dropping dead in the streets. You must save the Kingdom and yourself and time is very short. This adventure was created for the Swordthrust tournament at the 1981 World Science Fiction Convention, and was won by the famed rogue Gerald of Denver with 3898 points. Swordthrust is Donald Brown's interlocked series of fantasy role-playing games for the Apple][where you watch your characters grow and develop from adventure to adventure. You must have the first Swordthrust diskette to use any of the other games. Swordthrust #1 sells for $29.95, #2-5 sell for $24.95 each. At your local dealer or contact: DE Software, 801 73rd Street, Des Moines, IA 50312 (515) 224-1995.

The Game Show. This highly entertaining educational program features a multi-player game using animated color graphics. The Game Show starts by introducing you to your partner on the screen. Your partner then gives you clues to help you guess the mystery word or phrase. Comes complete with numerous topics including: Volabulaty (elementary through advanced), History, Algebra I, Saling, Computer Terms. Also includes an authoring system that allows you to easily add your own topics. Comes complete with documentation, a one year warranty, and a back-up diskette—$45. Computer-Advanced Ideas, Inc., 1442A Walnut Street, Suite 341, Berkeley, CA 94709 (415) 526-9100.

Volcanoes. Volcanoes is a game for 2 to 4 players in which the players must make predictions about the volatility of the various volcanoes. These predictions are based on various investigations that the "scientist" players may choose to do. It is an enjoyable game to be played on different levels of educational expertise and a game that teaches cooperation rather than competition. This game can be enjoyed by those having no knowledge of geology or it can be played on a more

scientific level by reading the accompanying "Blue Book" and learning the terminology which is explained in its glossary. Hi-Res drawings contribute to the identification of the various types of volcanoes. It has been tested and enjoyed by individuals ranging from 9 to more than 60 years in age. If you've ever wanted to know more about what makes those volcanoes "tick," you should not miss this one—$52.50. Earthware Computer Services, P.O. Box 30039, Eugene, OR 97403.

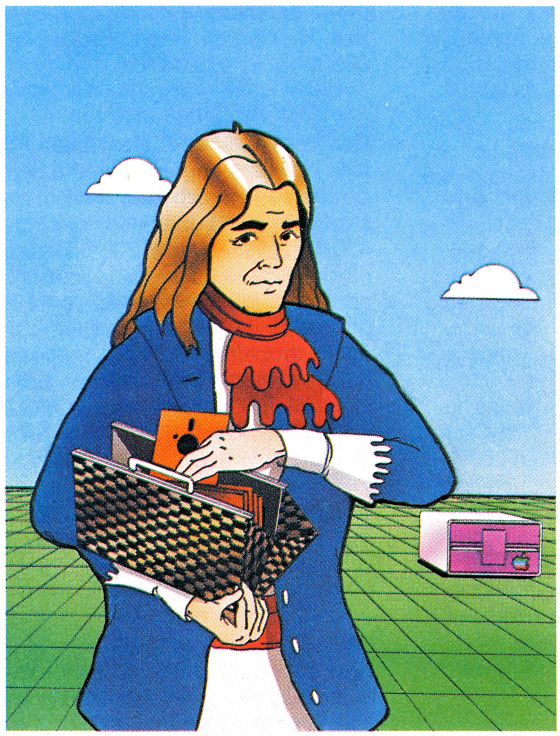
The Quest for the Holy Grail. This new adventure game features hi-res and lo-res graphics. Includes extensive, interactive text and music. The player searches for the Grail throughout the forests and monasteries of merry old England and along the way encounters dragons, killer rabbits, wanton wenches, black knights, fair maidens, wizards, and other characters. The game is fully listable and modifiable as an aid to learning programming. Over 300 sectors (75K) or programs/displays. Requires a 48K Apple][, DOS 3.3 and Applesoft in ROM—$19.95. HHH Enterprises Inc., 4312 Arizona Ave., Kenner, LA 70062 (504) 468-2273.

The Time Dungeon—American History. This is a five-game package that is designed to help the user become knowledgeable in five eras of U.S. history: American History 1607-1850, American History 1848-1914, American History 1916-1975, American History-Civil War 1850-1865, American History-Presidents 1789-1981. The package is written in BASIC. As the game begins, the user finds himself at an unknown location in a dungeon with 1,000 pieces of gold. He must answer questions concerning the history of the U.S. during the era chosen. The object of the game is for the operator to map his way out of the dungeon with as many pieces of gold remaining as possible. Gold can be gained, among other ways, by answering questions correctly. Time portals, a Crystal Key, Closet doors, Secret doors, Time Traps and Alien Travelers all add to the mystery of the game. The same company markets The Time Dungeon World which offers three separate games: Ancient History 4,000 B.C-6 B.C., World History WWI 1894-1919 and World History WWII 1933-1945. Advanced Operating Systems, 450 St. John Road, Michigan City, IN 46360 (219) 879-4693.

Jabbertalky. This is a programmable word game for one or more players. Jabbertalky includes two game features and a utility program. Alphagrammar—an anagram game, challenges players to unscramble entire grammatically correct sentences. In Cryptogrammer, a code breaking game, the player must decode sentences in which each letter of the alphabet is substituted by another. The utility program lets players create their own sentences. Jabbertalky has eight skill levels and is for ages seven through adult—$29.95. Automated Simulations, Inc., P.O. Box 4247, Mountain View, CA 94040.

County Fair. You're on the midway, and here's a chance to show your skill. You pick up your rifle and bang away. Seems easy but watch those ducks! They're sneaky as all get out. They'll gobble up your bullets and leave you with an empty gun and a low score. And don't miss the rabbits . . . they multiply like crazy. Enjoyable, fascinating Hi-Res graphics the whole family will love—$29.95. At your local Apple dealer or contact: Datamost, 19273 Kenya St., Northridge, CA 91326 (213) 366-7160.

Bug Attack. The bugs are on the loose, and they're hungry. Defend against ants' antics, malicious millipeds, and the menacing medfly invasion. Bug Attack will keep the whole family captive with colorful creatures and superb sound effects. Expert debuggers who defeat the bugs in the three gardens beware, as they must face a five-fly formation with a deadly flight pattern. At your local Apple Dealer or contact: Softsel, 8295 So. La Cienega Blvd., Inglewood, CA 90301 (800) 421-5770 in CA (800) 262-4242.



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VisiCalc Formatting Aid. VISI-CAIDS is a companion package of formatting aids for use with VisiCalc text files. The LABEL SPLITTER breaks wide labels into shorter consecutive columns. It creates a new text file, compatible with VisiCalc, which divides wide label entries in a selected column into two or more narrower columns. With this utility you can quickly type wide labels into one column and choose the final column size later. WIDTH ADJUSTER displays VisiCalc models with variable width columns. If you use VisiCalc in conjunction with a printer you will really appreciate what this program can do to improve printed reports. You can even simulate a split screen when the "in between" columns are assigned a new width of zero. VISI-CAIDS also includes a program which reads VisiCalc print files and another program which prints or displays formulae, labels, etc. and theior coordinates—arranged by column in ascending order. Available in either DOS 3.2 or 3.3—requires Applesoft and one or two disk drives—$34.95. Data Security Concepts, P.O. Box 968, Manchester, MO 63011 (314) 966-2826.

Multiple Regression. HSD REGRESS is a menu-driven multiple regression package which accepts up to 25 variables of 300 data points each. Data can be entered from the keyboard or disk. All data can be reviewed and edited, transformed numerically, and stored on disk. Multiple regression analysis can be performed on all variables input, or on any subset of variables, in any order. Output includes correlation matrix, predicted and residual scores, matrix inverse, semi-partial correlations, coefficient weights and p-values—$99.95. Includes disk, complete documentation, imprinted 3-ring binder. Human Systems Cynamics, 9249 Reseda Blvd., Suite 107, Northridge, CA 91324 (213) 993-8536.

A new Pascal Program, DataFax, is designed to allow the user to enter and access information according to individual needs without programming. Allows the user to enter data in virtually any form and to retrieve it in an individually meaningful way . . . thus eliminating the constrictions of set programs. Each screen of information you enter can be cross-referenced or categorized by any word or words you desire. Individual screens are retrieved by the keywords associated with them such as names, dates, or any categories relevant to your use. Screens may be chained together if necessary and a hard copy obtained. All data is entered via a simple screen editor . . . anywhere on the screen. Keywords may be logically ANDed and ORed in any combination. $250 from Link Systems, 1655 26th St., Santa Monica, CA 90404 (213) 453-1851.

Data Base Utilities. Link Systems has introduced three new software packages to give Apple Pascal users mainframe programming capability. LinkIndex is a rapid key retrieval unit based on the sophisticated B-tree Indexing method. This easy to use Pascal utility maintains keys in sorted order and supports duplicate keys. LinkIndex can retrieve any record from up to 25,000 in less than a second when using a high speed medium such as a Corvus hard disk drive. Includes a tutorial, sample program, detailed reference guide and an introduction to file access methods. Available for the Apple][or the Apple ///—$150. LinkDisk is a free-standing Pascal utility designed to take the guesswork out of mainipulating mass storage media. With LinkDisk you can compare any two Pascal files or volumes byte by byte. No more bad copy or back-up worries. In addition, you can examine disk data one block at a time and change data at the nibble level. LinkDisk will translate data files, both text and binary, for DOS 3.3 to Pascal. For the Apple][—$70. LinkVideo is a multi-function screen utility that reduces user I/O programming time up to 90%. LinkVideo is provided on source and p-code, so the user can fine tune the unit for his own special needs. This software also creates terminal independent programs; safeguards programs from user error; validates, filters and prompts input; and simplifies screen handling. LinkVideo runs on the Apple][and Apple ///—$55. Link Systems, 1655 26th Street, Santa Monica, CA 90404 (213) 453-1851.

Management Decisions Simulation. This learning program places you in the shoes of a pajama manufacturing executive, competing against a rival manufacturer. Based on a five-year plan, business world realities such as sales force size, advertising costs, credit terms, pricing, inventory, plant capacity and manufacturing are the competitive tools used. The computer allows the possibility of "seeing" the relationship between cause (decisions) and effect (consequences) during the course of the five-year period. However, true managerial skill is tested when sudden obstacles such as changing bank rates, big business mergers, inflation, theft, etc. are placed in the middle of the road to success—$49.95. Hayden Book Company, Inc., 50 Essex Street, Rochelle Park, NJ 07662 (201) 843-0550.

Data Management Package. The Data Reporter is a powerful database system using a floppy or hard disk drive, a report generator, a plotter/analyzer program, calculator capabilities, and a variety of utilities, all designed to work together on common data files. You can make your own database, inventory control, accounts receivable, sales analysis, bibliography, memo programs, etc. The set-up can easily be changed at any time, and all data files can be reformatted without re-entering data. The sophisticated text editor lets you design and print letters, reports, documents, contracts, etc., with ease. Requires 48K, Applesoft, at least one disk and DOS 3.3. Hard drive or floppy drive versions—$220. At your local dealer or contact: Synergistic Software, 5221 120th Ave., S.E., Bellevue, WA 98006 (206) 226-3216.

Computer Retailer Mailing List. Computer dealers and retailers can now be easily accessed by mail thanks to a disk-based mailing list of their addresses. The lists are an aid to prospective hardware and software manufacturers, in their quest for retail outlets. A menu helps the user to obtain a printout of the list onto labels. There are two different products. One disk contains over 800 authorized Apple dealers ($150). The second disk contains more than 1600 Microcomputer Retail Outlets ($250). This disk contains the aforementions Apple dealers, but no Radio Shack stores. The disks are available for an Apple with 48K, Applesoft in ROM, DOS 3.2, or 8 inch CP/M format in machine language. Please specify format. Also, the lists are available in the form of peel-off-labels for $75 and $125 respectively. Connecticut Information Systems, 218 Huntington Road, Bridgeport, CT 06608 (203) 579-0472.

Congressional and Senatorial Mailing List. Now all Congressmen and Senators can be easily reached by mail, in one fell swoop. This is a disk-based mailing list of 435 Congressmen and 100 Senators. The disk may be used over and over again to print up a full set of labels. Anyone with political interests can quickly conduct mail campaigns for any purpose. No typing is necessary! Available on a 5¼ inch disk for the Apple with DOS 3.2 and Applesoft in ROM and 48K or on an 8 inch CP/M disk in 8080 machine language—$75. One-time peel off label versions of the list are available for $25. Connecticut Information Systems, 218 Huntington Road, Bridgeport, CT 06608 (203) 579-0472.

Data Handler. Datadex is a general purpose data handler that will perform many of the business tasks that used to require specialized programs. The system's flexibility stems from unique file and report generation programs that allow novice users to define how they want their data files structured and what they want their reports to look like. Creating a file on the computer is like designing a blank

form on paper. Once a file is created users may then go to the "Enter Data" section. This section is so easy that a person can be trained to use it in a matter of minutes, even if he or she has never touched a computer before. Some users use this for their income tax records, while others use it to store and sort information about their record and tape collections. Business applications include inventory, accounts payable, mailing lists, and more. Datadex's flexible form generator can even be configured to write checks and maintain financial records from the same data base—$295. Requires an Apple][. Information Unlimited Software, Inc., 281 Arlington Ave., Berkeley, CA 94707 (415) 525-9452.

Data Factory. The latest version of The Data Factory allows data storage within records to the fullest extent possible in the Apple. Permits you to relocate records into a new data base, add, delete or change field lengths anytime. Requires 48K and 1 or 2 disk drives—$300. The Mini Factory has the major routines of The Data Factory but is a beginning system for those with lesser needs and can be upgraded anytime. Requires 48K and 1 or 2 disk drives—$75. The Invoice Factory generates statements, aged receivable reports, product or customer reports, sales analyses by product in graph or report form, and much more. Use a new free form, automatic, in addition to the standard invoice format for added flexibility. Product descriptions along with various charges may be included on an invoice—$200. The Merger is a utility for The Data Factory and The Invoice Factory. Merges data from fields in either program into those of another file—$50. VisiBlend allows users of VisiCalc to combine the data in multiple VisiCalc files merging data across files. Requires 2 disk drives—$50. VisiFactory allows for a marriage between The Data Factory and VisiCalc files. You can move data in either direction, manipulate it within the chosen program, and then store it either way. It is an exciting tool for market research, information surveys, and analyses of any selected data. Requires 48K and 2 disk drives—$75. Micro Lab, 2310 Skokie Valley Road, Highland Park, IL 60035 (312) 433-7550.

Data Base Manager. The General Manager is written in hierarchical structure allowing each screen display to interrelate with the total data base. You design your own screens, and then fill them in. It's like working with a set of blank forms. Information from one screen can be automatically used in any other screen. Each entry can be used in complex calculations to figure costs, interest, payment terms, discount rates, recipe proportions, and many more. Data built from one screen can be easily used to make comparisons or build totals on another screen. It can generate standard text files of the complete data base of selected fields, which can be used by word processors. You can use one data base for accounts receivable, customer billing, and by linking to a word processing program, generate form letters and mailing lists. Requires a 48K Apple with 1 or more disk drives—$99.95. On-Line Systems, 36575 Mudge Ranch Road, Coarsegold, CA 93614 (209) 683-6858.

GRAPHICS

Contour Mapping Package. This is a contour mapping system with many features. It is menu driven and easy to use. The user is given the choice of several map styles. It adapts to the printer width—maps are made in strips the width of printer or plotter paper (no limit to strip length or number of strips in a single map). Accepts either gridded or irregular data; large regions are subdivided into small parcels which can be run individually and randomly to form a contiguous, integrated whole (which minimizes RAM requirements and permits excessively long runs to be broken down into several small runs—an important feature for micros). Modular design with your choice of gridding algorithms. Training is available. $2,000 from Geosystems, Inc., 802 E. Grand River, Williamston, MI 48895.

Zoom Graphics Printing. With this new system you can print the full Hi-Res screen or any area of the Hi-Res screen as large or small as you like. A window feature allows you to frame and see the specific area of the screen to be printed. Prints either horizontally or vertically—margins can be completely adjusted for custom placement of picture. Form and line feed can be controlled from keyboard. Works with Anadex, Apple Silentype, Centronics, Epson, IDS, Nec—$39.95. Phoenix Software, Inc., 64 Lake Zurich Drive, Lake Zurich, IL 60047 (312) 438-4850.

Graphics Plotter. The Superplotter is a professionally oriented graphics package for applications in business, engineering, education and math. The program features Pie Graphs, Standard Bar Charts, Point and Line Graphs, a Mathematical Function Plotter, a Least Squares Polynominal Curve-Fit Generator, Automatic Graphics Disk Storage and Recall, a Data File Editor, Overlay Modes, a User Tutorial, and Keyboard Image Shapes that can be mixed with the user's own graphic displays. Requires Applesoft in ROM or Language Card—$59.95. Dickens Data Systems, 433 Greenwood Drive, La Place, LA 70068 (504) 521-8744.



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Sound to Graphics. Signt 'n Sound transforms sound into action on the Hi-Res screen of the Apple. Sound can be input by playing a tape into the cassette input port or by using a microphone. The program monitors the changes in frequency and "plots" to the screen accordingly. An example program called "Lips" provides synchronized moving lips while you talk. Also includes a kaleidoscope for disco effects. A powerful design editor is included for creating new designs. Features geometric and laser-like designs, a guitar player whose lips and guitar strings move, a Christmas tree, an "EKG" (to watch your heartbeat) and more. Accessible from Applesoft. Requires 48K and disk drive with Applesoft—$26.95. Compugraphics Software, #6 White Plains Drive, St. Louis, MO 63017.

LANGUAGES

CIS COBOL for the Apple][. Now you can create serious business programs with the world's most popular professional programming language—COBOL—and run them on the industry standard operating system—CP/M. FORMS-2, a COBOL source-code generator, lets you begin with a blank screen . . . and end with a fully operational program. FORMS-2 generates standard COBOL code. You can use it as is or build on it to create even more sophisticated programs. CIS COBOL on the Apple][is standard COBOL (ANSI X3.23-1974). With it, you have the broadest aplications flexibility available today. It provides you with all the power of ANSI COBOL file handling. Underlying B-tree technology takes care of large ISAM files . . . fast. CIS COBOL is certified on the Apple][by the General Services Administration. See your Apple dealer or contact: Micro Focus, Inc., 1601 Civic Center Drive., Santa Clara, CA 95050 (408) 248-3982.

Pilot Plus. PILOT Plus is the first commercially supported Computer Assisted Instructional language designed to run on a variecro and minicomputer systems. Allows developers to design and implement courses that will run on various systems without modification. Supports videotape, videodisc (both Sony and DVA), stored digital voice, tough panel or light pen input, and color graphics. Requires Apple with Z-80 card. Also supports TRS-80 Model II, HP 125, Xerox 820, Northstar, Altos, Cromenco. Base price is $150. Internal Institute of Applied Technology, Inc., 20010 Century Boulevard, Germantown, MD 20767 (301) 428-9010.

Pascal Learning Aid. LinkSample I includes 21 teaching programs that mix some simple business routines with eash mathematics and the added spice of a few games. Commentary is included on the diskette to explain how each program applies Pascal principles and techniques. A comprehensive 68 page manual discusses these programming techniques in greater detail. LinkSample is provided in source code so the user can examine how the programs are written and also modify them. Available for the Apple][and the Apple ///—$60. Link Systems, 1655 26th Street, Santa Monica CA 90404 (213) 1851.

N/C Programming Language. Arrowcode 15 is an N/C programming language written for Mills, Lathes and Punches. It consists of fifteen code words which enable the N/C Programmer to define part geometry with little or no trig involved, as well as a CRT Plot at the time of code-word entry, resulting in a finished N/C Part Program. Features include: Complete Editing, CRT Plot, Tool Offset, Mirror Image, Pattern Rotate, Pocketing, Bolt Holes, Threading, Parabola, Optimizing, Shop Math, CNC and Time Share Compatible. Post Processors are available for most N/C Control Units. Arrowcode 15 sells for $1,950. Arrow Data Systems, 5910 E. Washington, Los Angeles, CA 90040 (213) 726-9440.

Machine Language Debugging Tool. Bug Byter features display of all registers. It is compatible with all Apple languages and completely relocatable. Full hex and ASCII I/O is provided. Multiple options while in trace mode. Literal and transparent breakpoints may be set. Provides resident assembler and disassembler and a user-definable screen. RAM screen dump in HEX and ASCII. Comprehensive documentation, single keystroke operation, instruction cycle counter, Hex-Dec conversions. Can run in add-on RAM card. A complete debugging tool for the Apple 6502—$39.95. Computer-Advanced Ideas, Inc., 1442A Walnut St., Suite 341, Berkeley, CA 94709 (415) 526-9100.

UTILITIES

Apple][—Apple /// File Transfer. Transfer /// is a new and valuable utility for the Apple /// computer. It moves sequential text files either way between an Apple][disk (DOS 3.3) and an Apple ///. It can be used, for example, to transfer VisiCalc data files, word-processor text files, BASIC programs converted to text files, and laboratory-data files. All actions required are performed easily and automatically after you select options from menus. Only one disk drive is required on the Apple ///. Furnished with a diskette and manual for $60. Mind Systems Corporation, P.O. Box 506, Northampton, MA 01061 (413) 586-6463.

Pascal 1.1 Utilities. A user-friendly Pascal Utility Package (PUP-1) has the following features: Moves BASIC files (Applesoft, Integer, Text, Binary) to a Pascal disk, Sets system date at boot (automatically if you have a Mountain Hardware clock), produces printer-formatted listing of Pascal text files, supports Pascal wildcards, 40/80 column formats, upper and/or lower case, user-modifiable BASIC tokens, error-checking with understandable diagnostic messages, single or multi-drive operations, on-line user assistance, full user documentation, easy to use by Pascal beginners—$29.95. Gryphon Microproducts, P.O. Box 6543, Silver Spring, MD 20906.

Pascal Programmers's Utility. The Electric Semicolon is a Pascal programmer's utility. It automatically inserts semicolons (in the proper places), finishes such often-typed words as BEGIN, WRITLN, and END besides doing much more. It is a program that can be used by the novice as well as the experienced programmer. This one has many very useful features that should be demonstrated to be appreciated—$115 plus $1.50 shipping. Earthware Computer Services, P.O. Box 30039, Eugene, OR 97403.

Useful BASIC Programs. Advanced Operating Systems has introduced several packages of software written in BASIC for microcomputers. The Mostly BASIC Interface/Scientific Program Package includes seven programs—The Time Machine turns the computer into a digital clock, The BASIC Telephone Dialer can dial programmed numbers, The Combination Lock program allows turning on appliances and unlocking doors, etc., by entering a combination. Two educational programs are Constellation 10 and The Sun. The former teaches the user ten constellations and then offers a test on the material. The latter gives infornation and a test about the solar system. A Hex to Decimal and Decimal to Hex Conversion program converts base 10 to base 16 numbers and vice versa. The Word Board permits English words to be assigned to each of 26 keys, while a foreign language equivalent can be displayed when the key is pressed. Or, by assigning words to each key the program can be used as an aid for the physically challenged to form sentences. Advanced Operating Systems, 450 St. John Road, Michigan City, IN 46360 (219) 879-4693.

Disk Directory Formatter. Directory Master is a fast machine language utility for the Apple][which lets you directly customize your disk catalogs for a unique and professional look. This easy to use program allows you to create attractive diskette headers and catalog titles

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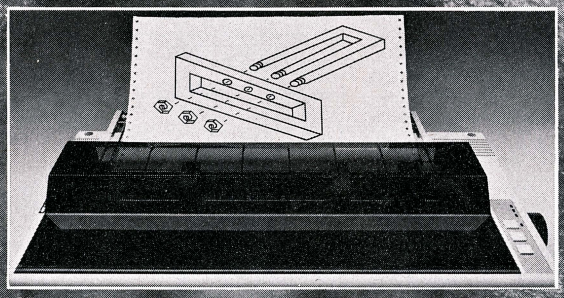

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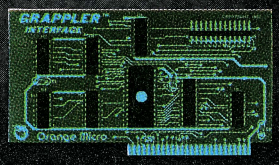

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containing normal, inverse, flashing and/or control characters. Any number of file names may be sorted alphabetically or recordered. File names may be hidden so that they cannot be seen when the disk is CATALOGed. In addition, the package lets you recover files that have been accidently or intentionally deleted from a disk. Any range of files may be locked, unlocked or deleted with just a few keystrokes. Files may also be "expunged" from the disk, wiping the disk clean as if they had never existed. Requires an Apple][with Applesoft in Rom, and works with either one or two drives. Different versions available for DOS 3.2.1 and DOS 3.3—$39.95. Micro-SPARC Systems, P.O. Box 325, Lincoln, MA 01773.

WORD PROCESSING

Gutenberg Word Processor. The Gutenberg Word Processor is a powerful, new, low cost word processing program that runs on the Apple][computer. Special features of the TEXT EDITOR include: split-screen editing, character set definition, full word wrap around in all editing modes; automatic search and replace with counter; programmable keys; built-in soft high-res character set with French accents; user selectable forward and reverse scrolling by screen lines, sentence or paragraph, as well as all major text editing features known in the industry. Full composition print program allows complete page makeup which supports the Qume Sprint 5/45 and the Centronics 737/739. The PAINT program allows the user to create any heading, logo, illustration or graph and place it anywhere on the page. The user can also load, display, edit, revise, crop and save any binary picture file produced on the Apple Graphics Tablet, or created with other programs such as Apple Plot. Distributed by Micromation Limited, 1 Yorkdale Road, Suite 406, Toronto, Ontario, Canada—M6A 3A1 (416) 781-6675.

Word Processor File Transfer. The Super Apple Textwriter allows you to convert a file generated by Applewriter, Supertext, and Superscribe word processors into a file accessible by the other two. It can convert standard test files into files accessible by either Supertext or Applewriter and it converts Applewriter or Supertext files into standard text files. It lets you edit information obtained from a communications network as well as transmit files through a modem. It is possible to develop and edit a BASIC program using a word processor and then use Super Apple Textwriter to convert the file into a text file that can be executed into memory—$49.95. Mint Software, 6422 Peggy St., Baton Rouge, LA 70808 (504) 766-2318.

Catalogs/Books

Everybody's Guide to Assembly Language. This reference is a complete reprint of Roger Wagner's monthly column "Assembly Lines" published in Softalk magazine. It deals with assembly language programs at a basic level and has caused more comment and more mail than any other feature in the magazine. Includes all columns through December 1981 in a compact form, bound with spiral binding to make reference easy—$19.95 plus $1.50 postage and handling. Softalk Book, 11021 Magnolia Boulevard, North Hollywood, CA 91601.

VisiCalc Newsletter. SATN is a bi-monthly periodical designed to help users of VisiCalc apply the program more effectively. Each issue highlights functions of the program, problem-solving techniques, hypothetical problems, solutions and applications. Tutorials are also included for all personal computers that run the program. A six issue subscription to SATN is $30. SATN Subscriptions, P.O. Box 815, Quincy, MA 02169 (800) 257-7850 operator 737 in NJ (800) 332-8650.

Micro Moonlighter. This new periodical is a self-help publications which caters to the interests of those who are making or would like to make money from microcomputer ownership. Contains the latest techniques, tips, and guidance for the person who is comfortable with his system. Marketing methods, advertising hints, the ins and outs of contracts, and industry trends will be covered in regular departments. Each issue features reviews of books helpful to the micro-entrepreneur in such areas as business start-up, mail order methods, tax shelters for the small businessman, and personal motivation. Subscriptions are available for $25 per year (twelve issues) in the U.S., $29 in Canada, and $35 per year Worldwide. Micro Moonlighter, 2115 Bernard Ave., Nashville, TN 37212 (615) 297-5106 Micronet: 70625,220.

International Microcomputer Dictionary. The International Microcomputer Dictionary is a pocket guide containing definitions of the most important terms, acronyms (with pronunciation) and numbers used in microcomputer jargon. In addition, the IMD provides a ten language vocabulary of essential computer words. Several other useful sections are included. Contains over 1,600 definitions arranged alphabetically in an easy-to-read, easy-to-use format. Especially useful is "The Numbers Game," a list of those electronic parts numbers which are common in everyday microcomputer parlance. Other

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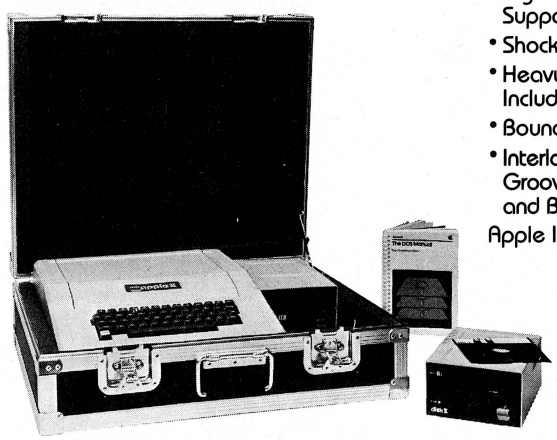

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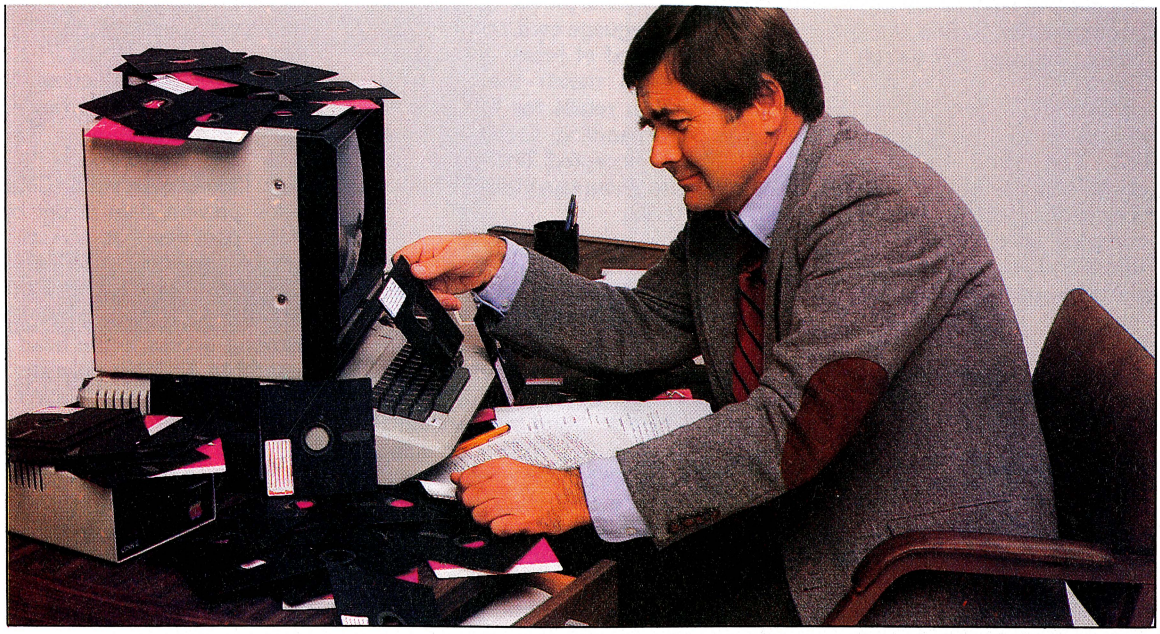

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sections are included on standards and specifications, and addresses and phone numbers for suppliers of microcomputer systems and components. SYBEX, Inc., 2344 Sixth Street, Berkeley, CA 94710 (415) 848-8233.

Robots 1982. The 1982 Robotics Industry Directory contains comprehensive listings of industrial robots worldwide with prices, complete specifications and the name, address and phone number of knowledgeable representatives. Specifications matrices and included. Also included are robot components and peripherals, cam systems, robot distributors, consultants, robot research institutes and more—$35 or $60 with monthly update. Robotics Publishing, P.O. Box 423, Tujunga, CA 91042.

Apple Freeloader. A guide to free and almost free software, publications and services for Apple users. A fully indexed directory of public domain software, free catalogs, community services. A perfect gift for Apple enthusiasts—$6.95. American Software Publishing Company, P.O. Box 57221, Washington, DC 20037 (202) 887-5834.

The Creative Apple. This 320-page book contains the best of the Apple-oriented articles from the past three years of Creative Computing with vital updates and useful information added. Much of this information, written by leading Apple programmers and reviewers, is not available elsewhere. Contents include: Animation, Graphics Utilities, Digitized Images, Music Editors, Educational Software and Applications, Word Processing, Telecomputing, Home Control Systems, Programs for the Investor, Break Even Analysis with VisiCalc, Fantasy Games Simulations, More Ready-To-Run Programs, Tips and Tricks for Easier Programming, The Quest for the Perfect Printer . . . and more. Paperback is 8½x11 inches, 320 pages, $15.95. Creative Computing, 39 E. Hanover Avenue, Morris Plains, NJ 07950 (201) 540-0445.

Miscellaneous

Vent Top for the Apple][. Ventop is a metal cooling penel that replaces the plastic cover supplied with the Apple][. Ventop's ability to cool the Apple][is due to its superior heat transfer characteristics plus carefully engineered placement of ventilating louvres. Because Ventop lowers the operating temperature inside the Apple][, it extends the reliable operating life of this popular computer. Furthermore, Ventop requires no fans or auxiliary power. Its use is essential if a user has installed three or more of the following accessories: disk drive, 80-column board, serial printer card, parallel printer card, language card, modem, Z80 card. Constructed of heavy gauge steel and painted to match the Apple][cabinet, Ventop retails for $45 plus $3 shipping and handling. Credit card and C.O.D. orders accepted. Tovatech, 1903 Fordham Way, Mountain View, CA 94040 (415) 968-0392.

Cool Stack for the Apple. The Cool Stack forces fresh air into the computer across the components through a foam enclosure surrounding the open slot area. Lab tests show temperature reduction of over 48 degrees F. using the Cool Stack versus using no fan. Offers attractive organization by supporting a monitor and two disk drives as well. High quality, low noise fan works efficiently. A library rack, fully adjustable from 0 to over 12 inches and provided with protective felt strips, completes the Cool Stack package—$69.96. FMJ, Inc., p.o. Box 5281, Torrance, CA 90510.

Printer Stand. Printer Pal permits you to store paper below the printer for extra convenience and space while the printer sits on top. It is constructed of 16 gauge steel in an attractive black textured finish with plastic trim and rubber feet. For the Epson, NEC, Okidata, Centronics, Paper Tiger and many other printers. Model P80 measures approximately 14¼ x 13 x 4½ inches—$29.95. Model P100 is approximately 21 x 13 x 5½ inches—$49.95. FMJ, Inc., P.O. Box 5281, Torrance, CA 90510.

Disk Cleaning System. Clean Cycle Kit helps prevent data errors by removing oxide particles that accumulate during normal operation. The cleaner itself resembles a standard disk and is inserted into the drive the same way, thereby allowing access to the head without disassembly. An inner polyester "scrubber" and a proprietary cleaning solution remove contaminants, while lubricating the head to minimize friction and head wear. Can be used with 5¼ and 8 inch single and dual-sided drives that accept standard ANSI-type jackets. Each kit is good for at least 60 once-per-week applications—$59. Specify size. Inmac, 2465 Augustine Drive, Santa Clara, CA 95051 (408) 727-1970.

Keyboard Dust Cover. From dust, to the roving fingers of the curious, to what until a second ago was a jam sandwich, your Apple is worth protecting. Qwk is that protection. Made of high impact textured black plastic, the Qwk keyboard cover

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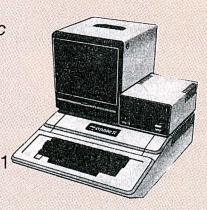

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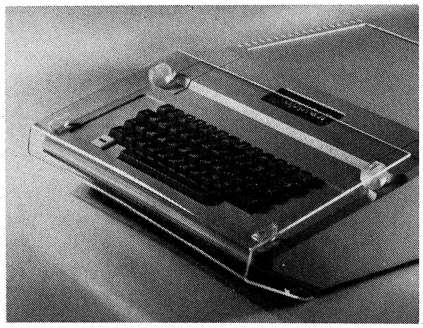
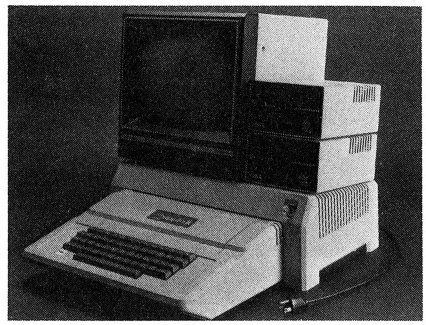
holds itself snugly in place on padded arms, requiring no modifications to your Apple. It is quickly removed for use—$12.95. Hutton Industries, Inc., P.O. Box 1413, Tacoma, WA 98401.



Plexiglas Keyboard Cover. Plexa-Lok is a clear acrylic high quality protective cover that slips up and over the Apple][keyboard. The keyboard is protected from falling objects, spills, and cigarette ashes that might cause damage. Plexa-Lok will keep little kids' fingers from reaching places they shouldn't, like that partly completed program you have been working on all day! Enhances the looks of the system while protecting from dust, etc. Comes with 60-day guarantee. Great for schools. $22.95 shipped UPS pre-paid. Last Electronics, P.O. Box 1300, San Andreas, CA 95249 (209) 754-1800.

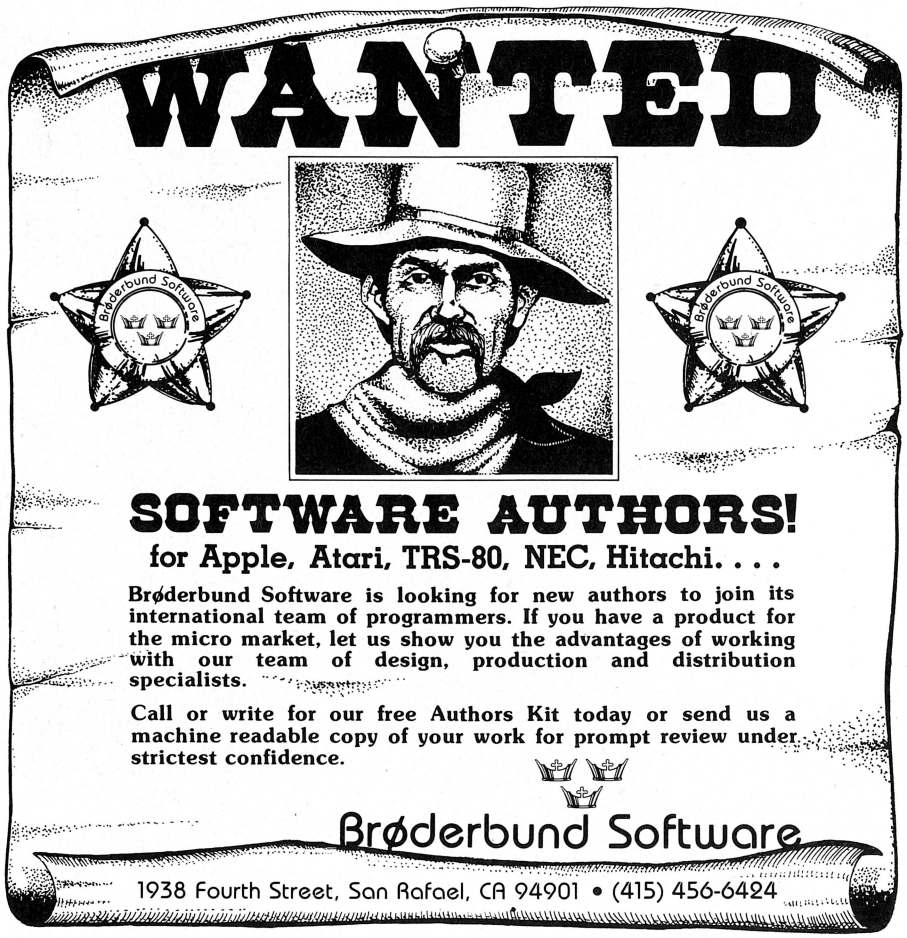
Apple Furniture. This handcrafted computer "desk" solves your storage and usage problems. This single unit becomes your computer center in your office, home or other work area where space is a problem. Available in three wood finishes: Walnut, Oak and Tesk. Features a pull out computer work surface, two side tables which raise to give additional work space of space for equipment placement, ample bottom storage for printout paper, diskettes, small accessories and other related needs, complete 4-outlet electrical system with on/off switch and external light indicator, wheels for mobility—$429.95 or $439.95 with lock. Systems Solutions, Inc., 16783 Beach Blvd., Huntington Beach, CA 92647 (714) 963-7860.

Hand-operated Decollator. This hand-operated device can decollate and restack multi-part computer forms at the rate of 350 sheets per minute. The decollator can separate a full carton in five minutes. Used in conjunction with multi-part paper, this is the most efficient, least costly way of obtaining duplicate printouts. Accommodates paper with up to 6 parts and in widths up to 16½ inches. A removable carbon bobbin minimizes handling of carbon paper. Adapts to carbonless paper with a separate attachment. Weighs 22 pounds and fits readily on a CRT stand—$295. Carbonless attachment is $49. Inmac, 2465 Augustine, Santa Clara, CA 95051 (408) 727-1970.



Apple Workstation. Station][secures and organizes the Apple][and peripherals into an integrated work station. Its molded, structural case is identical in color and style to the Apple][. With the Apple][inside and a monitor and disk drives on top, Station][allows the user to get inside his Apple without unstacking and restacking peripherals. It also clears the work station of electrical cords and cables, because Apple, monitor and another peripheral plug into Station]['s built-in power outlets. One cord and one wall plug power the system. A line voltage surge suppressor helps prevent the loss of a program due to a power surge. The problems of theft and unathorized users are also addressed. With Station][secured to a desk, the Apple can be locked inside with a key either while "on" or "off." Contact Trace Systems, 1928 Old Middlefield Way, Mountain View, CA 94043 (415) 964-3115.

Microcomputing Information on CompuServe. The Micro Advisor, a clearinghouse for a wide variety of information about microcomputing, is now an information provider on the CompuServe Information Service. Micro Advisor offers aid and advice to both the experienced and novice user of personal computers, providing information through an interactive question and answer format on equipment use and selection, peripheral devices and software to solve specific problems. Current information about computer clubs in various areas of the country, industry magazines and publications for specific user groups and the latest developments in the microcomputing industry are also available. CompuServe subscribers can access this information for the standard fee of $5 per hour weekday evening, all day Saturday and Sunday and holidays. Weekday daytime access is also available. To use the service, a subscriber needs a personal computer or terminal, a telephone and a modem. CompuServe is available through a local telephone call in more than 260 U.S. cities. CompuServe, 5000 Arlington Centre Boulevard, Columbus, OH 43220 (614) 457-8600.



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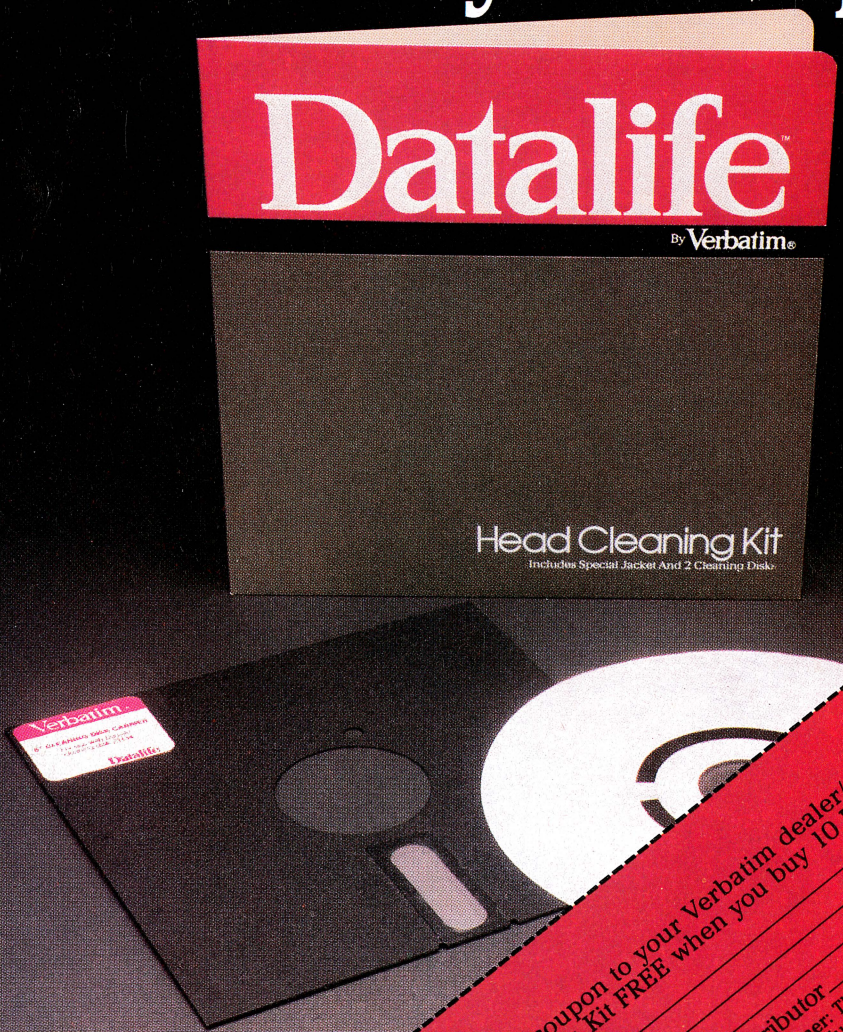

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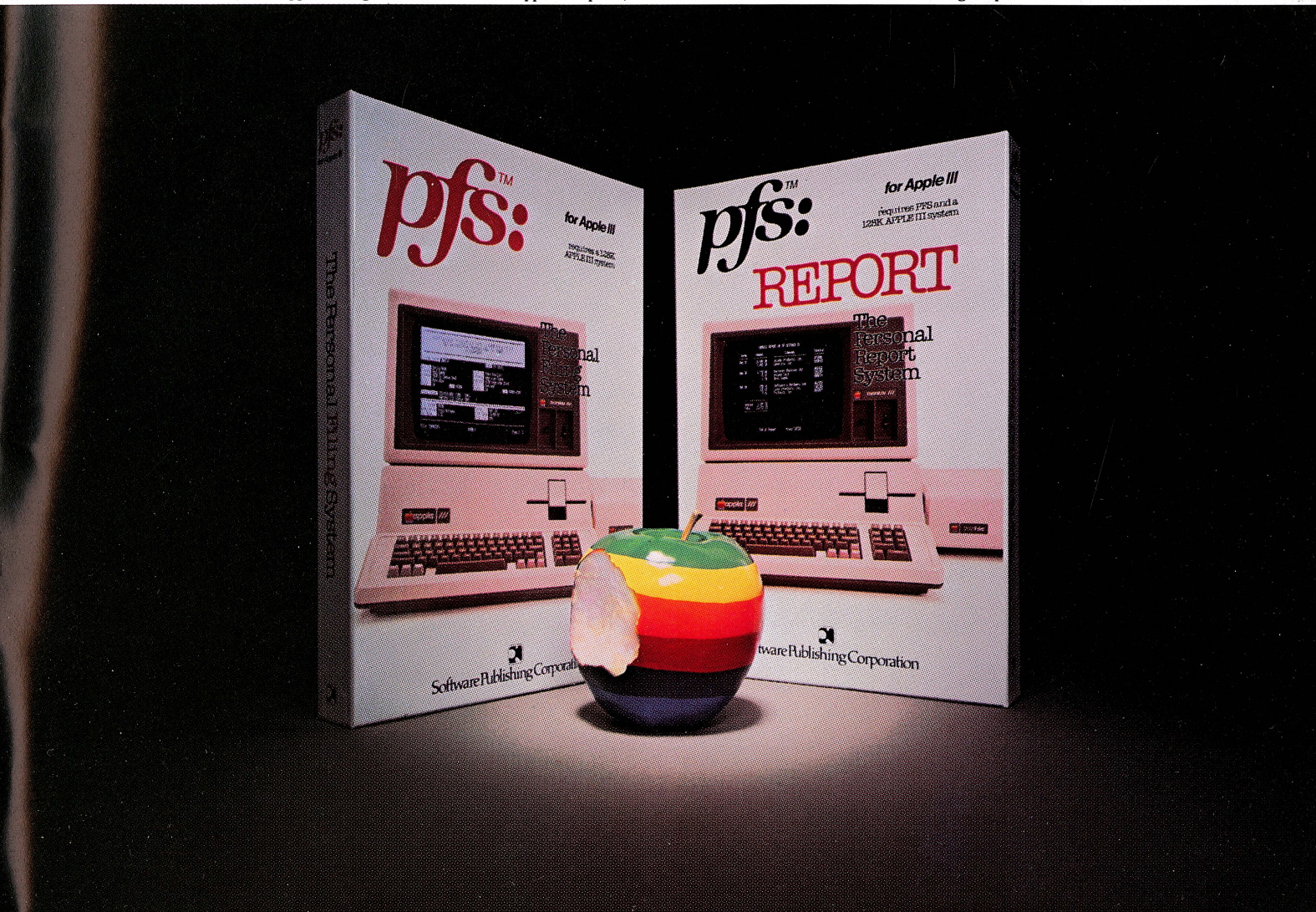

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