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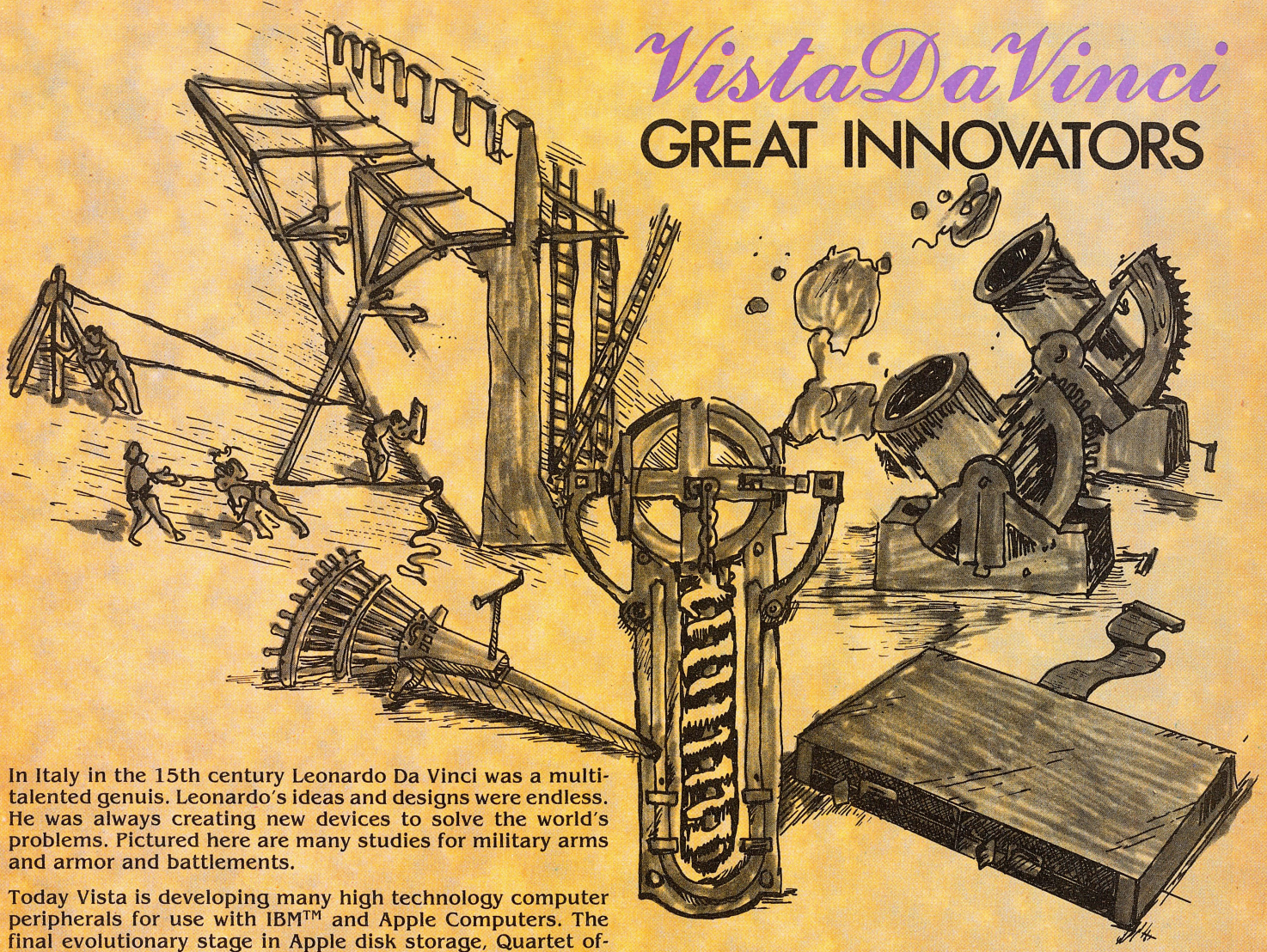
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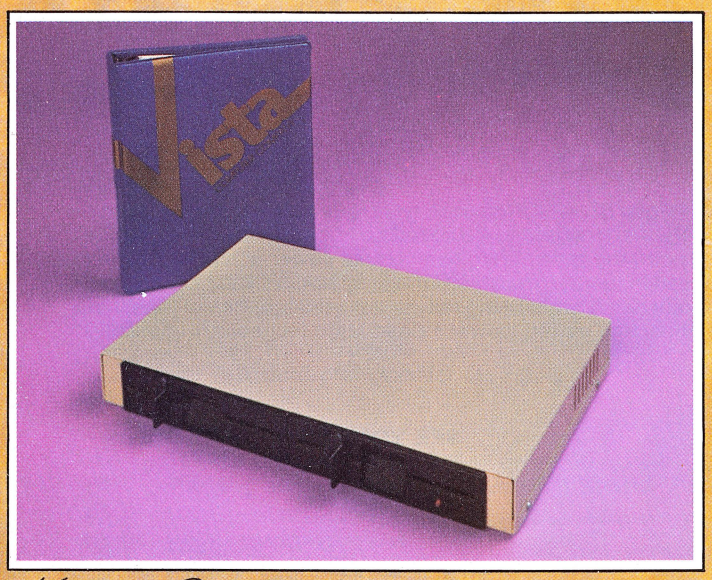
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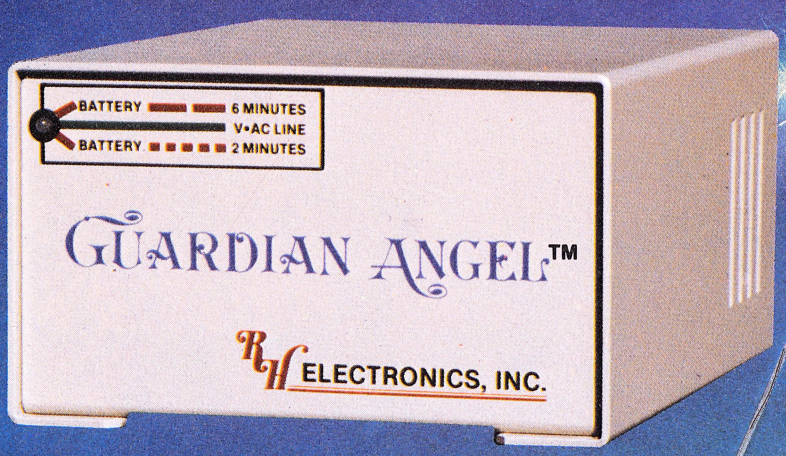
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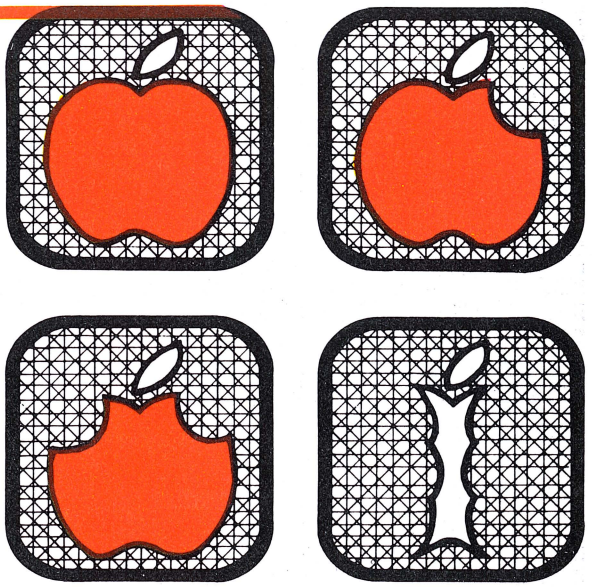
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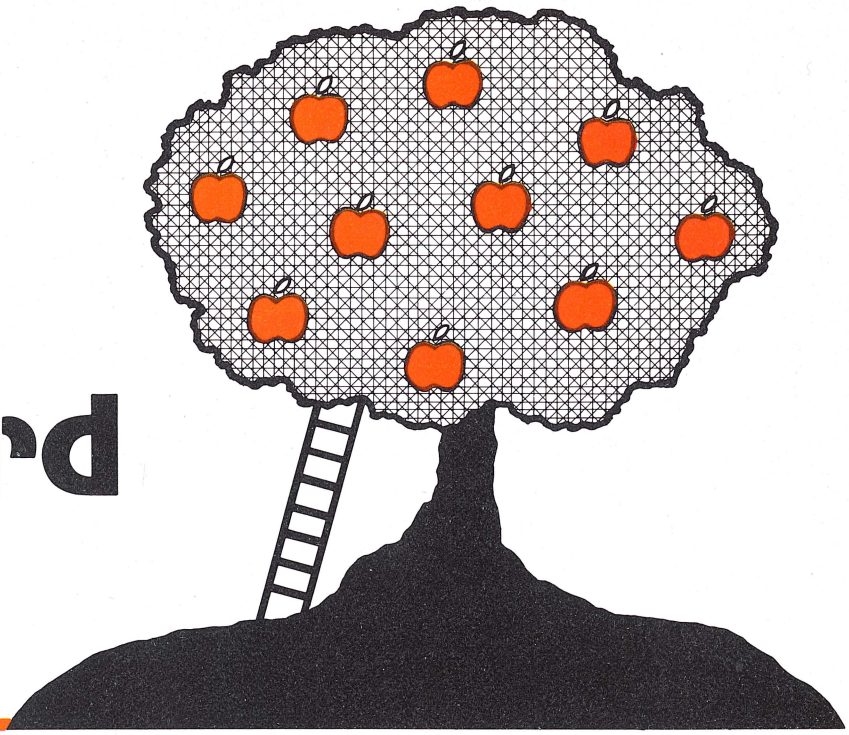
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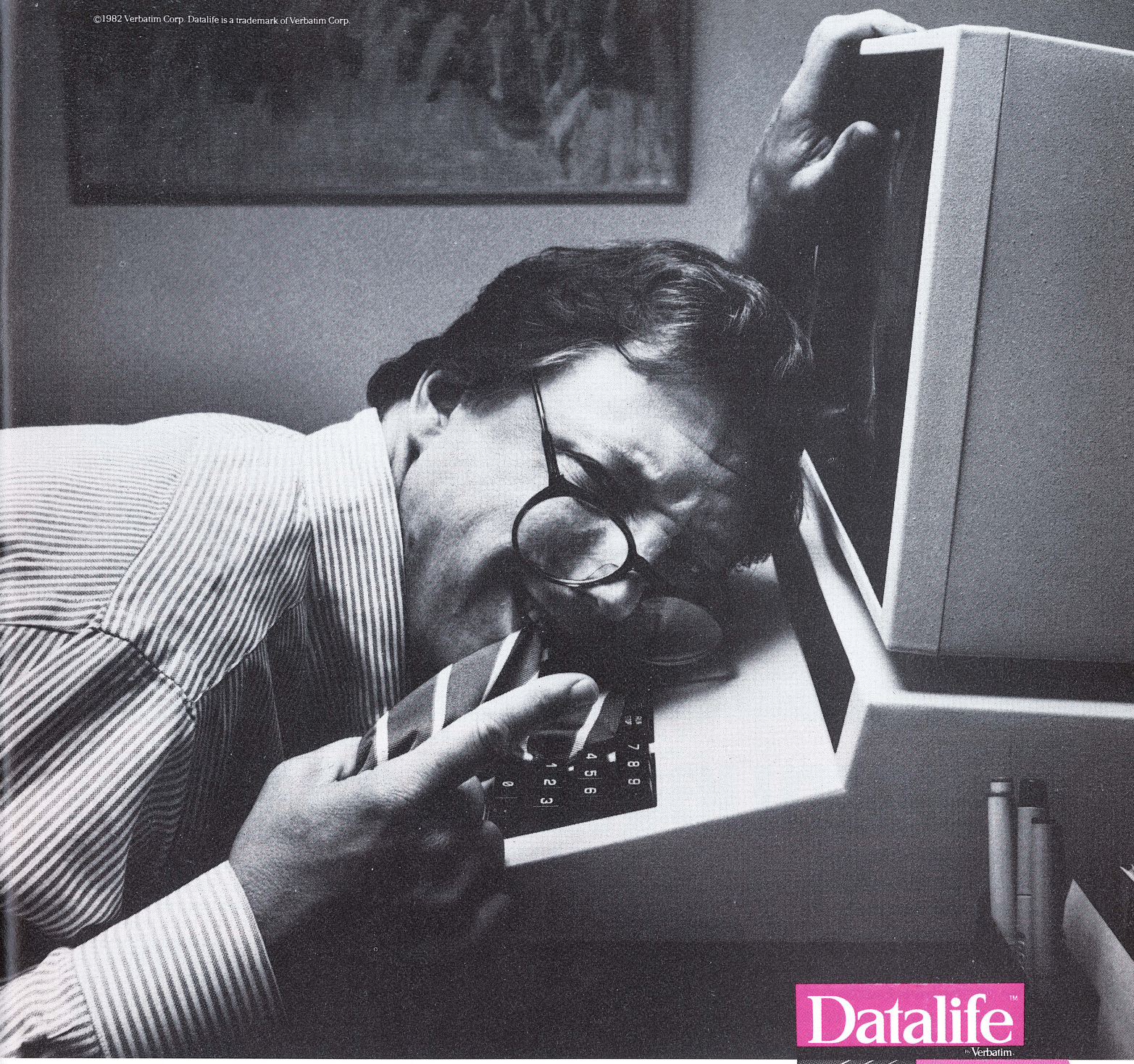
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APPLE ORCHARD (ISSN 0277 - 1950) is published bi - monthly by the International Apple Core, Inc., 908 George St., Santa Clara, CA 95050. Second Class Postage paid at Santa Clara, CA and Forest Park, IL.

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

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CF A0
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CC C1
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C4 **ly deleted, this** A0
A0 D0
C6 **software can re-** C1
C9 **cover it for you.** D4
CC C3
C5 C8
D3 A0
A0 **Also, it can** D5
A0 **reorganize your disk** D4
A0 **and inform you of** C9
C5 **the remaining** CC
D8 **space available.** C9
C1 D4
CD D9
C9 A0
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C5 **you to patch any** C1
A0 **sector: display in** CE
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TEXTFILE

The Apple //e is an interesting machine because it represents what people at Apple Computer, Inc. have designed and built *after* the legendary garage became a distant memory. The principal designer wasn't named Steve, either: he's Walter Broadner, one of the few people who had the combined knowledge of computers in general, the Apple II in particular, large-scale chip design, and the other technologies necessary to turn an idea into a manufacturable product.

We introduce you to the Apple //e in this issue through the efforts of Morgan P. ("Pat") Caffrey. Pat took what we were told was the first advance model //e to leave Apple Computer premises destined for a publication, and wrung it out. Results of the first wringing are herein. He tells us that the hard thing was to remember that while many of us will say "That's changed", "That's not changed", etc., many people will not have the Apple II frame of reference, and will consider themselves lucky for never having had to cope with the "inadequacies" of the Apple II. Others will claim that the new machine isn't as good as the old Apple II was. (Of course, many of these also claimed that the Apple II Plus was a sissy machine, a step in the wrong direction, a "minus", etc.)

A fundamental difference between the //e and older models is the Auxiliary Slot, wherein an 80-column/memory board can be inserted. Frank Curtin takes us on a guided tour of this truly new Slot, through the "Back of the Bus", showing us which signal is where. We expect to see manufacturers develop more multifunction peripheral boards for that Slot, containing everything short of a Cray emulator.

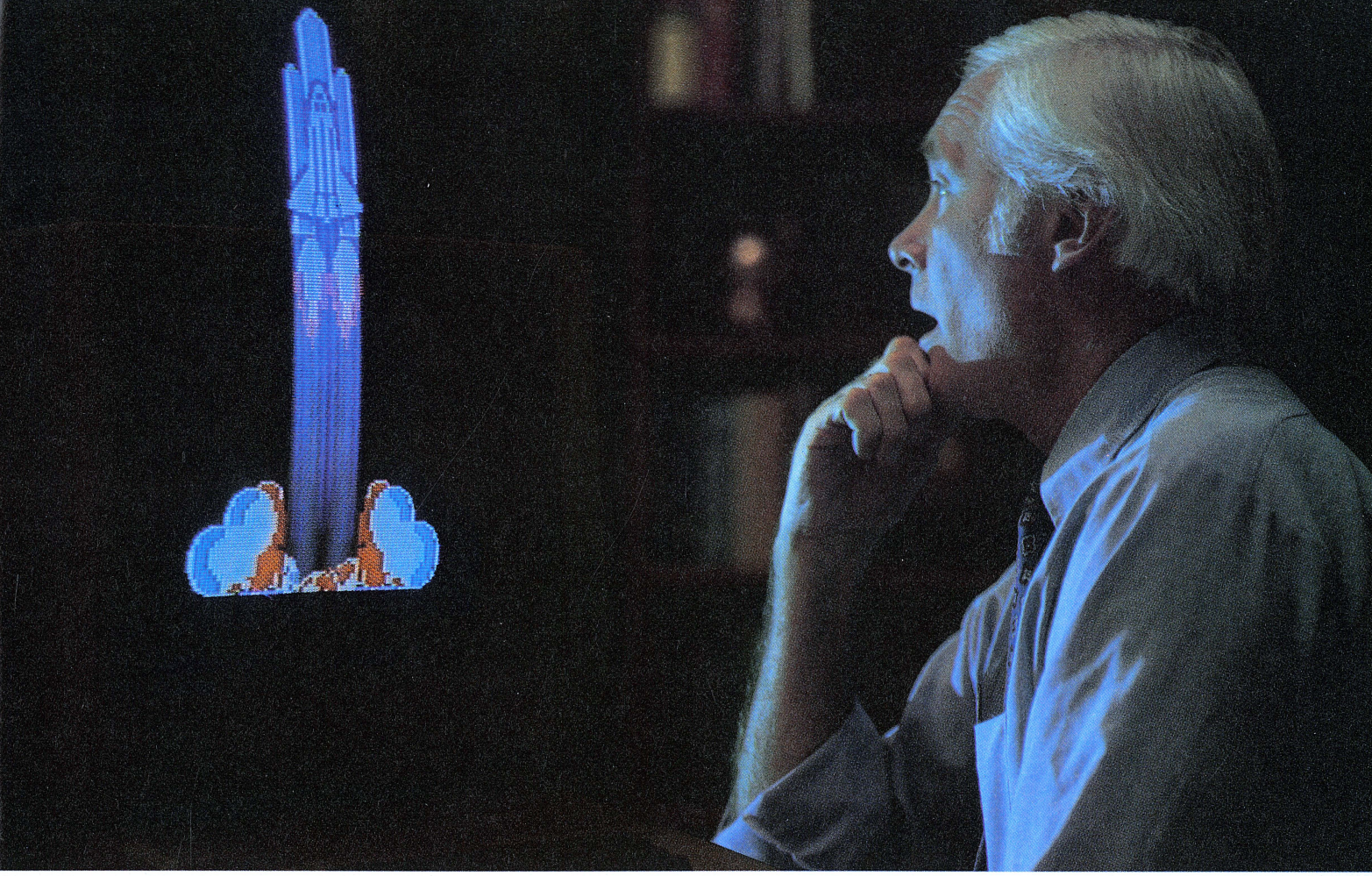
Progress comes to us all, whether we want it or not. We asked Applefolks Joe Budge and Penny Gallant to take a look at the //e from another viewpoint: how progress affects compatibility with the II, and how to make a II do almost what a //e will do. They also looked at some keyboard features from a slightly different angle than did Pat Caffrey.

There is, of course, another Apple computer making its debut at this time. It has been codenamed "Lisa", has not one but a group of microprocessors inside, and is, according to Apple, "genuinely the first of its kind: a personal computer designed to accommodate the way people deal with typical tasks and manipulate various forms of information. [Lisa] is a revolutionary entry: the first personal office system." We'll cover this machine more thoroughly beginning in the March issue.

Other features this month include Neil Lipson's tips on diagnosing and repairing some of the things than can go wrong with an Apple; Part 4 of the Sobel and Bayer series on VisiCalc, and a variety of product reviews. The //e material forced postponement of Part 3 of Will Harvey's Graphics series, and the next Apple /// installment by Alan Anderson. They'll be back in March, along with material on EXEC files, Pascal, and other categories.

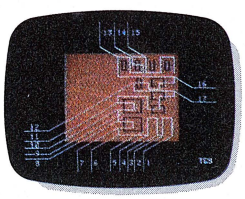
With this February issue (no January), we begin publication of Apple Orchard at the rate of nine issues per year. That's due to your support of our independent user voice. That growth means that the masthead has a few additions. First, Donna Caldwell assumes the post of Managing Editor; she will be responsible for the actual assembly of Apple Orchard's many parts. Then, on the theory that no good deed goes unpunished (see the //e material), Pat Caffrey joins our roster of Contributing Editors. Dawn Brown becomes our Circulation Manager, and Nicole Lefcourt has joined us as Editorial Assistant. Finally, Karen Zinsmeister (*nee* Vanikiotis), who left us this summer for marriage, has returned to California, with husband. Karen has rejoined the IAC staff.

What would you like to see in **Apple Orchard**? More than any other publication, this one belongs to those of us who use Apple computers. We'd be happy to hear from you, and that includes suggestions as well as contributions. The schedule of a magazine often precludes prompt replies, but we do read, and are guided by, your comments.



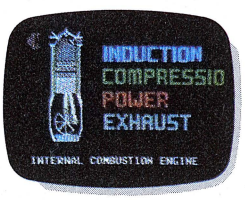
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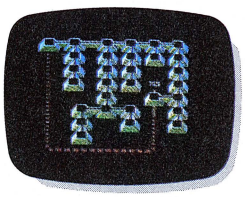


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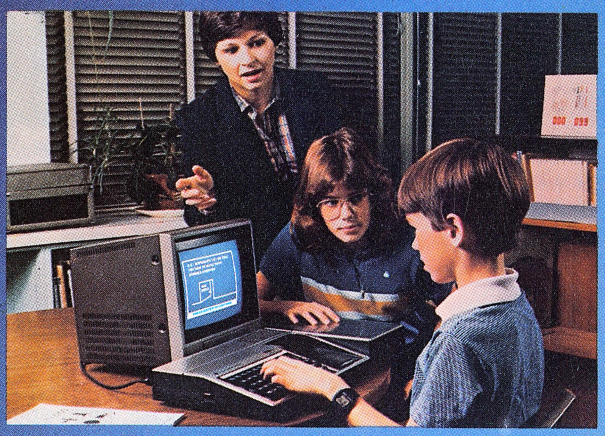
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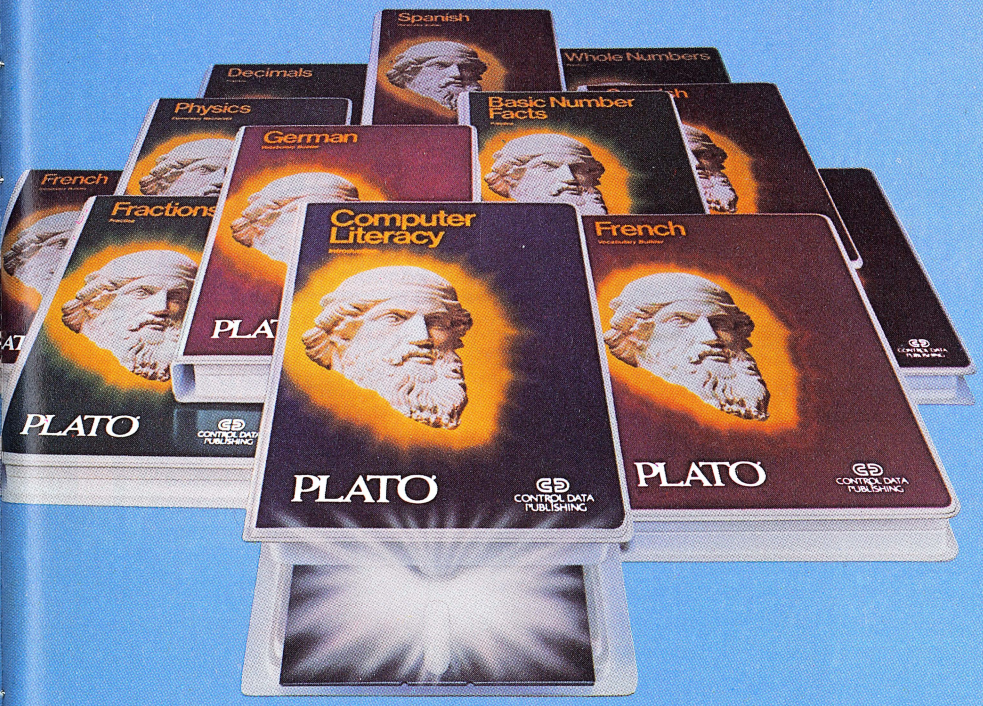
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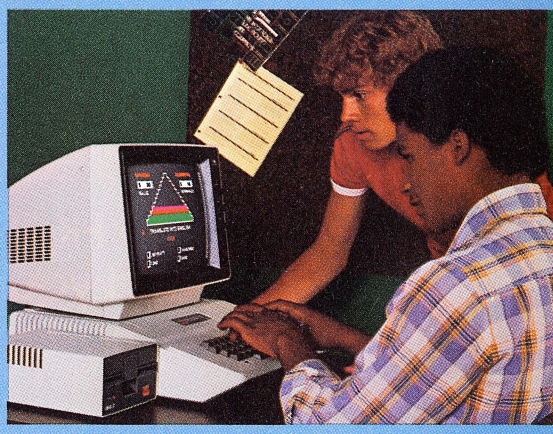
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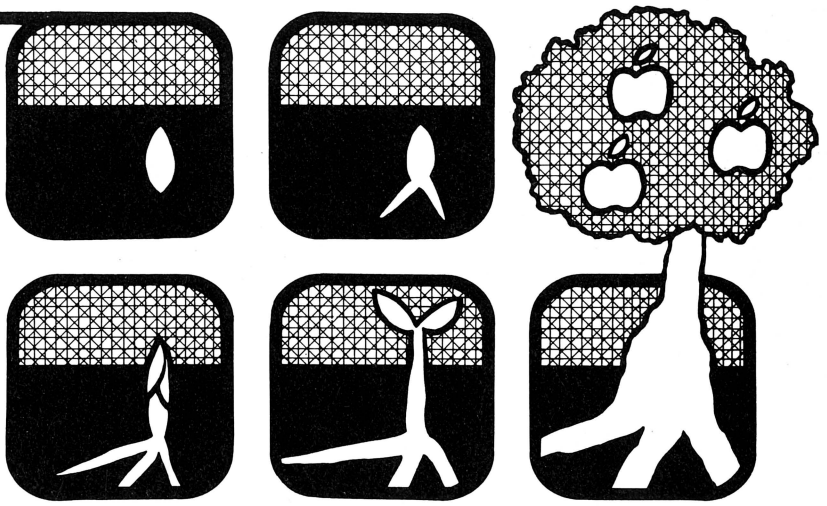
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Planting a seed...





The Documentation Hassle

We've all heard the old saw, "When All Else Fails, Read the Manual." But what do we do when the *manual* doesn't have the answer? Or explains it in overly technical language? We do two things, mostly: we become very frustrated, make telephone calls, write letters of increasing nastiness; or we don't use the product. If the manual doesn't impress us when we're looking at a product, the chances are we don't buy it in the first place.

It's the single most severe problem in microcomputerland today: hardware and software documentation that doesn't document, doesn't tell the user what he or she needs to know, doesn't tell the user where in the manual a given piece of information is, or tells the story in a way the user doesn't understand. It's a shame, because some otherwise pretty good products wind up on the user's (or dealer's) shelf because of an impenetrable "paper curtain."

We've all had our bouts with inadequate documentation, despite manufacturers' solemn claims that documentation is "thorough", "extensive", or "clear". At times, it seems like somebody said, "Well, the software's finished, we can get documentation out in a week and get it to market" What is overlooked is that documentation's function is not to compensate for weaknesses in the product, but to explain how the user can take advantage of its strengths.

Here's one major cause: much documentation is written by folks who are intimately familiar with the program or hardware. They can be easily recognized by their mottos: (1): The program or hardware is the main thing, and the documentation is secondary, an afterthought, and (2): "Aw, heck... everybody knows *that*!"

Wrong, and wrong. As much as it pains the entrepreneurs, programmers and engineers to hear it, the documentation is every bit as valuable to the end user in the overall product package as is the disk or board. *Sine qua non* is the appropriate phrase. The user needs the documentation to use the product, or nothing happens. Nothing good, anyway.

In the interest of collective sanity, here are a few suggestions:

Take the risk of insulting the user's intelligence. Not only about the unusual parts of your software, but about the "standard", or "normal" parts as well. The reader is likely to have a much more limited frame of reference than the author.

Don't let the programmer or designer write the manual by himself; someone who has *not* been intimate with the product's development is less likely to make assumptions or take things for granted ("It's obvious that Control-C is the 'Quit' command...";).

Give the program and documentation to one or more persons who have never seen the package before (not the first customers, please), and be guided by the results. It's amazing how many things *aren't* obvious.

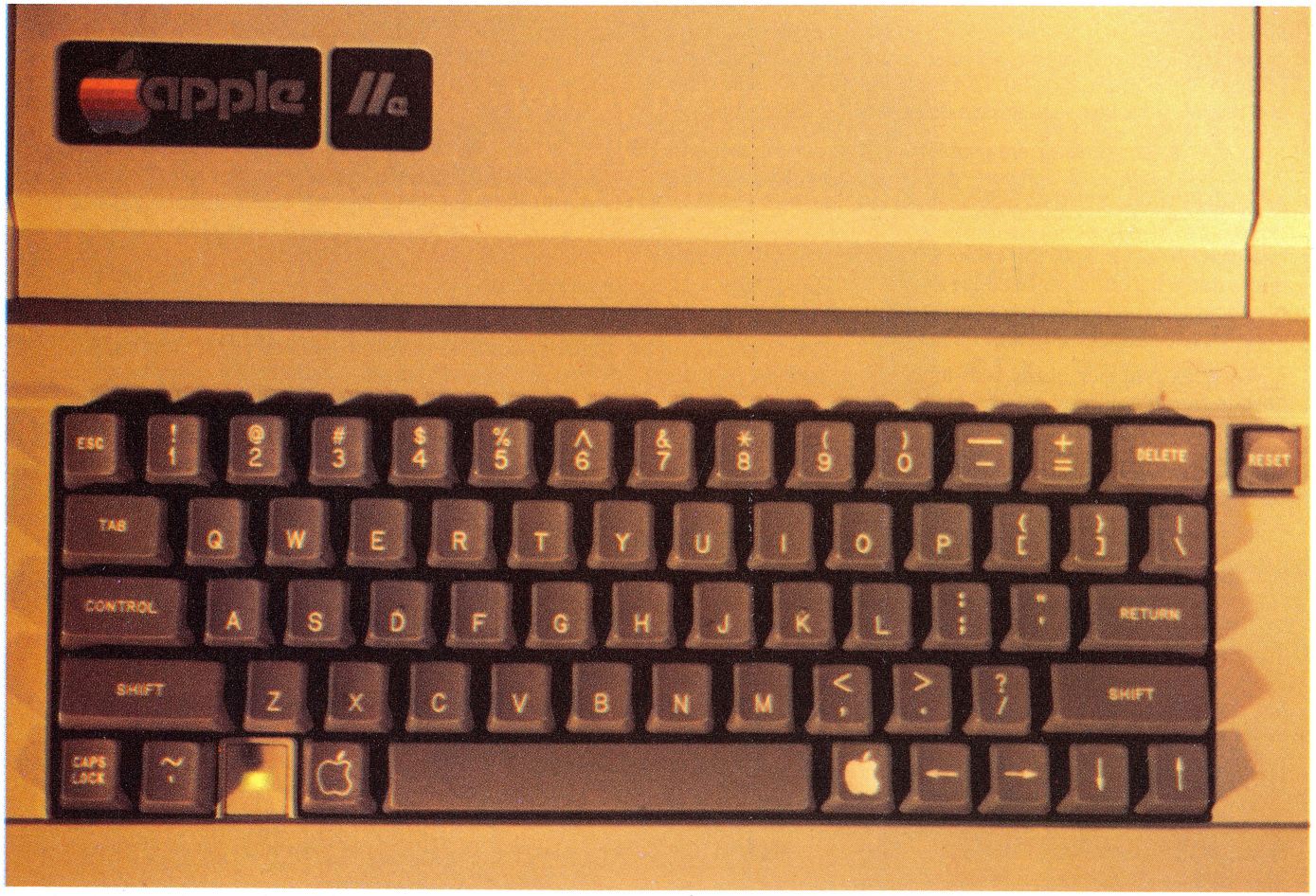
Don't be afraid to go in and revise the sacred program's user interface (menus, data entry, etc.) if it appears that the documentation is really straining to explain a complex process or a problem area. (Classic case: "Do not enter anything but numbers at this point, or the program will bomb.") Fix the error traps, for heaven's sake!

Here's an interesting approach: have the documentation specialist work with marketing to develop the idea and write the user document. When it has been typeset, hand the thing to the hardware and software types and tell them to build it!

Before anything at all fails, write the documentation right!







All //e photos by Ken Silverman

The New Apple //e

Inside and Out — a first look

by Morgan P. Caffrey

The Apple //e ("extended" or "enhanced") is remarkably like its predecessors (Apple II and II Plus), yet it is a machine which is quite different and a far-reaching improvement.

First, the headlines:

* 64K RAM expandable to 128K;
*Upper and Lower Case screen characters, with descenders;
* New Keyboard (upper/lower case with CAPS LOCK, OPEN APPLE and CLOSED APPLE keys, four directional-arrow keys, DELETE, TAB, more);
* Expandable to 80 Columns with full support in the monitor (HOME, Clear EOL, EOP, Scroll, Tab);
*Compatible with most existing software packages;
*All previous software "switches", and useful new ones;
*10-Key Pad connector (but not, alas, on the keyboard);
*Hardware diagnostics (simple and nice).

There are both cosmetic and substantive changes between the Apple //e and the II/II Plus. First thing is the character used for the model designation. The brackets used for the Apple][, (which are often converted into " II "s by frustrated typesetters) are gone, replaced by the slashes first used on the Apple ///. So we have the Apple //e (lower case), for graphic consistency. (Pronounce it "tooee".) Hereafter, we'll just group the old Apple II and Apple II Plus into the same symbol: " II ", and use " //e " for the new model.

Outside Appearance

The //e case is the same size as the one for the II. I didn't measure it, but it fit in my carrying case just fine. There are now two "Tecknit" linings on the pop-top to help reduce TV-disturbing RFI (Radio Frequency Interference), as was found on the later IIs. The top comes off with a bit less fumbling, as two grip extensions at the back edge ease removing the top from the case.

But you probably won't be taking the top off the //e as much, because of the back panel redesign. Rather than the II's deep cuts into the rear of the case, the //e has 12 openings of various sizes to allow various kinds of cables to enter. Unused openings are sealed with plastic snap plugs. With very large and very rigid cables these openings may be difficult to use, but they reduce dust entry and somehow do add to the attractiveness of the machine. The idea is that sockets of appropriate size, as for example, the 25-pin sockets we used to wedge into the II's V-grooves, can now be mounted in these holes; peripheral cables then plug into the sockets, instead of directly to the fragile card connectors.

I had to struggle to find a method to get my ancient game paddles routed correctly to the game port (it's still there). This is only a problem for old timers, however, since Apple has brought the important game connector points out to the back of the machine, to a 9-pin socket. History buffs will appreciate the fact that the cassette input and output jacks are still with us.

Because the top will not have to be removed anywhere near as often, Apple has provided small holes at the joint between the top and the back. These allow sheet metal screws to be inserted to fasten down the top, a feature which will bring smiles to school administrators worldwide. It's not a lock, but it is an obstacle to indiscriminate meddling with the interior.

The Keyboard

The //e has a 63-key typewriter-like keyboard (better, not perfect). The feel of the keyboard is similar to the Apple ///, which shouldn't be surprising. The arrangement closely matches that of the IBM Selectric, allowing for the differences of dealing with video display. It's very close to a "standard" keyboard, whatever that may be. (*Interesting; IBM set a* de facto *standard for keyboards with the Selectric, yet their PC is . . . never mind. — PCW.)* A green power lamp appears to be an extension of the case but is actually part of the keyboard.

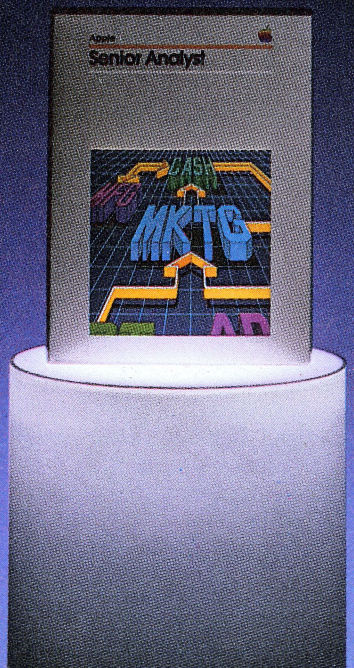
The RESET key has been moved. Keys not found on the II include: TAB, DELETE, OPEN APPLE, CLOSED APPLE, CAPS DOCK, all four arrow keys (up and down added), brackets square and curly, backslash, vertical bar, tilde, and accent.

No, there isn't a ten-key numeric pad. But on the motherboard, an enticing set of pins for a ten-key connector. Undoubtedly Apple (and others) will sell the device.

The New Keys

SHIFT KEY: The Apple II never had a shift-key which altered the case of alpha characters. Bright and inventive people devised a method to use the game I/O one-bit input port SW2 to attach a "shift key mod" so that software could detect the depressed condition of the shift key. Thereafter, upper or lower case could be forced. The //e has a true shift key. But to use software which was dependent on the old "shift key mod" requires reconfiguration to "true upper/lower case keyboard". In some cases, adaptation by another solder bridge may be required.

What if "what if" isn't enough?



Just when the business world is up to its white collars in visiclones, calcalikes and other spreadsheet packages, Apple's® come out with something entirely different.

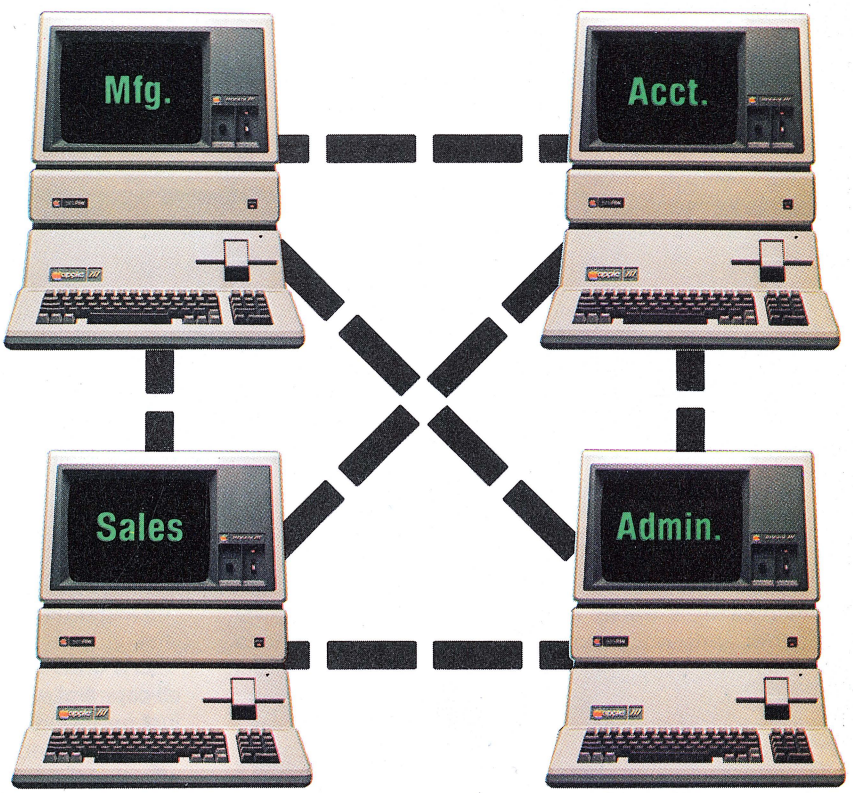
Introducing Senior Analyst.

Like other financial modeling packages, it allows managers and professionals to ask all those proverbial "What If?" questions.

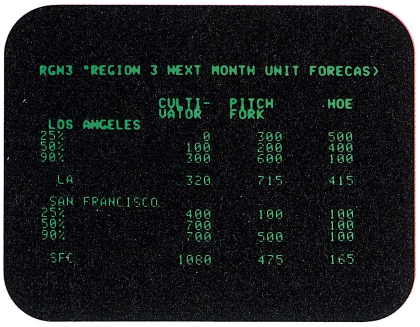
Unlike the others, this powerful financial planning tool was designed to be used in a corporate environment, by lots of people. So you get lots of advantages.

For example, you can transfer data (across diskettes) from one financial model to another. Or consolidate many models into one.

So sales, manufacturing, administration and any number of other departments (even in other cities) can easily share information. Giving each the power to create comprehensive and



Senior Analyst lets different departments share and consolidate data. That way the company doesn't make more pitchforks than it can sell.



With Senior Analyst, you can now cultivate forecasts by merging reports from distant divisions.

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Easy to follow commands allow employees to create models without learning a second language.

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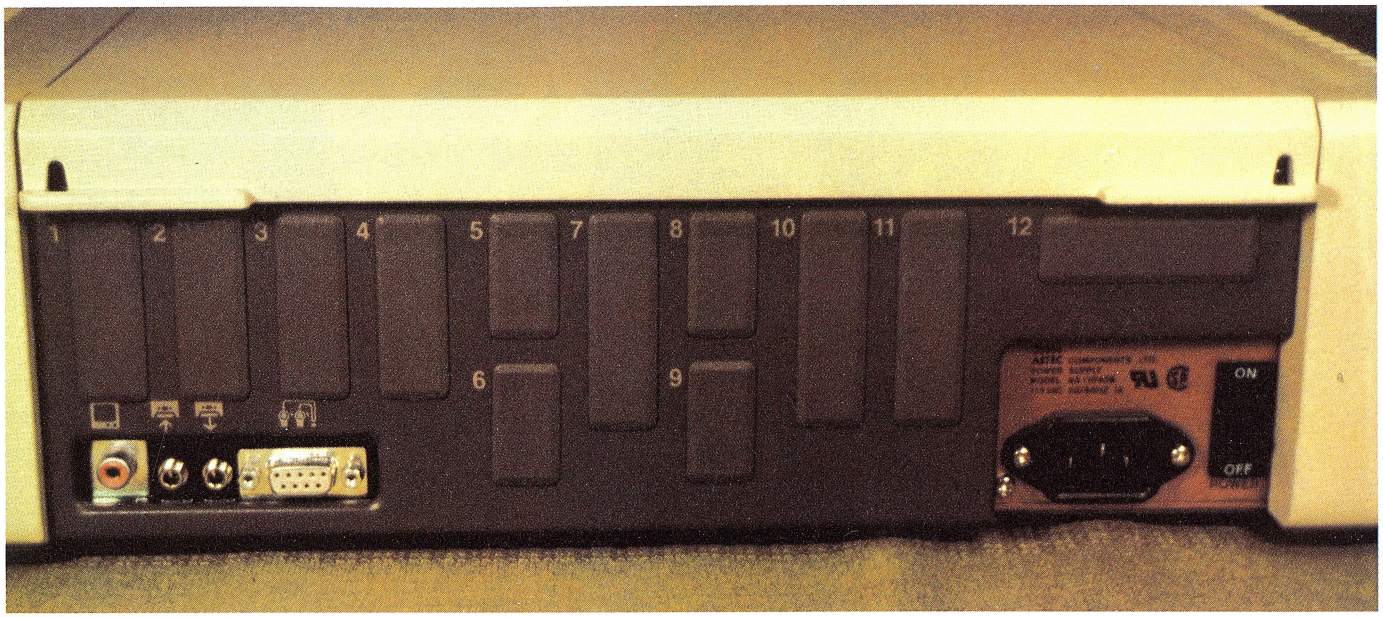
All of which we'd like you to experience in person, at any of our 1300 authorized full-support dealers (they also offer a vast library of other quality software distributed by Apple for Apples).

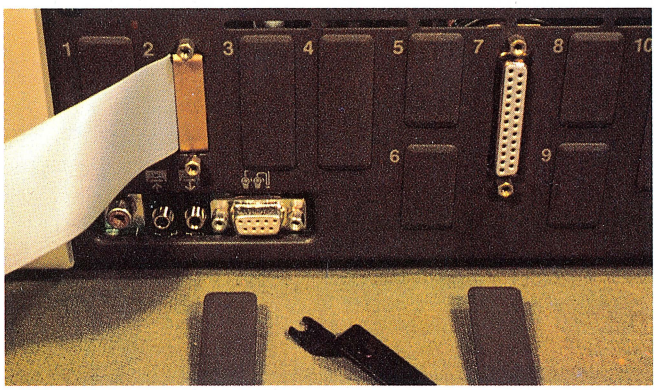
And don't ask for just any spreadsheet package. Tell them you need to see an analyst.

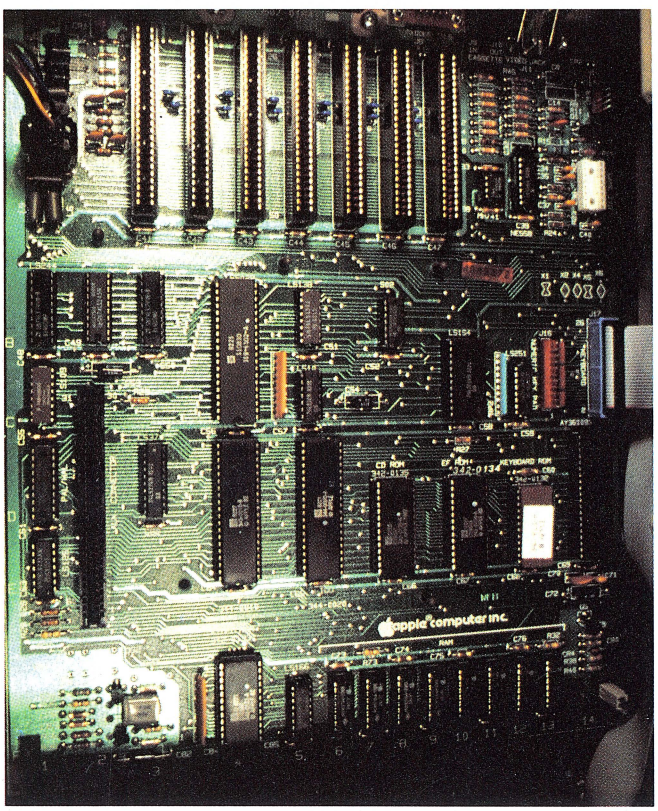
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CAPS LOCK: Some keyboards make it very difficult to enter all-caps text with interspersed numbers, and this is more than just annoying. On the //e this has been avoided. The CAPS LOCK key performs as it should, capitalizing letters without affecting the state of symbol and number keys until the SHIFT key has been pressed. that is, with the CAPS LOCK set, the " 4 " key produces a " 4 ", not the " $ ".

RESET: It's recessed, above and to the right of the main keyboard. This should eliminate the RESET accidents common in the II. In addition to the new location, the RESET key won't work without the CONTROL key also pressed down, a move called "CTRL-RESET".

Pressing the RESET key in most computers is a catastrophic return to a known state of affairs because something is wrong. It is not used as a mere program switch to return to a menu. The Apple's RESET can be directed, however, and there has been no change from the II to the //e in "Reset Vector" locations.

The RESET key presents something of a problem for me. I'm one of those who cursed and muttered and lost time because of the II's RESET key positioning directly above the RETURN key. When the II Plus was released with the newer keyboard, the problem was effectively solved. A switch under the hood allowed user selection of simple RESET or CTRL-RESET operation. Well, the option switch isn't present in the //e. You have to press two widely separate keys simultaneously in order to reset.

But how will an impaired person with one arm, or with an arm in a sling, ever manage to reset the //e? The answer is that the impaired user would be required to turn off power to reset, which can mean loss of important data. As computers are increasingly used to add to the viability of the physically impaired in the normal workplace, human engineering should include these factors. Expense was probably the motivating factor, but the RESET key could have been positioned on the same side of the keyboard as the CONTROL key without greatly increasing the liklihood of accidental resets.

We were told that a small soldering iron modification inside the machine can be made which will cut the CONTROL key out of the picture, but it is an either/or proposition. Check your dealer, and/or wait out the 90 days until your warranty expires before any soldering activity.

ARROW KEYS: Four of them are on the right of the SPACE bar. The LEFT and RIGHT keys are operationally the same as the old II. The DOWN key is CONTROL-J for Line Feed. The UP key reads out as CONTROL-K, which is sure to cause some interesting misunderstandings. For example, in BASIC, the UP key is the only one of the four that is inoperative, because the BASIC interpreter never heard of CONTROL-K to go up one line. Some word processors use CONTROL-K for other functions, so approach the UP arrow with caution. Systems like Apple Pascal which can be reconfigured should be no problem.

OPEN APPLE and CLOSED APPLE keys flank the space bar. The open and closed apple keys are extra appearances of the game paddle pushbuttons, (SW0 & SW1). This will be very useful, not only for game players, but for software developers who want to add a secondary meaning to the keys without using the standard CONTROL functions. The OPEN and CLOSED APPLE keys are also used by the system Monitor to allow special types of resets and to initiate a self-test mode.

AUTO REPEAT: The old REPEAT key has been replaced with an automatic repeat function when any key is left depressed for more than a portion of a second. Many times while writing, when pausing to think, I accidentally inserted unwanted copies of some character. I have had this "trouble" with other keyboards (including the ///'s) as well. I would like to be able to defeat auto-repeat, but think I'll just have to learn to live with it. Those of us who developed our habits on the Apple II and choose to get a //e will just have to relearn a few things.

A more difficult side-effect of the keyboard's auto-repeat appeared when I used a graphics package which includes a nice tone generator and music module. Having mapped the piano keyboard to the //e's keyboard, the user resses a key to obtain a note and releases the key to stop the note. The notes acquire a chattering quality when auto-repeat kicks in. Those doing musical tasks will need to rewrite software somewhat to take advantage of a secondary readable switch now available, which merely reports the fact that some key has been depressed. We'll talk more about soft switches later on.

DELETE: This key is used when in terminal mode, as a destructive backspace; a keystroke that deletes the character to the left of the cursor and moves the cursor to the left. This is not supported by current Apple II stuff, nor by Applesoft in the //e. Uses are likely to be developed by industrious software authors.

I had some short-lived trouble adjusting to the //e keyboard. The RETURN key is positioned one row lower than the II's (but in the same location as on the ///). I tended to hit the " \ " key when I intended the RETURN key. The left and right arrows have moved. You will also hit the TAB key when looking for ESCAPE if you're a convert from the II, and will have some troubles with the colon and equals signs as well. These are minor and temporary irritations only to someone who has been touch-typing with the II for several years. Not to worry; the changes are for the good and I'm becoming acclimated even as this is being written. Beginners will have less trouble than I had shifting from my typewriter to the II's non-standard keyboard.

International Keyboard Version

The Apple //e with an international keyboard will be sold outside the U. S. The keyboard arrangement is a good bit different and requires an alternate 2316 ROM for keyboard decoding. It allows hardware switch-selection of alternate character sets. (This character set selection feature exists in software in the American version). Matching special-character key caps, ROMs, and translated software and manuals for fifteen languages will be sold. This means that Apple has committed major resources to marketing the //e overseas. The effort is no small investment since it suggests a support network in many languages. This hasn't been done before, I believe, and Apple deserves both credit and sales.

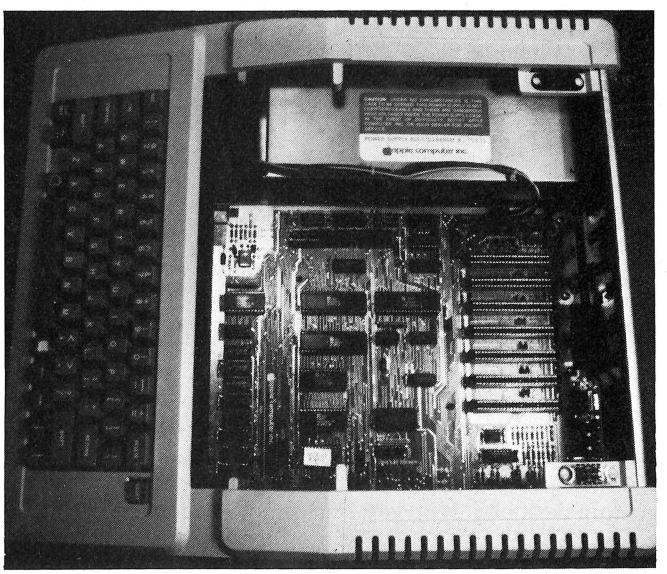
At this writing, it is not certain whether the International keyboard //e will be readily available in the U. S. International Apple models have a motherboard compatible with European TV circuitry (PAL), which is not compatible with the U. S. system (NTSC). Such availability on this side of the Atlantic is to be hoped for, because NTSC is used in Canada (*la pomme Quebec*), and in parts of South America. Here in the U. S., there's a considerable market for translators' aids, particularly in California. We shall see.

Screen Display Character Set

The screen character display is created with a 2333 character generator ROM. The ROM allows a "straight-through" channel for graphics video information, thus reducing the need for additional switching circuitry.

The domestic //e video display includes an alternate character set which disables FLASH to enable lower case INVERSE. The alternate character set is selected automatically in 80 column mode. Since few of us make extensive use of the FLASH mode (it's somewhat hard on the eyes), it will likely not be greatly missed. Software which requires FLASH and wants to work in 80 column mode will need to be slightly altered. A drawback of the alternate character set is that "clearing" routines used in INVERSE mode clear not to black but to "white" (or green, or orange . . .), which can be quite disconcerting.

Again, the International Apple //e will allow for purchase of additional or alternate character display ROMs. These ROMs can be hardware or software switch-selected for the display which most closely matches the special punctuation marks of any of 15 languages. It will be entirely reasonable, for instance, to have German and English or German and French fonts.

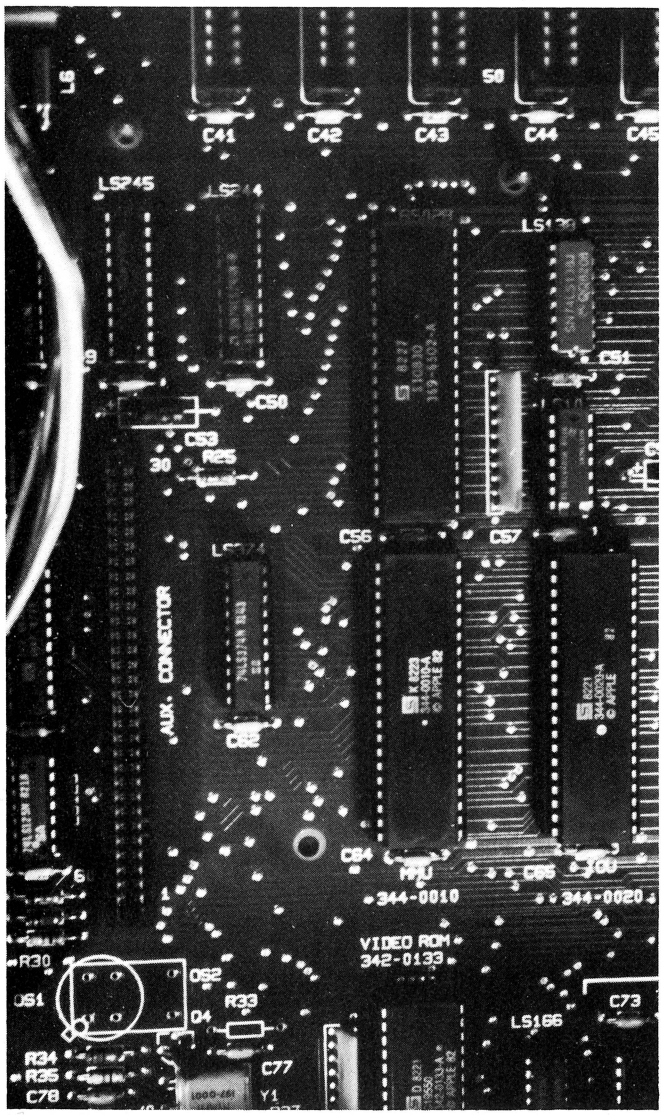


Taking a Look Inside

The first thing that struck me when I popped open the case is the presence of an internal power lamp (actually an LED) at the

back, alongside the peripheral connectors. I have accidentally removed and "fried" several circuit cards when a dead power lamp in the II led me astray. Nothing will make this impossible (the LED can fail too) but the two indicators failing at once is not likely, and this is good "ergonomic" (engineered for humans) design. It also allows the Apple folks to monitor the burn-in process during manufacture.

If you were to take the //e's case off, you would find another difference: the keyboard is not attached to the case, but is fastened to the base plate by means of a bracket arrangement. The //e works with its case off, unlike the II, and the three-handed maneuver to assemble the thing is no longer required. In fact, the overall "manufacturability" of the //e is considerably better.



Where Have All the ROMs Gone?

Compared to the II, the inside of the //e looks almost peaceful. There are many fewer IC chips than in the II, because the designer, Walt Broadner, persuaded Apple to select custom-designed very large scale integration (VLSI) MOS chips. That is, many functions previously performed by many discrete IC chips have been compacted to fit on one of three custom chips. This reduced chip count returns benefits for Apple (reduced assembly and test motions, increased reliability, faster repair) and to us (added functions, reduced heat, increased reliability). the VLSI chips are:

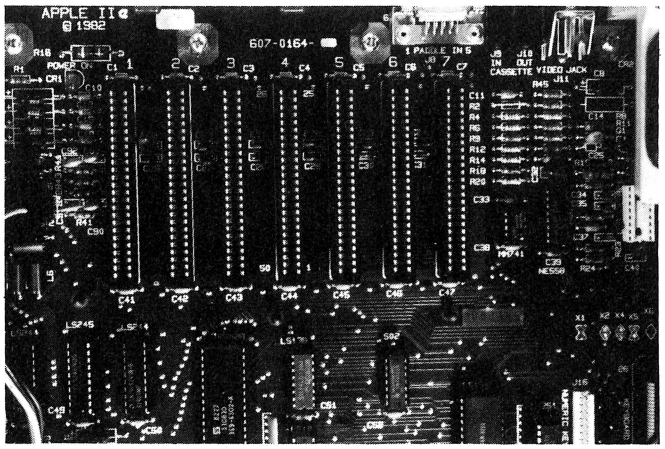
Input output unit (IOU); includes logic to handle many soft-switch activities, character-set select, any-key-down, annunciators, vertical blanking (a video situation).

Memory Management Unit (MMU); includes logic to switch banks of memory, Page 2 (text and graphics), and generally, clearly enough, circuitry to manage memory.

Programmed Array Logic (PAL); generates timing and control signals.

The row of six 2K ROM chips that used to provide the Monitor and Applesoft language has been moved into two large 8K ROMs. Much less heat is produced. The additional address space is dedicated to self-diagnostics and extra Monitor extension. Either of these two ROMs may be replaced with EPROMs for customization of the system. For industrial purposes this may be significant. See the article on "interrupts and the //e" for further information.

RAM memory chips? The whole 64K is handled in one row of eight 64K chips, replacing the 24 16K chip array plus language card.



Peripheral Connectors (1 - 7)

Seven slots are present where there had been eight; Slot Zero as we knew it is gone. The major improvement in the peripheral connector bus, though, is that it has been fully "buffered". This is a performance change rather than a visible change, but it means that circuit cards will not be able to adversely affect the other internal circuits. The occasional unexpected and previously unexplained failures of my all-slots-used Apple II haven't happened with the //e. I tested the //e with printer controller, Modem, 80 column, CP/M, clock card, standard and hard-disk controllers. I fired all of them up at once with Z-term. Said test has blitzed my old II a number of times. The //e passed with flying colors.

There is a new, larger auxiliary slot; it is covered in a separate article.

The System Monitor ($F800-FFFF)

The system Monitor Read-only Memory (ROM) chip contains the code which makes an Apple computer different from another computer with a 6502 microprocessor. It is known as the Monitor because with all other languages absent, it provides the code routines necessary to write programs, inspect memory contents and in general, monitor the operational state of the device. It contains all the raw routines to get a character from the keyboard, store it somewhere, display it on the screen, move blocks of memory around, compare mem-

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MORE: Useful music, text and hi-res tricks for your programs. Educational documentation.

APPLE MECHANIC: $29.50
(Includes Peeks/Pokes Chart & Tip Book#5)

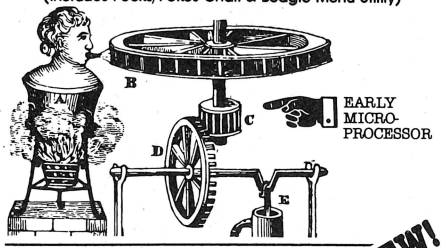
NEW! Typefaces

FOR APPLE MECHANIC

26 NEW FONTS for Apple Mechanic's Xtyper and Hi-Writer programs. Most are full 96-character fonts, large & small, of fully-editable characters. (Apple Mechanic required)

BEAGLE MENU: Use with your disks. Display only the filenames you want (e.g. only Applesoft files or only Locked files) for one-key cursor selection/execution. Space-on-disk, catalog scan, optional sector-number elimination.

TYPEFACES for Apple Mechanic: $20.00
(Includes Peeks/Pokes Chart & Beagle Menu Utility)



EARLY MICRO-PROCESSOR

Beagle Bag NEW!

12-GAMES-PLUS ON ONE DISK
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TWELVE GREAT GAMES from the classic Beagle Bros collection— TextTrain, Slippery Digits, Wowzo, Magic Pack, Buzzword... Almost all of our "Game Pack" games, updated and re-released on one jam-packed, entertaining, unprotected disk.

COMPARE BEAGLE BAG with any one-game locked-up game disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, AND the disk is copyable. You can even change the programs or list them to LEARN, and see what makes them tick.

BEAGLE MENU TOO: See "Typefaces" above.

BEAGLE BAG: $29.50
(Includes Peeks/Pokes Chart & Beagle Menu Utility)

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PRINT VARIABLE-WIDTH TEXT on the hi-res screens with normal Applesoft commands (including Htab 1-70). Normal, expanded & compressed text on same screen— no hardware!

ADD GRAPHICS TO TEXT or vice-versa. Run existing programs under Flex Text control. Easy to use and compatible with PLE© and GPLE.©

DOS TOOL KIT© FONT compatibility, or use Flex Text fonts. Select up to 9 fonts with ctrl-key commands. Print/List/Catalog in any style! Custom TEXT CHARACTER EDITOR included.

FLEX TEXT: $29.50
(Includes Peeks/Pokes Chart; requires monitor)

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

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SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
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ory contents, and much more. Some computer folks call this the "personality module".

The Monitor routines have been relied upon by software developers for the Apple II since the original release. The Monitor was changed once in the transition from the simple II to the more usable II Plus.

In the //e, the Monitor has been drastically revised and extended; yet it maintains compatibility with most previously developed software. (*Most*?? Read on.) The extensions have been placed on an additional ROM which shares the $C100-C7FF address space dedicated to peripheral slot I/O. The Monitor extensions allow for extended screen editing, scrolling and clearing functions. Additionally, the new ROM allows space to include system diagnostics to be added.

For Assembler programmers, entry points to previous routines have been strictly maintained. Other than the entry points, however, *nothing* is guaranteed. If you have code which has been making use of some odd side effect of a sub-routine in the Apple II's Monitor ROM by making an unusual entry to that routine, your code may no longer work. It may, however, work like a champ. Our old friends trial and error will show, and we will publish, all useful information regarding use of the //e Monitor.

As to software, I have a number of pieces of Apple II software which see almost daily use. They now fall into two groups: //e-compatible and others. Fortunately, there were really none in the "others" category. My copies of 40-column Piewriter word processor, Program Line Editor, ASCII Express (Modem), Disk Library, CP/M, dBase II and Merlin Assembler worked perfectly the first time. (*See also "TANSTAAFL" in this issue. —PCW.*)

The Assembler software I use worked correctly the first time with no revisions. My few inspections of the Monitor code revealed some of the methods used to expand Monitor functions. The ROM does much more than the 80 column extensions; it also includes the code which reads keystrokes from the keyboard.

When a function requires code in the new extended ROM area, the Y-register in the 6502 is loaded with a function number and a "soft-switch" maps the ROM into the $C100 address space. Then the dispatch code is executed. Here are the functions I have tracked so far; they all vector through code at $FBB4.

$FC42 Y=0 CLEAR EOP
$FC58 Y=1 HOME
$FC70 Y=2 SCROLL
$FCA1 Y=3 CLEAR EOL
$FCA5 Y=4 CLEAR EOLZ
$FA75 Y=5 RESET
$FD1B Y=6 GET ONE KEYSTROKE
$FD24 Y=7 FIXIT
$FB51 Y=8 SET WINDOW

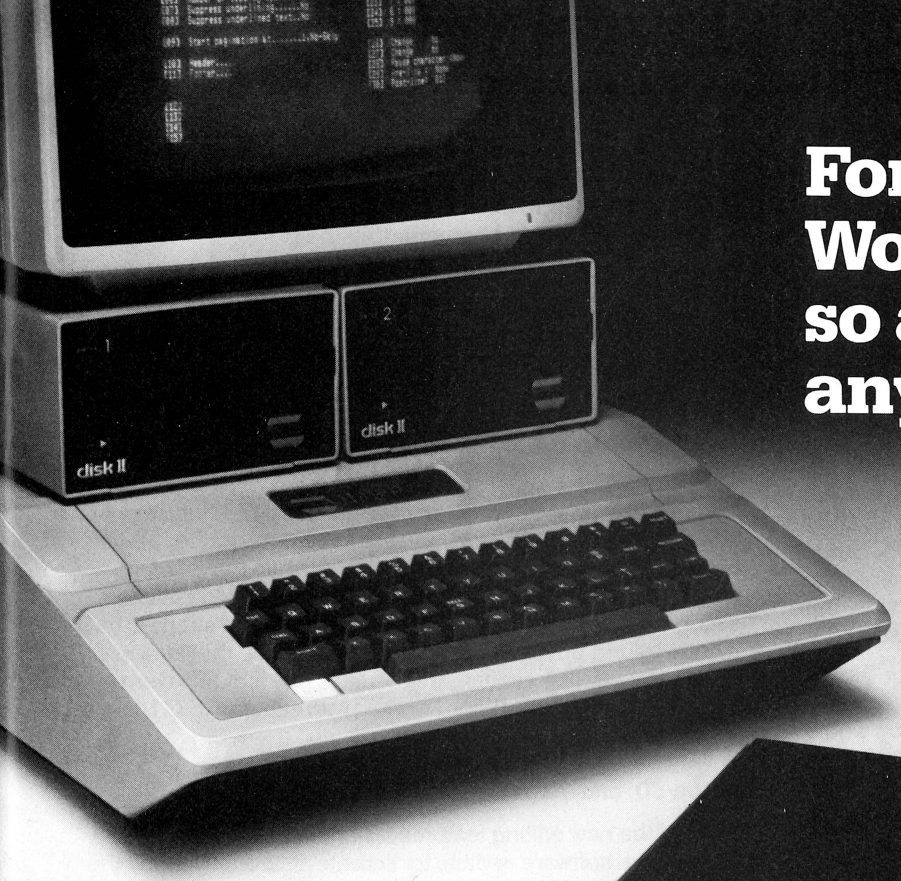
Self-Diagnostics

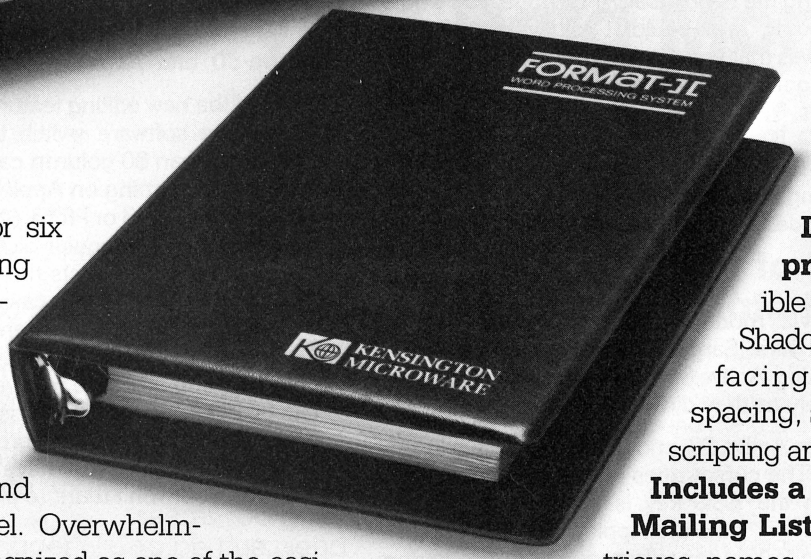
The //e has a set of routines which test the hardware whenever you like. Just press the CTRL-CLOSED APPLE-RESET (three keys at once), and watch the //e's Hi-Res graphics show the testing of the system's memory, until it displays "KERNEL OK". Be prepared for a cold start afterwards. Without turning off the Apple, you can cold-boot the system using CONTROL-OPEN APPLE-RESET. I have only gotten one error message from the diagnostics, which had to do with the IOU and was never repeated.

Old	Function	Newfi
ESC @	Clear Window and HOME Cursor	CTRL-L
ESC A	Move Cursor one char right	CTRL-
ESC E	Clear to End of line	CTRL-]
ESC F	Clear to End of Screen	CTRL-K (up arrow)
	(all the rest are new with the //e)	
	HOME Cursor without clearing	CTRL-Y
ESC R	Turn on restricted-case mode	
ESC T	Turn off restricted-case mode	
	(see next section)	
	Delete Cursor line	CTRL-Z
	Set NORMAL mode	CTRL-N (not from keyboard)
	Set INVERSE mode	CTRL-O (not from keyboard)
ESC 4	Set Active 40-column	CTRL-Q
ESC 8	Set Active 80-column	CTRL-R
	Deactivate 80-column mode	CTRL-U (not from keyboard)
	Scroll Display down	CTRL-V (cursor stable)
	Scroll Display up	CTRL-W (cursor stable)
	GOTOXY	CTRL-^ (not from BASIC)

Table 1: Edit Key Sequences

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System Requirements: 48K Apple® II Plus with 80 column card.

Editing Features

The Apple II gained early renown for its memory-mapped editing features. The ESCAPE editing is very simple. Touch the ESC key and then the I, J, K, or M and the cursor moves in the direction of the key pressed.

I

J ESC K

M

Until you press any *other* key than those four, each key moves the cursor and doesn't enter the key input buffer. Move the cursor around and then use the right arrow (CTRL-U) to copy what is visible on the screen into the input buffer. Change only that which is wrong, then press RETURN and the command executes properly. It saves lots of time reentering commands which have been mis-typed. It's a time saver.

Still, there are things that people didn't like about the II's editor. The lack of lower case has now been taken care of. But sometimes, while using the handy ESCAPE mode, you would get a SYNTAX ERROR, and couldn't tell why. A further annoyance on the II was that you couldn't tell, from looking at the cursor, what was going on. New editing features in the //e help a lot to ease this. They fall into three categories:

1. Visible prompt, identifying EDIT mode.
2. Additional editing keys and features.
3. BASIC entry Mode. (Restricted Case Mode)

Visible Prompt

In normal "INACTIVE" mode, the cursor is a small checkerboard square (we call ours "Sargon"), flashing under software control. Before initiating Active-80 mode, the screen editing features work precisely as they did with the II.

But after initiating Active-80 mode, more features are available on the //e. The cursor does not flash, but is a solid inverse block. When the ESC key is pressed, the cursor becomes an inverse " + " (like the Applewriter Edit cursor), until the ESC mode ends. You can tell whether you are entering commands or moving the cursor. This new feature I used most frequently. It is more precise than its predecessor and allows all four arrow keys to function as expected.

CTRL-K (up arrow)

I

CTRL-H (left arrow) J ESC K CTRL-U (right arrow)

M

CTRL-J (down arrow)

Since this keeps all previous editing traditions in place, the //e also maintains the earliest editing features for those who just can't break the habits developed on the original Apple II. Each of the following performs the cursor motion and then resets the " + " cursor mode, tedious but previously the only game in town.

The general trend of improvements in the screen editor is to take key sequences that required the ESC key and a separate key in two separate motions and execute them with a simpler CTRL-key sequence. Table 1 shows the original editing features, all still implemented, and their newer counterparts. There are unexplained redundancies here.

Restricted-case Mode

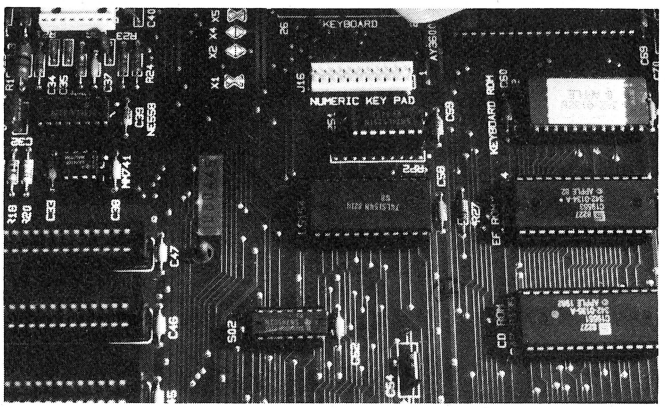
Apple's two "native" BASIC interpreters, Applesoft and Integer, won't accept lower case reserved command words. Yet the new upper and lower case display looks much nicer with upper-lower case prompts. So, writing a program which requires you to switch back and forth becomes confusing, or worse.

The //e's answer is "Restricted-case" mode, initiated by ESC-R from the keyboard. In restricted-case mode, all text entered is forced to uppercase mode *until the quote (") character is entered.* Then, lower case is accepted until a second quote is keyed. The first few times it felt strange, but then I realized how deft the solution was: make the *computer* keep track of when capitals are required. Use ESC-T to turn off restricted-case mode. When I worked with either BASIC, I didn't turn it off.

Active-80 and Active-40 Modes

All of the new editing features fall under the "Active" mode. There is a software switch to activate it, even without the presence of an 80-column card but it will most frequently be triggered by turning on Apple's 80 column card. This is done with a simple IN#3 or PR#3. (Note: *not* when another brand 80 column card is in regular Slot 3.) It selects 80 column mode, clears the screen selects the alternate character set (without FLASH, but with lower case INVERSE), and activates the expanded editing mode. Thereafter a simple CTRL-Q from the keyboard or printed to the video display will return to 40 columns with all of the "active" editing features in place. You can go back and forth by pressing CTRL-Q and then CTRL-R; a code-wise and visually interesting, but functionally useless experience. Once you have 80 columns and the editing features, you won't *want* to switch back to 40 column mode.

The screen editing features described above fall under a subheading of changes to the system Monitor. Programs which use the auxiliary memory area need to transfer information from main memory to the auxiliary and back. There are some tricky aspects of this and to reduce user difficulties, Apple has published the location and requirements of the routines AUXMOVE and XFER which are extensions of the system monitor. We'll get into those in a future issue of **Apple Orchard**; maybe even the next one.





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Software-Switches

The Apple //e has a number of "soft-switches".Most of these switches were designed into the II. A soft switch is a hardware feature which is enabled or disabled by reading data from or writing data to, specific memory addresses. This means that software can set hardware conditions: turn on a light, activate a stepper motor, read the setting of a switch, in general interact with the outside world.

The software switches in the //e include all switches found in the II, a good number of additional switches dealing with the augmented features, and the additional ability to read the state of the switches. The charts with this article are a handy reference.

Let's look at the switches one at a time. There is a number of switches which interact in subtle ways. We'll pay particular attention to bank-switched areas in a future issue.

ALTCHARSET: When you POKE or store information into the address C00F, the data is not retained at that address but the alternate character set is selected. To reselect the standard character set, and reenable FLASH mode, POKE or store data to $C00E. To find out what the present setting of the switch is, read $C01E or PEEK(49198) and if the result is greater than 127 (that is, the high bit is set) the switch is ON.

80COL: When on, contents of memory addresses $400-7FF from *both* main and auxiliary banks are combined to form 80 columns. Main memory contains horizontal character positions. Auxiliary memory contains even numbered character positions. Switching without proper adjustment of monitor activity leaves a portion of the screen updated and a portion left entirely alone.

80STORE: When 80STORE is off, RAMRD and RAMWRT work for the entire memory space from $0200-BFFF. When 80STORE is on, RAMRD and RAMWRT have no effect on the display page.

PAGE2: This switch, present in the II, acquires new meanings in the //e. Within either bank of memory, it will switch TEXT and graphics pages between the alternate addresses (See Reference Manual). But when used in conjunction with 80STORE ON, it ceases to switch between memory pages on a single bank and switches between the *same* address space on the *alternate* banks. This can easily be used by BASIC programs to directly access either bank of TEXT display or either mode of graphics.

ALTZP: The 6502 microprocessor which is the center of the //e and II makes very specialized use of the memory spaces $00-FF and $100-1FF. It is very desirable to have alternate "pages" which can be used with applications programs without disturbing system or language values. This alternate page also selects the alternate bank of $D000-DFFF memory. It is nothing for the unwary to play with, as an accidental switch without proper preparation will cause a permanent "Branch To Tall Grass" instruction to execute. Perform a cold boot.

RAMREAD: Use these settings to read data from either the main or the alternate bank of memory.

RAMWRT: Use these settings to write data to either bank of memory.

ALTCHARSET	ON	$C00F - WRITE - FLASH DOESN'T WORK
	OFF	$C00E - WRITE - FLASH WORKS
	STATE	$C01E - READ
80COLDISP	ON	$C00D - WRITE
	OFF	$C00E - WRITE
	STATE	$C01F - READ
80COLSTORE	AUXMEM	$C001 - WRITE
	MAINMEM	$C000 - WRITE
	STATE	$C018 - READ
ALTZP	MAIN	$C008 - WRITE (also switches in $D000)
	ALT	$C009 - WRITE (bankswitched locations)
	STATE	$C016 - READ
RAMREAD	MAIN	$C000 - WRITE
	ALT	$C003 - WRITE
	STATE	$C013 - READ
RAMWRT	MAIN	C004 - WRITE
	ALT	$C005 - WRITE
	STATE	$C014 - READ
SLOTC3ROM	SLOTROM	$C00B - WRITE
	INROM	$C00A - WRITE
	STATE	$C017 - READ
SLOTCXROM	CX00ROM	$C007
	INROM	$C006
	STATE	$C015 - READ
VERTICAL BLANKING		$C019 - READ

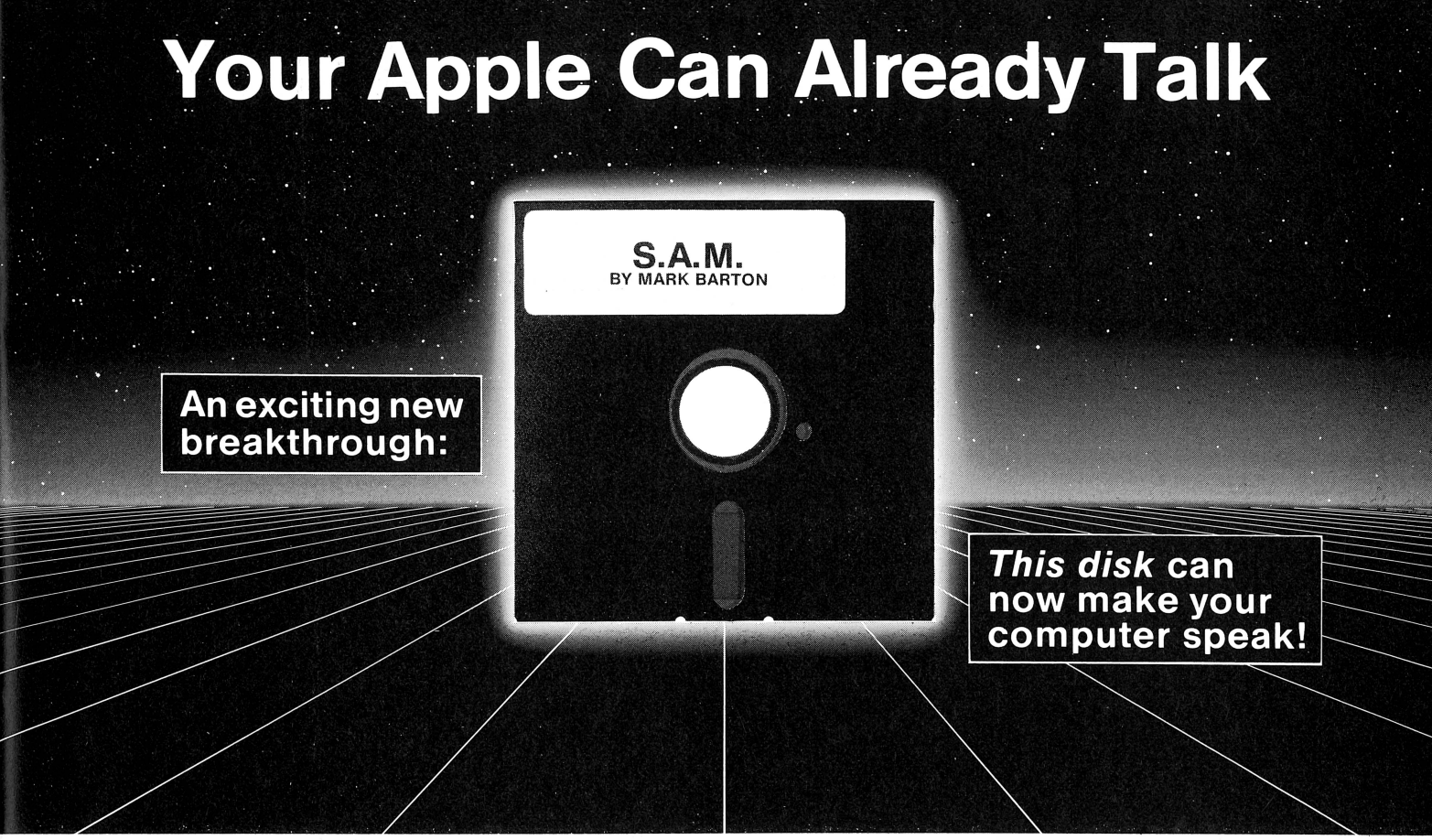
Softswitch Reference Chart

SLOTC3ROM: When this ROM is off, the Apple standard 256 addresses are assigned to each of the seven peripheral connectors. When switched on, a portion of the Internal ROM is enabled and mapped into the $C300-C3FF and $C800-CFFF ROM space.

SLOTCXROM: When on, selects the peripheral expansion ROM space $C800-CFFF and allows INTC3ROM to select between the standard mapping or the specialized combination of INTERNAL and EXPANSION ROM necessary to carry through all 80-column functions. When off, maps in the internal ROM from $C100-CFFF

VERTICAL BLANKING: This rather specialized signal has a very real value when used in conjunction with fast-switching graphics programs. It allows data to be written to memory mapped as graphics only during those periods of time when the contents of memory aren't actively being displayed. This allows smoother transitions.

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Talk is cheap

TO READ THE STATE OF ANY SOFTSWITCH
(If PEEK(memloc) > 127, it's true)
(high bit always means condition is true)

RAMREAD	$C013
RAMWRT	$C014
SLOTCXROM CX00ROM	$C015
ALTZP MAIN	$C016
SLOTC3ROM SLOTROM	$C017
80STORE	$C018
VERTICAL BLANKING	$C019
TEXT	$C01A
MIXED MODE	$C01B
PAGE2	$C01C
HIRES	$C01D
ALTCHAR	$C01E
80 COL DISP	$C01F

Documentation

The Apple //e comes with a single owner's manual, which describes unpacking, setup and general keyboard use. The Owner's Manual really does *show* how to open the box, pop the top, what things are where etc. It presents color pictures highlighted and with arrows pointing out specifics being discussed in text. Pictures show the use of a small hex nut tool ("The Apple Wrench") for clamping down cables etc. and I imagine lots of these little tools will be sold as extras. None were available at review time.

The Owner's Manual is only intended to get the reader using the system quickly, and expects the individual application software or hardware piece to document its own operation. This acknowledges that the //e is not intended primarily for programmers and hobbyists. It is aimed largely at a business, educational, and to a lesser extent, the scientific market.

According to Dave Larson of Apple's Marketing department, additional system documentation will be available for separate purchase. You buy only what you need. (I feel strongly that Applesoft documentation ought to be included since the language comes with the computer.) The additional documentation includes:
Applesoft Reference Manual
Applesoft Tutorial
//e Reference Manual
Integer BASIC
DOS Manual (comes with purchase of disk drives)
The Apple //e 80-Column TEXT Card Reference Manual
The Apple //e Extended 80-Column TEXT Card Supplement

As an early Apple II owner, I impatiently awaited the arrival of good documentation for the system hardware, Integer and Applesoft BASIC languages, and the disk operating system. I needed the information to make any real progress. As the Apple company grew, the documentation appeared in stages. I grew with the system and devoured documentation hungrily. It always seemed just barely enough. Not everyone had my interest, however; I will always remember a wonderful secretary I worked with who had been given the Apple II to solve a problem (I provided software). She sat and dejectedly looked at the stack of manuals, including the Application Manual I provided, and said "I don't have *time* to read all this. How am I going to get anything *done*?".

In increasing numbers, small computer owners want first of all to get something specific done. They don't begin with the impulse to explore and play. It may therefore be appropriate to provide the minimum documentation necessary to get specific tasks done. *Clear* documentation is better than *more* documentation, and the draft documentation I received for the //e is pretty clear indeed. (*We'll look at final documentation when released, and report on that too. —PCW.*)

Keyboard Tutorial

There is included a delightful self-paced keyboard tutorial program written by Bruce Tognazzini, which guides the novice through the initial intricacies of the computer keyboard, making full use of the Hi-Res graphics screen. It qualifies as excellent documentation; go through it as soon as you can. I sprung it on a total novice who was hostile towards any computers, anywhere. A few minutes later, he was grinning. *QED*.

Technical Terms

The //e Owner's manual does a fair job of introducing the hardware, using boldface type and a glossary to introduce words that describe new concepts. But new terms are not always defined on first use. Instead the user is expected to see the bold-face and go to the the glossary.

The //e Reference Manual we received didn't have all the pictures or diagrams in place. It had a wealth of information about the underpinnings of the system and will be reviewed on its own merits.

There are cogent arguments that all technical terms should be left out of user documentation. I disagree. Such comments intimate that everything can be described in terms of previous concepts. I think that there is no way to avoid introducing new concepts as more and more people begin using computers. It is handled, not sidestepped, in this documentation. The novice will still have to struggle a bit to understand the underpinnings, but all the information is there to be dug out.

Extended 80-Column Text Card Supplement

The "Final Draft" I received is very good, and professional programmers intending to use the added facility will do neither much, nor well, without learning its contents.

It is this Supplement which describes in detail how the alternate 64K of memory is organized, how the video circuits access the material for display, and which generally covers the territory of using the second 64K bank of memory. The diagrams I found were legible and useful but clearly destined for further artwork. We hope that no errors will be injected during that process.

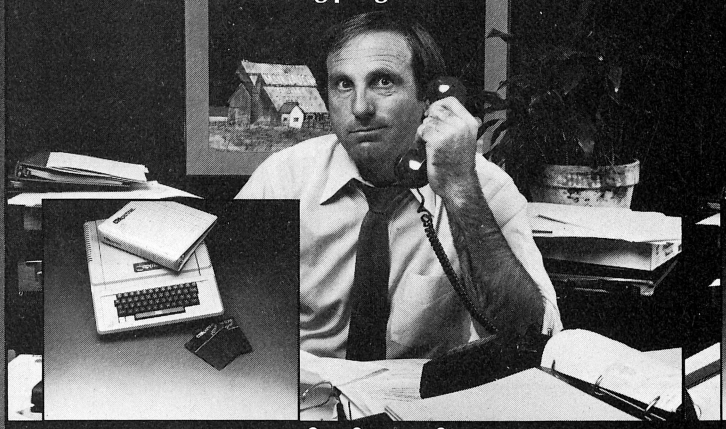
Among the things I couldn't evaluate yet was the 560-wide graphics display effect which can be achieved with the auxiliary card. Identical in concept to the 80 column display, the circuitry reads a graphic pixel from both memory banks at the same time and sequences the correct information into the stream of video information at the proper time.

The instructions for altering the Extended card did not identify what a "Molex-type" pin is, nor did a diagram point to it. The software is not provided to handle the double-wide graphics but I am sure someone (or several hundred graphics games companies) will spend an evening or two solving the problem.

Maybe it's time you took on a few partners

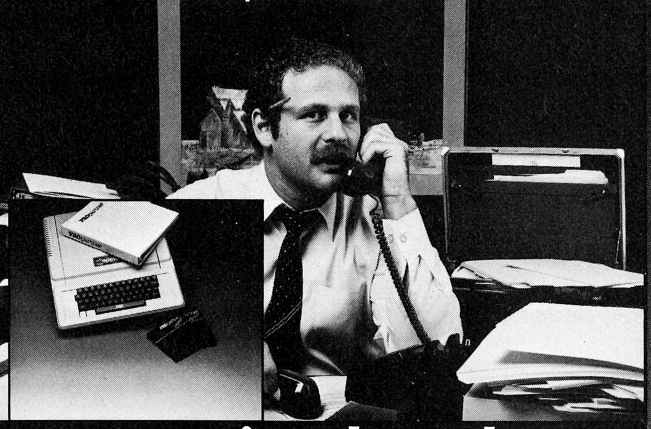
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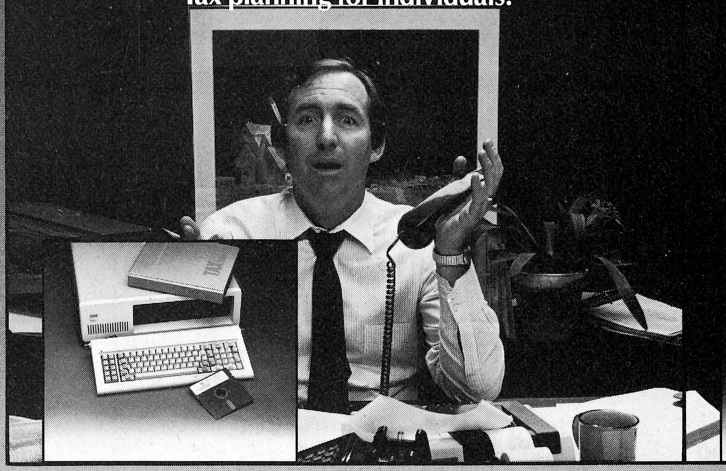
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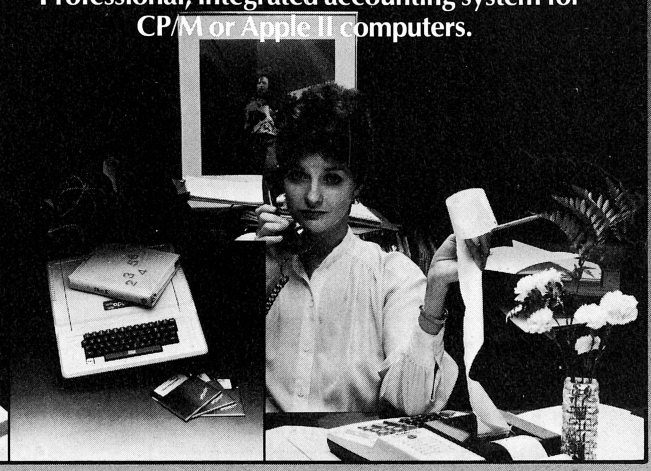
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Using Auxiliary Memory

Apple's documentation asserts that two banks of 64K don't really equal a 128K system. In a 128K system, all of the memory would be available to all parts of the system. But the //e's second bank of 64K cannot be used directly from BASIC or Pascal. The interpreters need the correct information in the specialized zero-page and stack ($100-1FF) areas which is not transferred when the banks are switched. I don't think it will take long for someone to work out an Assembler-based method of using it from BASIC, though. Otherwise why have the extra memory? The two main pieces of software being released with the //e, AppleWriter and QuickFile both make full use of the additional memory for storing text files and data.

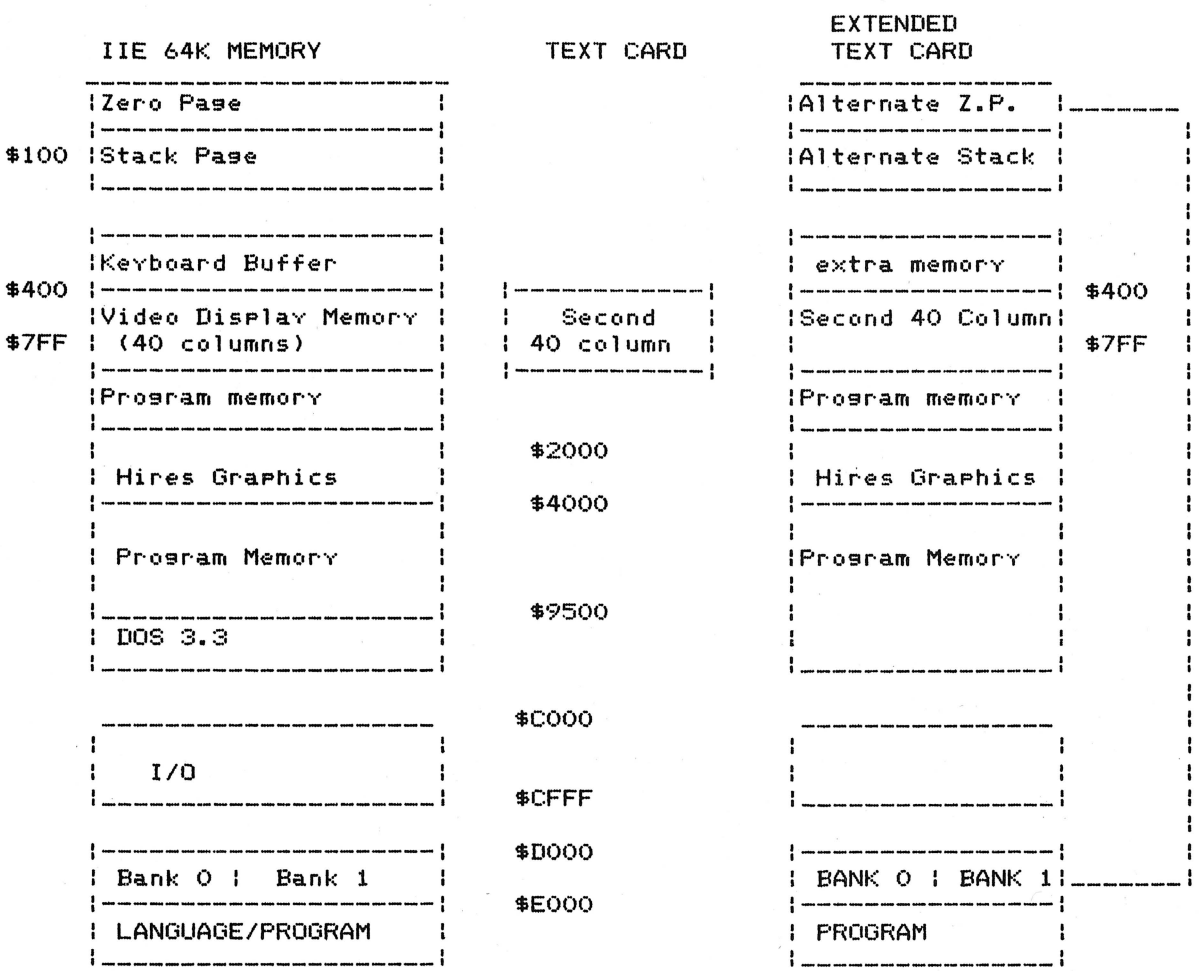
The supplement documentation comes with extensive information for the commercial programmer on how to identify which features are installed. The example programs are written in Assembler, BASIC and Pascal. We'll save these for future issues.

Temporary Conclusion

In the last few weeks I have had the opportunity to work with the Apple IIe, the German-made BASIS and the under-judicial-review Franklin 1000. All other legal questions aside, I think the Apple II genre of computers, coupled with the variety and quality of available software, will keep Apple II-compatible systems and software on the computer-store shelves for a long while. Apple's development of the //e has contributed greatly to increasing the overall viability and longevity of these machines.

Users may purchase these systems with confidence in continuing support, and software developers will be able to develop new products for a market which will continue to expand. Software sales will rise at a faster rate than ever. I look at the Apple II as the "Volkswagen bug" of computers. It adapts to a variety of situations. Parts are always available. There is always something to be done that has never been done before. It costs slightly more than the lower priced competitors but maintains a high resale value. I haven't seen many Apple IIs on the used computer market and none that aren't snapped up quickly. The //e's introduction will probably change that; *ce'st la vie.*

As an Apple II enthusiast, I welcome the continued vigor which the //e and other developments bring, and hope that those grumpy types who feel that the Apple II will, or should, fade away will find a (small) corner from which they can observe themselves being proven wrong.



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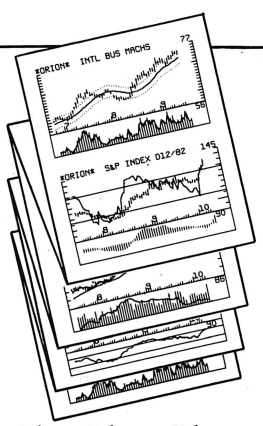
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TANSTAAFL
or, Compatibility and the //e

by Joe Budge and Penny Gallant
Apple Computer Inc.

TANSTAAFL (tan'sta.ful). abbr. 1.lit. "There ain't no such thing as a free lunch." (slang) 2. An expression which implies that all things have a cost.

The Apple //e is an enhanced version of the Apple II-Plus, but is it fully compatible with the II-Plus? Of course not; if it were, why then the //e would be a II-Plus, and what would be the point of a new version? Consider lower case letters, of which the //e has ample and the II-Plus has none. You can't just add lower case to a computer like a Continental spare tire to a trunk lid. Software must know what lower case looks like, what it means, and what to do with it. Software written for a computer without lower case letters probably won't have the foggiest idea what these little characters are all about. But people want computers with lower case. TANSTAAFL.

The majority of the 10,000-plus hardware and software products available for Apple II computers were designed for the Apple II-Plus. There naturally will be concern over what products are compatible with the Apple //e. TANSTAAFL means they won't all be.

In modernizing the Apple II-Plus, Apple has added a number of new features to the Apple //e. The new features required many changes in the computer's hardware and software. In return, the //e user has a machine which is more versatile, more reliable, and includes features long demanded by the user base. Other articles in this issue of **Apple Orchard** describe what the new features are. Here, we'll describe what the changes in the //e mean in terms of Apple II-Plus compatibility, some of the problems and their causes, and how to recognize them. We will also describe, as far as possible, how to make an Apple II-Plus function like an Apple //e.

In General

Despite the thrust of this article, we should state right off that most Apple II and Apple II-Plus software and peripheral cards work just fine on the //e. "Ah," you say, "what does '*most*' mean?"

Once the //e design settled down, Apple asked itself the same question. They commissioned the proverbial independent testing agency to find out. After testing hundreds of products for the II and II-Plus on the //e, the agency found that 78.4% worked as is, straight out of the box.

Now, this agency is fairly literal-minded. That is to say, they expected *all* the products to work *exactly* as their documentation described. If the documentation showed the RESET key in its proper place on the II-Plus, not its new place on the //e, or failed to specify that the software needs upper-case only letters, then they said the product "didn't work". Well over half of the problems they found were similar documentation or keyboard problems. These are easily solved by finding where the key has moved to on the //e. TANSTAAFL.

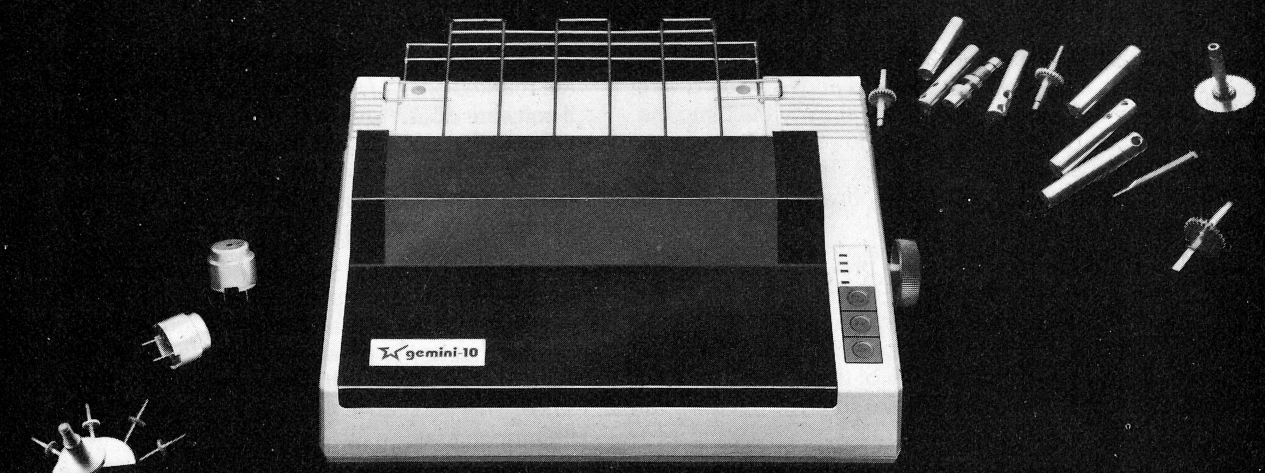
After allowing for the documentation and keyboard problems, only 8.8% of the products tested remained. These are the ones you would consider *real* problems. We won't itemize all of the Apple II-Plus software that works on the //e right now, however; that list would take up the whole magazine. Apple will be distributing the list to all Apple dealers so that you can check with an Apple dealer for product-specific information.

Hardware Incompatibility

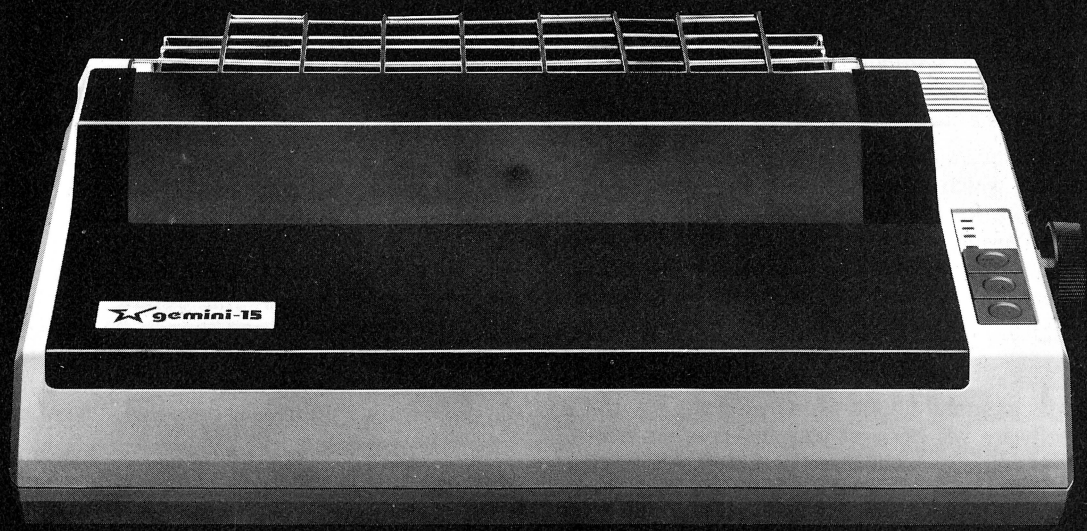
Hardware designed for Apple IIs may not work in the //e for basically two reasons: either it won't fit in the //e, or the software required for the hardware won't run in the //e. We'll deal with software incompatibilities in their own section. Here we'll just discuss hardware which, for one reason or another, doesn't fit in the //e.

The most likely hardware incompatibility you'll encounter will involve the new back panel of the //e. Rather than having vertical slots cut in the back of the case, as in the II, the //e has cutouts for connectors. This makes Apple much more popular with the FCC, that agency of the Federal Goverment which worries about radio and TV interference. The new back panel also makes interface cards much easier to connect to peripheral devices. Unfortunately, the connectors for some existing interface cards just don't fit into those cutouts. Short of taking up metalworking, the only cure is to make, or have someone make, an adapter cable for you.

The next most likely difficulty you'll find is that there isn't any place into which you can plug some hardware in the //e. Although Slots 1-7 are unchanged, most chips on the //e motherboard are different from the II-Plus. Consequently, hardware requiring a jumper or plug-in connection to a chip on



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the II motherboard won't be able to plug into the //e. The good news is that most, though not all, features added by hardware with this form of //e incompatibility are already built into the //e. For example, none of the upper/lower case hardware modifications for the Apple II can plug into the //e. This isn't a problem, though, since the //e already has upper and lower case built in.

This "chip incompatibility" is most prevalent among 16K memory cards and 80-column cards. (Remember, the //e is already a 64K machine.) While some cards in both categories operate without connections to chips on the II motherboard, the majority do. Some manufacturers of these boards will be supplying both II and //e versions. Make sure you get the right one.

Of course, any hardware destined for Slot zero on the II will have difficulty working on the //e. Slot zero on the //e has been replaced by a built-in Language Card. Memory cards which need no jumper cable to the motherboard will work in Slots 1-7 provided, however, that you have the software to run them. The card manufacturers usually supply this software. A word of caution is in order here: *The new auxilary slot in the //e is not the same as Slot Zero. Plugging any card not designed for the Auxilary Slot into it could damage the card permanantly.*

Software Incompatibility

The majority of software incompatibilities arise out of the //e's new keyboard, which includes upper and lower case letters. Some software for the Apple II rather unfortunately makes a number of assumptions about that older keyboard. Getting this software to work on the //e involves fooling the software into thinking it's dealing with an Apple II-style keyboard.

Upper/lower case incompatibilities show up when some Apple II programs demand input from the user via the keyboard. The software will beep at you and give an error message that reads something like "SYNTAX ERROR," "OUT OF RANGE," or "INVALID INPUT." This tells you that the software never thought it would receive lower case input. The cure for this is simple: press the ALPHA-LOCK key on the //e. Then all the alphabetic keys will be upper case only, just like the Apple II keyboard. You should be aware that this situation can occur not just with application programs; it is inherent in DOS, Applesoft, and Integer BASIC.

Many word processor users will want to use the full upper/lower case keyboard of the //e. In doing so, they will discover that most word processors for the II and II-Plus don't know what to do with lower case input. There's a trick which gets around this most of the time: before entering text in the word processor, give the computer the word processor's *software* command for alpha lock (don't press the key on the //e keyboard.) To generate lower case on a II or II-Plus, most word processors modify characters coming in from the keyboard which they expect to be upper case. But when the software is told to put upper case letters into text, word processors take unmodified characters from the presumably upper case keyboard. If the keyboard provides both upper and lower case, as does the //e, then both upper and lower case will end up in your text when the word processor thinks it's in caps-lock.

Including lower case on the //e keyboard required moving a number of characters around on the keyboard. Some characters used to sit on the same keys as letters. For example the right bracket ("] ") used to be a Shift-M. That won't work on an upper/lower case keyboard because Shift-M has to be a capital M. So all those special characters now have their own keys and are marked on the //e keyboard. The documentation for some II software doesn't refer to these special characters, instead it refers to the alpha character, like Shift-M. As a general rule, any Apple II software which refers to a shifted letter key is using a special character. Don't let this throw you, just find the new key on the //e keyboard.

While we're on the subject of the //e keyboard, there's an area where you need to be careful. The Apple II has a 'REPT' key which, when pressed simultaneously with any other key, causes that key to repeat. On the //e the 'REPT' key is gone. Instead all keys will start repeating if you hold them down for a while. This can cause unexpected results if you have heavyyy fffffinnngerssss.

A variety of software compatibility problems can arise out of the Monitor on the //e. In order to get self-test, lower case, and an 80-column card into the //e, Apple had to make a number of changes in the Monitor, which takes care of elementary housekeeping functions. Some copy protection schemes check to make sure that the computer is an Apple II-Plus. Software with this kind of protection scheme won't run at all on an older Apple II or on the newer //e because both have different monitors. Most software doesn't use this protection scheme, but check first.

Apple documented a number of entry points into the Monitor software for the benefit of assembly language programmers. All these documented entry points have remained the same in the //e, and the effects of the called routines are the same. The code between the entry points isn't necessarily identical, however. Any software which entered the Monitor at an undocumented point will behave unpredictably, which means literally anything can happen. If the software works fine in an Apple II or II-Plus but misbehaves strangely in the //e, this is most likely the cause. Interface cards which fit in the //e but still don't work right usually have this form of incompatibility.

The RESET key on the Apple II-Plus has long been a sore point with most Apple users. The key is right above the 'Return' key on the keyboard, so it's been quite easy to hit 'Reset' by accident. This problem has gone away on the //e. Apple moved the RESET key away from the rest of the keys. Unfortunately, some Apple II-Plus software will encounter new Reset incompatibilities on the //e. Reset on the Apple is designed so that software can control what happens when the user presses RESET. This is accomplished by telling the computer to execute a program in a certain portion of memory. In the Apple II-Plus, Reset left the Language Card alone, so a program could sit there waiting for Reset to come along. But the //e Resets the whole system, including the built-in Language Card. This means that any Apple II-Plus software which depends on the Language Card for its Reset functions won't work as advertised on the //e when RESET is pushed. Instead the //e is likely to freeze up or re-boot. There's not much you can do about this other than do a forced Reset on the //e (Control Open Apple Reset). Be careful with Apple II-Plus software which requires you to push RESET to get to a menu: the software might be incompatible with the //e. *(Using RESET regularly was never a good practice anyway, and never recommended —PCW.)*

Finally, there's a rather obscure software incompatibility you might occasionally see which involves the cursor. The cursor on the Apple II and II-Plus was a small blinking white square. On the //e it's a small checkerboard. A few Apple II programs used the cursor character for graphics displays. Needless to say, these graphics look substantially different with the checkerboard cursor.

A Note on 80-Columns

The Apple //e provides for a low-cost 80-column board which can be inserted in the Auxiliary Slot. Some advanced applications software for the Apple II will be incompatible with this 80-column card. The internals of virtually every model of 80-column board on the market for the II and II-Plus are unique unto themselves. Unless advanced software is written specifically for that board, it usually won't work. The 80-column board for the //e is no exception.

Most text-oriented applications written in Pascal will use the //e 80-column board. Pascal graphics are another story, however. When Pascal sees any 80-column board it automatically turns the board on. However, Pascal graphics can't use an 80-column board. As a consequence, Pascal graphics programs probably won't work if you have an 80-column board. This applies to Apple II's and II-Pluses as well as the //e.

What if I Have an Apple II?

Naturally enough, many Apple II or II-Plus owners will want many of the features available in the Apple //e. Some features are easily obtainable through products already on the market; in fact, many folks with Apple IIs already enjoy most of these features. Others, such as software access to video signals, can't be obtained without radically changing the computer's motherboard.

Don't try replacing a II or II-Plus motherboard with a //e motherboard. That won't work. The //e motherboard requires the //e keyboard. The //e keyboard, in turn, won't fit in the keyboard opening of a II or II-Plus. The //e has more keys and an offset RESET key. In addition, the //e keyboard mounts on the computer's base, not on the case as in the II and II-Plus. To fully modify a II into a //e you would need to replace the base, motherboard, keyboard, and case. In other words, you'd have to replace the entire computer except the power supply!

Short of buying a new computer, you might want to add some of the //e features directly to a II or II-Plus. There are many hardware products on the market right now which will do this for you.

As an Apple //e has built-in Applesoft, if you have an Apple II the first thing you need to do is to convert it into a II-Plus. This is easily done by replacing the Monitor and Integer BASIC ROMs on the motherboard with Applesoft and an Autostart ROM. Your Apple dealer can get these parts as service parts or you might already have them on an Applesoft card.

The next thing to do in adding //e features is to add a 16K card to Slot 0 on the Apple II-Plus. The //e has one of these built in; that's how it gets 64K of memory. Many different 16K cards are available on the market, most of which will be suitable. As long as the card reliably emulates the 16K of RAM in an Apple Language Card it will do.

An Apple //e supports upper and lower case letters which, of course, Apple II-Pluses don't. There are several hardware products which will add lower case to II-Plus. These fall into two categories: keyboard recoders and character generators. The keyboard recoders work to change the upper case output of the II-Plus keyboard into upper and lower case. Most of these also provide for full ASCII output from the keyboard. The Paymar Lower-case adapter is the pioneer here; Keymax-96 by Micromax and the Enhancer II by Videx both also fulfill this function. Your dealer can help you find these or similar products from other manufacturers.

You can't stop at modifying the keyboard in order to utilize lower case letters. Normally, Apple II's can only display upper case letters, even if the text is in lower case. Character generators provide lower case display of the characters once they've gotten into your Apple II-Plus. There are many character generators available on the market. Your dealer can help you find one for your Apple.

Character generators and keyboard recoders won't let you emulate the Open-Apple and Solid-Apple keys on the //e keyboard. That's really no problem, though, since these keys on the //e are connected to the pushbutton inputs on the Game I/O connector. With any game paddle or joystick, push Button 0 for Open-Apple and Button 1 for Closed- or Solid-Apple.

The other major change you can make to your Apple II-Plus is to add an 80-column card. At last count, there were at least 15 different 80-column cards on the market for the Apple II-Plus. As we mentioned above, most of them are different. Before you purchase one, list which software you intend to run on it. Then check with your documentation, your dealer, the software's manufacturer, or the manufacturer of the 80-column card to determine if the 80-column card you are considering is compatible with the software.

Finally, you might want to make a small change to the keyboard to add auto-repeat features similar to the //e's keyboard. The *Apple Tech Notes* describe a circuit you can build which adds auto repeat. If soldering isn't in your repetoire, the Repeaterrrr by High Order Micro Electronics provides an alternative.

One way or another, most of the //e features are available to you; but, as we said, TANSTAAFL.

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Diagnosing and Repairing Your Apple II

by Neil D. Lipson, P. E.

"I don't know what happened . . . it just hiccupped!. "After I run it for a while, it starts doing strange things." "It gronked . . . went out to lunch!"

Yes, Apples are very reliable machines, but every once in a while, you hear a statement like the ones above. Before you cart your computer off to the dealer for electronic R&R, let me tell you about many of the problems that I have heard about or have personally experienced, and how to correct them. This represents about 5 years of debugging and repairing these mostly faithful computers. I'll try my best to break them down into categories, but there will be some overlapping, so if you have a particular problem, just read on; chances are we'll come to it. By the way, many of these fixes also apply to the Franklin computer, for more or less obvious reasons.

Chip Problems - Oxidation and Dirt

One of the best things about the Apple is that they use sockets for mounting the integrated circuit chips, rather than soldering them directly to the large printed circuit motherboard. However, one of the worst things is also that they use sockets. In other words, sockets have tremendous advantages and disadvantages. Air and pollution can corrode the chip leads. Oxidation will build up and then something (or everything) will stop working.

The sockets make replacing chips a breeze, but you have to beware of certain problems. The constant heating and cooling of the components will cause the chip to slowly push its way out of the socket in time. Therefore, maybe once every 6 months, with the power off, place your left hand on the power supply to ground yourself, and push slowly and firmly on each chip with your right hand.

Don't push too hard or you'll put a strain on the circuit board (more on the board later). Pushing the chip cleans off the oxidation and good contact is made. Memory chips present the most problems. If possible, use the gold plated versions, and problems will be substantially reduced.

The Circuit Board

Unfortunately, the Apple II does not have enough strain reliefs below the circuit motherboard, and it will warp when pushed. Constantly pushing the board could break a trace, but this is rare. Solder joints also can make poor contact. I have heard of some masochistic technofreaks solving many problems by taking apart their Apples and touching up all of the solder joints with a soldering iron (with the chips removed, of course).

Chip Problems - Bent Pins

I had an intermittent problem with my Apple about 2 years after I purchased it. Whenever I pushed the memory chips in, the problem went away, but it got worse as time went on. I was sure I had a crack in the motherboard (from all of the years of pushing on it). I then proceeded to take the computer completely apart and inspect the motherboard. I took all the chips out one by one, and put them into conductive foam. The last chip I was about to remove was the 6502, which I hated to remove because of the difficulty of re-installing it, but if I was going to do any soldering, it had to come out. When I did remove it, to my amazement, there was a bent pin (completely bent 180 degrees up). At first I thought the wire broke off in the socket, but noticed that the pin was bent so tight, it looked like it was crimped. It had come from the factory like this, and it worked . . . just barely. My pushing on the board was just enough to flex the pin and give good contact. By the way, it was the Phase 1 timing pin.

I imagine that many Apples out there have some variation of this condition, but they are not creating problems now. These are time bombs, waiting to bedevil you in the future. How do you find them? If pushing on the board (always with the power off) solves the problem, poor pin contact could be the culprit.

Here's how to insert the chip so you do not bend any more pins. Push the chip in half way and stop. Look carefully at all of the pins (it only takes a second or two), and as long as they are all entering the socket straight, push them in completely. This almost guarantees a perfect installation. If you don't do this, it is only a matter of time until you bend one (it usually bends under the chip where you can't see it, and you never know it). Believe me, I bent many pins before adopting the careful approach.

Chip Problems - Timing and Other Failures

Interesting chip problems? As Jimmy Durante used to say, "I got a million of 'em!" But it's only a small percentage of all that exist.

If you ever have a problem with the Apple video, it could be one of the four 74LS161 chips to the right of the second 16K RAM row. If you replace any of them, replace all four with four chips from the same lot. Why? You're more likely to have timing problems when you mix lots.

Another sore spot is the four 74LS138 chips. If the specs are off, many peripheral cards will not work properly in your Apple (the Z-80 for example). Sometimes, just rotating the chips around will solve the problem. Some of the old Apples had the gray Korean ROMS. These always had problems. If your Apple has them they could cause problems. Some of the chips may have "LS" in the part number (such as 74LS138) on the board, but just "S" on the chip. If you replace them, replace with what is on the chip, not what is on the board. There is a difference.

If you ever put an EPROM in your Apple to replace the ROMS, assuming you rewire the EPROM, diagnose your RAM card. If some chips appear bad, the EPROM may be fighting the RAM chips (the Apple is selecting both). This can be solved with an inverter, or by using very low powered and slow Hitachi EPROMS. Sometimes, just rotating the memory chips on the RAM card will solve the problem.

Timing Problems - Keyboard and General

Apple has gone through a few revisions of keyboard and of motherboards in the history of the Apple II. A natural result is that some Apple keyboards will not all work with some motherboards. Timing is the problem. I saw a problem where the ":" and the "-" key and right arrow would auto repeat by themselves. When I pushed on the encoder board with my hand, it went away. The capacitance of my hand was solving the problem. The solution in this case (after all, I needed my hand for other tasks, like Control-P) were two 5 pf capacitors from ground to two of the pins on the encoder. I have heard of this problem from a few people.

Z-80 peripheral card can be a real headache. Microsoft put a small capacitor on their card to solve some problem, but this caused other problems (the capacitor affects the entire timing of the Apple). The Z-80 card causes an interrupt every fourth cycle, from what I understand, and timing problems will cause some Z-80 cards to work less than perfectly. This is much more apparent on the newer Apples with the RF shielding. It is also apparent with the Franklin Ace 100, but not so much with the Ace 1000. The solution is simple, if exasperating: just swap cards until you find one that works. Also because of timing problems, the Saturn 32K card will not work with the Franklin (according to Franklin themselves). This problem is being worked on.

I found that you can't always use the Andromeda RAM card for the 56K and 60K CP/M if your Apple has a timing problem. When I changed to Prometheus, it worked great. Nothing wrong with the Andromeda, but my Apple's, timing preferred the Prometheus (that was really a tough problem to find, by the way).

Incompatibilities in General

Many cards will not work with each other in the Apple. For example, the old high speed serial card in Slot 1 didn't work if there were more than 256 bytes of ROM on the card in Slot 2. The patch was a new P7-04 ROM available from Apple. The ROM Plus card could not be placed next to certain cards, or problems would develop. In some cases, a modem can be driven to your distraction when placed next to some other cards.

The First Aid Kit

The one person that I know who has spent more time on Apple repairs is Jerry White. Jerry has painstakingly put together what he calls the "First Aid Kit". It includes all of the chips except copyrighted ROMS, character generator, and one or two other chips. However, in general, it is quite complete. It includes a spike protector, a chip insertion and extraction tool, all of the Apple chips except those mentioned above, and one set of 16K chips. It also includes 2 of the most commonly burned out disk drive analog chips and other assorted goodies. It's a real bargain at $100. I would recommend that you get together with a few friends or within the User Group, and buy them as a small group. It is cheap insurance if there is ever a problem. Many of these chips may take quite some time to get when it is an emergency, and you'll pay a small fortune for one or more of them then. For information, contact Jerry White at 215-461-5058.

Heat Problems

If you don't have a fan on your Apple and you have more than 3 peripheral cards, you are asking for trouble. The power supply SCR's expand and contract with heating and cooling, and eventually the semiconductor junction will break, for example. Memory chips have many more "soft errors" at high temperatures, causing intermittent and frustrating flakiness. The constant heating and cooling will push the chips out of the sockets, and the chips in general will fail much faster. Please buy a fan. It is worth the investment.

Static Electricity

That's a subject worthy of a book; indeed, some have been written. But space here permits us to cover only a few pertinent points. If possible, use a static mat. I installed anti-static carpeting in our computer room, at a slightly higher price than regular carpeting. That will solve the problem. Spraying with STATIC-GUARD on the rugs also helps. Attach a ground wire from one of the screws under the disk drive case to the Apple Chassis ground. Believe it or not, if you touch the disk drive with static, the charge will go through the case to the read/write head, and will then proceed through the analog card to cause all kinds of problems. Static electricity degradation of electrical contacts is also common. One static charge may not completely eat away a part of an IC, but it will do some damage. This is very slight, but it is cumulative over time. The chip may fail a week or a month from now. Just because it works after being hit with a charge doesn't mean there is no damage. It's just biding its time.

Magnetic Flux

The video monitor or CRT is a real culprit for magnetic fluxes. These stray currents can erase your diskettes. How to find fluxes. One trick that I use is with a phone. Dial one digit to kill the dial tone and move the phone around the Apple. If you hear a buzz near the printer or CRT, then there is a magnetic field. By the way, be careful of that telephone if there's one near your computer most of the time. When the phone rings, a considerable flux will be generated, so don't keep the phone around the computer.

Conclusion

Well, not really a conclusion. I have gone over just a few of the more common problems that I know of in this first article. We plan to publish more of these artices as we hear of problems and fixes. You are invited to send me a letter describing what problem(s) you may have had, and how it was solved, if it was. Please send it to:

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Visicalc Tips and Techniques
Part 4: Overlays, DIF and Other Goodies

by Joseph J. Sobel and Barry D. Bayer

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Overlays

"Overlaying" worksheets can be a useful and time saving approach to preparing Templates. Overlaying is accomplished by loading two or more VisiCalc Templates onto the same Worksheet. In order to combine multiple Templates, you simply load more than one file into the same worksheet (VisiCalc screen) without clearing the screen between loads. However, several important rules must be remembered:

A. Data in the previously loaded Template will be replaced by data contained at those Cell locations in the Template currently being loaded. For example, if Template 1 contains data in Cell B4 and Template 2 also contains data in B4, the data in B4 of Template 2 will replace the data contained in RAM for Cell B4. Of course, any data in Template 1's disk file denoted as Cell B4 will remain intact on the disk. Figure 6 will illustrate this.

Note that Template 2 in Figure 6 contained the "ITEM" labels and numbers in column A. This was included merely to facilitate a comparison of the two Templates. Template 2 could have contained only the value 7778 in Cell B4.

B. Data in Template 1 will *not* be eliminated by blank cells at the same coordinates in Template 2.

Note that the data in the second Template in Figure 7, Coordinates B4 through B7 were inserted in the "combined" Template without disturbing the data in Cells B1 through B3 of Template 1. Remember, the data to be overlaid from the second template must be contained in the same coordinates in which they are to be entered in the first Template.

TEMPLATE 1

	A	B
1	ITEM 1	2334
2	ITEM 2	456
3	ITEM 3	398
4	ITEM 4	447
5	ITEM 5	6748
6	ITEM 6	765
7	ITEM 7	1110

TEMPLATE 2

	A	B
1	ITEM 1	
2	ITEM 2	
3	ITEM 3	
4	ITEM 4	7778
5	ITEM 5	
6	ITEM 6	
7	ITEM 7	

COMBINED TEMPLATE

	A	B	
1	ITEM 1	2334	
2	ITEM 2	456	
3	ITEM 3	398	
4	ITEM 4	7778	<-------
5	ITEM 5	6748	
6	ITEM 6	765	
7	ITEM 7	1110	

Figure 6: Overlays for Data Replacement

TEMPLATE 1

	A	B
1:	ITEM 1	4278
2:	ITEM 2	3333
3:	ITEM 3	2256
4:	ITEM 4	
5:	ITEM 5	
6:	ITEM 6	
7:	ITEM 7	

TEMPLATE 2

	A	B
1:	ITEM 1	
2:	ITEM 2	
3:	ITEM 3	
4:	ITEM 4	9328
5:	ITEM 5	1476
6:	ITEM 6	1212
7:	ITEM 7	8787

COMBINED TEMPLATE

	A	B
1:	ITEM 1	4278
2:	ITEM 2	3333
3:	ITEM 3	2256
4:	ITEM 4	9328
5:	ITEM 5	1476
6:	ITEM 6	1212
7:	ITEM 7	8787

Figure 7: Overlays Combining Data

C. Format Commands contained in otherwise "blank" Cells will add the Format Commands to labels or formulas contained in the previously loaded Template, without disturbing the contents of those coordinates. For example, see Figure 8.

This can be a great timesaver if you must add Format Commands to a series of Cells already containing data you don't want to destroy. First, save your existing Template and then clear the screen. Now, set up the Format Commands in the appropriate Coordinates on the blank Template as follows:

>B1:/FI
/R:B2.B3

Now reload the original Template. Again, remember that the second Template need only contain the data, formats or other information you want to *add* to the Template. In the example above, the Format Commands are shown in the square brackets.

D. Blank Cells in the previously loaded Template will be filled with data contained in the same Coordinates in the Template currently being loaded. This is basically the reverse of the examples shown in Paragraph B above.

TEMPLATE 1

	A	B
1:	ITEM 1	1222.31
2:	ITEM 2	3239.2
3:	ITEM 3	1510.76

TEMPLATE 2

	A	B
1:		[/FI]
2:		[/FI]
3:		[/FI]

COMBINED TEMPLATE

	A	B
1:	ITEM 1	1222
2:	ITEM 2	3239
3:	ITEM 3	1511

Figure 8: Overlays to Format Data

There are many uses for overlaying Templates. An example of a practical application of Template overlays is a Standard Bill of Material. Such an application of this technique could also apply to other areas where price lists are used. A standard "price list" template containing part numbers and unit prices can be prepared. The price list should be in ascending order, by part number, so you may use the list as the basis of a lookup table. This Template would be updated periodically for changes in current prices. Another Template, representing the Bill of Material or Job Cost sheet, would contain formulas referencing the appropriate Coordinates of the price list. Alternatively, the Bill of Material Template could reference the prices as Lookup tables. Here is a simplified sample Price List:

	A	B
1:	PART NO.	UNIT PRC
2:	---------	---------
3:	11475	21.85
4:	11476	1.01
5:	11477	4.56
6:	11478	10.78
7:	11479	5.55
8:	11480	7.87
9:	11481	[@ERROR]

Figure 9: Price List

The Bill of Material Template containing the list of items comprising the product, exclusive of labor, for this example, might look like Figure 10.

```
     A          B          C          D          E          F
1:                      PRODUCT #1123
2:                      BILL OF MATERIAL
3:
4:                      PART NO.  QUANTITY UNIT PRC  EXTD PRC
5:                      --------- ---------- --------- ---------
6:                         11476          6 [Note A]  [+D6*E6]
7:                         11478          3 [Note B]  [+D7*E7]
8:                                                    ---------
9:                      TOTAL MAT'L COST              [@SUM(F6.F7)]

          Note: [A] The formula contained in this Cell is:
                    @LOOKUP(C6,A3...A9)
                [B] The formula contained in this Cell is:
                    @LOOKUP(C7,A3...A9)
```

Figure 10: Bill of Material

The formulas in brackets represent the Cell contents. As shown here, the templates have not been combined. The following example reflects the combination of both templates into a single sheet which also reflects the results of the formulas contained in the cells in columns E and F. See Figure 11.

Although this is a rather simplified version of a Bill of Material, it illustrates the manner in which you may use this technique. Additional Lookup tables for labor rates, etc. may be included so that labor, materials and any other necessary items may be included in the complete Bill of Material. Templates such as this may be used to compute numerous types of standard repetitive formulas.

```
     A          B          C          D          E          F
1:  PART NO.   UNIT PRC  PRODUCT #1123
2:  ---------  ---------  BILL OF MATERIAL
3:  11475         21.85
4:  11476          1.01  PART NO.  QUANTITY UNIT PRC  EXTD PRC
5:  11477          4.56  --------- ---------- --------- ---------
6:  11478         10.78     11476          6      1.01      6.06
7:  11479          5.55     11478          3     10.78     32.34
8:  11480          7.87                                   ---------
9:  11481       [@ERROR]  TOTAL MAT'L COST                   38.40
```

Figure 11: Overlaid Bill of Material and Price List

Data Interchange Format (DIF)

One of the more interesting developments to appear in the upgraded DOS 3.3 version of VisiCalc, was the introduction of the Data Interchange Format, or DIF, as it is known. The VisiCalc manual introduced DIF with a long technical explanation better understood by, and possibly directed to, experienced programmers. The discussion of Vectors, Tuples, Headers and Data was somewhat disheartening to the average business user and other non-programmers. This situation was not aided by a rather technical article which appeared in *BYTE Magazine* in November, 1981.

VisiCalc users decided that it would be handy to place VisiCalc-developed information into data bases, graphing and analysis programs, and to take data from these same sources, and manipulate them in VisiCalc. But they hoped that programmers would read the technical data provided by Software Arts, Inc. and then develop programs utilizing this type of transportable data. Many of us forlornly put aside any hope of being able to use DIF, ourselves.

Well yes, DIF is complex! But DIF is also very useful in manipulating VisiCalc data and in moving data between different Templates, and between different sections of the same Template. Using DIF in this manner is really pretty easy. Although a technical explanation is not really required to use DIF in a strictly VisiCalc environment, the balance of this section may help the reader to understand how DIF works, and its capabilities. Such an understanding will aid those with programming backgrounds or abilities to further manipulate these files. Others who have little or no interest in programming may benefit from a general understanding of DIF and may find additional DIF applications in their own work based upon this expanded knowledge. Readers with a consuming technical curiosity about the internal workings of DIF should consult the VisiCalc user manual, and the *BYTE* article; readers without any curiosity at all should skip to the next section.

When VisiCalc saves a DIF file, it first converts all of the formulas and referenced values in the saved portion of the file into fixed numeric values. Thus, a formula like **@LOOKUP (A1,B17 . . . B33)** will be evaluated to "765.32", "ERROR" or whatever, and that *value* will be saved to disk rather than the formula. The name of the process, after all, isn't FIF. Ah, but to have FIF!

VisiCalc thinks of both Values and Labels as being organized into Vectors or Tuples, rather than Rows and Columns. But

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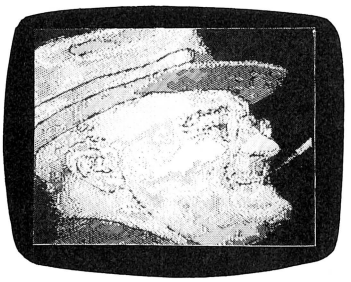
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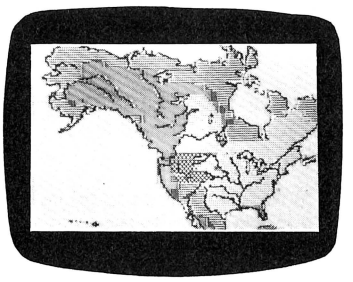
Take a look at some of our programs for APPLE II computers:

MEET THE PRESIDENTS



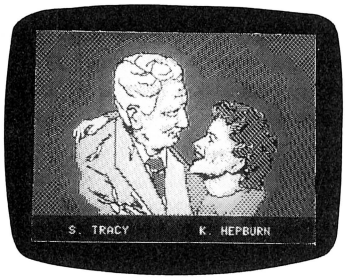
Questions that test the student's knowledge accompany a portrait of each president drawn by artist Saul Bernstein. Questions can be changed by the teacher to include any subject matter.
$39.95 4 Disks

GLOBE MASTER II



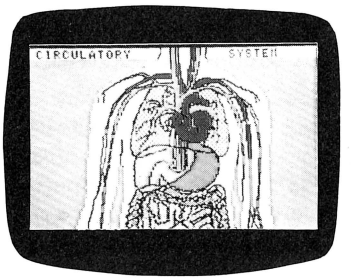
Nine full color maps aid in teaching lessons of geography. Questions cover all continents. Choose any one of nine subjects.
$39.95 1 Disk

HERE'S HOLLYWOOD



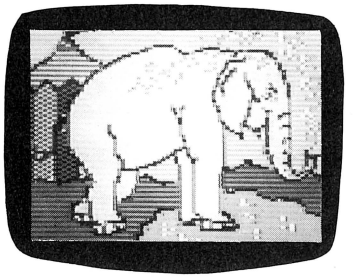
Knowledge of the Hollywood stars is tested by questions on 24 Academy Award winning stars. Questions may be modified as in MEET THE PRESIDENTS.
$24.95 2 Disks

ANATOMY I



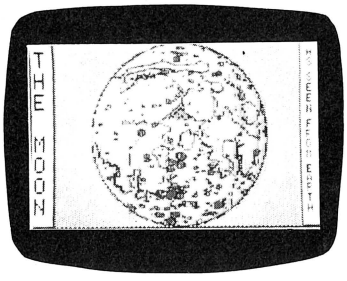
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don't get put off by these strange sounding names that must have come from some obtuse scientific discipline. Tuples and Vectors are like Rows and Columns, but are relocatable as to absolute location, and as to vertical and horizontal orientation. Each Tuple has an entry (although possibly an entry with a zero value) corresponding to each Vector. All of the Vector entries comprising a single Tuple are placed together.

In case the preceding paragraph is not perfectly clear, let's try an example. The Data in a typical DIF file might look like this:

Beginning of First Tuple:
Vector A Data
Vector B Data
Vector C Data

Beginning of Second Tuple:
Vector A Data
Vector B Data
Vector C Data
. . . and so on.

Indeed, it is possible to refer to a piece of data as being in the First Tuple and the Third Vector, just as it is possible to think of data in the 17th Column and the 50th Row.

Rows are always horizontal, and Columns are vertical, but DIF Tuples may be either, although if a Tuple is Vertical, the Vectors are, of necessity, horizontal. And vice-versa. Tuples can be placed anywhere in the VisiCalc workspace, although always in the same relationship relative to their corresponding Vectors. Thus values that had been sitting in Columns A, B and C, Rows 1 to 10, may be transferred to Columns X, Y and Z, Rows 25 through 34, or even to Columns X through AG, Rows 1, 2 and 3.

As part of a DIF save command, VisiCalc requests the user to specify save in C (for Column) or R (for Row) order, or just with «**RETURN**». When «**RETURN**» is pressed without specifying Row or Column order, DIF thinks of Tuples as Corresponding to Rows, and the Vectors as corresponding to Columns. The same is true for a DIF save in R (for Row) order. When C for Column is specified, however, Tuples become vertical and Vectors horizontal.

Let's look at an example.

	A	B	C	D
1				
2		COLUMN1	COLUMN2	COLUMN3
3	ROW1	1	2	3
4	ROW2	2	3	4
5	ROW3	3	4	5
6	ROW4	4	5	6
7	ROW5	5	6	7
8	ROW6	6	7	8
9	ROW7	7	8	9

Figure 12: DIF Data

Figure 12 is a simple Template, with both labels (the words 'ROW?' and 'COLUMNS?') and numbers. The following sequence of commands:

> A2:/S # S (Filename) «RETURN»
D12 «RETURN»

will save the Template in DIF format, with the Rows becoming Tuples, and the Columns becoming Vectors. The beginning data would look like this:

```
BOT
"
COLUMN1
COLUMN2
COLUMN3
BOT
ROW1
1
2
3

BOT
ROW2
2
3
4
```

. . . and so on

When the DIF file is loaded (**/S # L**) with the «**RETURN**» answer to the C, R or Return question, it will be entered into the grid in exactly the same way, Tuples across, and (necessarily) Vectors down.

If we were to DIF save the same data in Figure 12, in a C for Column format, the DIF file would look a bit different, because VisiCalc would have treated the Tuples as being Vertical, instead of Horizontal. Thus, the results of a Column save would look like this:

```
BOT
"
ROW1
ROW2
ROW3
ROW4
ROW5
ROW6
ROW7

BOT
COLUMN1
1
2
3
4
5
6
7
```

. . .and so on

Notice that in our example, C format will result in fewer, longer Tuples (and more, shorter Vectors) than the R or «**RETURN**» format. This factor may be of some interest if disk space is at a premium, as the more Tuples there are in a file, the more BOT's (Bottom Of Tuple) will be present, which may result in a slightly larger disk file.

If we were to reload the example we saved in Column format, but reload it in Row format, VisiCalc would look at the first Tuple, and display it across a number of Columns, in one Row, so that the Template would look like Figure 13.

In effect, we have accomplished a ninety degree rotation of the template. This exercise is very useful if you are taking information from a template that is organized vertically, and

```
    ____A_____B_____C_____D_____E_____F_____G_____H____
 1¦
 2¦              ROW1    ROW2    ROW3    ROW4    ROW5    ROW6    ROW7
 3¦ COLUMN1       1       2       3       4       5       6       7
 4¦ COLUMN2       2       3       4       5       6       7       8
 5¦ COLUMN3       3       4       5       6       7       8       9
 6¦
 7¦  ...and so on
 8¦
```

Figure 13: DIF Data Reloaded by Rows

placing it into a template with a horizontal orientation. But, as should be obvious by now, a DIF saved file will come out looking the same as it went in, if you load it in the same Row or Column order in which you saved it.

We suggest that all DIF saves be in the default «**RETURN**» format. Then, if you wish to change the format (rotate the file 90 degrees), reload it in "C" format. That's not quite the intent of the programmer, but it makes a lot of sense to us.

Now that we know how to use DIF, we can proceed to why we should use DIF. First, consider the common requirement to "roll" statistics from the end of one month, to the beginning of the next month. Figure 14 represents a common template which has a "balance forward" in Column C, entries for the current month in Column D, and a cumulative year to date in Column E.

```
    ____A_____B_____C_____D_____E_____F____
 1¦                BALANCE CURRENT    YEAR
 2¦                FORWARD   MONTH  TO DATE
 3¦  ITEM 1           1000    1321     2321
 4¦  ITEM 2            110    1009     1119
 5¦  ITEM 3          23212    2321    25533
 6¦  ITEM 4            321      19      340
 7¦                 -------  -------  -------
 8¦ TOTALS           24643    4670    29313
 9¦
```

Figure 14: Rollover Example, Month 1

Each Cell in Column E follows the format:

> E4:(C4 + D4).

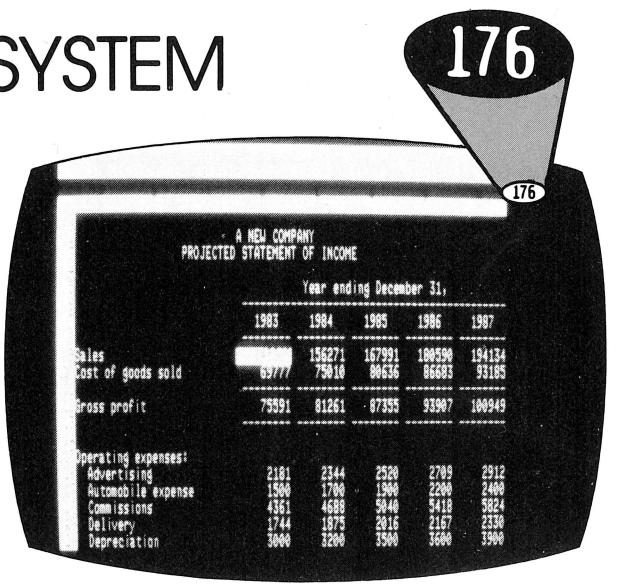
Figure 15 shows the same Template ready for the next month. Column C has last month's Year to Date and Column D is blank, ready for data entry. Column E has the Previous column added to the "0s" in Column D.

```
    ____A_____B_____C_____D_____E_____F____
 1¦                BALANCE CURRENT    YEAR
 2¦                FORWARD   MONTH  TO DATE
 3¦  ITEM 1          2321             2321
 4¦  ITEM 2          1119             1119
 5¦  ITEM 3         25533            25533
 6¦  ITEM 4           340              340
 7¦                 -------  -------  -------
 8¦ TOTALS          29313            29313
 9¦
```

Figure 15: Rollover Example, Month 2

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The big question is 'How do you get the Column E information from Month 1 into Column C for Month 2?'

The first possibility is to Replicate E to C, but this will result in circular references, as the formula "C4 + D4" is placed into C4, which again is reflected back into E. (Try it and you'll see what we mean.)

Next, we could Move E to C, but this doesn't work either. Nor does a move, combined with a Delete of Column D. VisEXEC commands, as outlined in another section of this article, can do the job, but unless one has and is using VersaCalc they can be time consuming to set up. They are very easy to use once you have learned and mastered the technique. And of course, one could take the previous month's printout and simply type last month's Column E into next month's Column C. Sound primitive? Well, this was the "state of the art" with Version 1.37 and earlier versions of VisiCalc.

With the introduction of DIF in the 193 and later versions, we can do the job, directly. (Let us take this opportunity to repeat a warning. Version 193 is defective. If you use it with DIF files, you may lose the data on your disk. We think VisiCorp should give you a 202 or later version, free, but if you have to buy one, or pay an upgrade fee, do it. It's definitely worth it.)

> E4: /S # S: ROLLOVER.DIF:F8 «RETURN»
> C4: /S # L: ROLLOVER.DIF: «RETURN»

The first line DIF-saves the appropriate portions of Columns E and F (blank Cells). The "totals" Cells are not appropriate, and not really needed, as we will reload this same data back into a template which will have its own @SUMs. Remember that DIF saves *values* and not formulas, so that all forward reference problems are removed. In saving not only Column E, but also Column F, we are saving a group of "blank" Cells, immediately to the right of the cumulative total Cells we wish to move.

The second line DIF-loads our file into the C and D Columns, not only loading last month's cumulative totals into next month's previous column, but also blanking out last month's entries, so that Column D is fresh for entering this month's statistics.

A second use of DIF is in consolidating several identically formatted reports into a single "total" report. Let us assume a retailer with stores in New York and Chicago, is selling 3 colors and 4 sizes of a particular item. The New York report for October, 1979 might have looked something like Figure 16:

	A	B	C	D	E
1					
2		NEW YORK INVENTORY OCTOBER, 1979			
3					
4	COLOR		BLUE	GREEN	YELLOW
5		SIZE			
6		6	13	13	12
7		8	8	23	15
8		10	34	13	7
9		12	12	6	4
10					
11	TOTALS:		67	55	38

Figure 16: New York Inventory

The Chicago report would have the same structure, but different quantities:

	A	B	C	D	E
1					
2		CHICAGO INVENTORY OCTOBER, 1979			
3					
4	COLOR		BLUE	GREEN	YELLOW
5		SIZE			
6		6	10	5	3
7		8	20	12	7
8		10	30	7	5
9		12	40	3	16
10					
11	TOTALS:		100	27	31

Figure 17: Chicago Inventory

We would like to be able to consolidate the two reports, to look like Figure 18.

	G	H	I	J	K
1					
2		COMBINED INVENTORY OCTOBER, 1979			
3					
4	COLOR		BLUE	GREEN	YELLOW
5		SIZE			
6		6	23	18	15
7		8	28	35	22
8		10	64	20	12
9		12	52	9	20
10					
11	TOTALS:		167	82	69

Figure 18: Combined Inventory

Once DIF is understood, the process is simple, albeit a bit confusing. Now let's look at the actual steps necessary to utilize the DIF rollforward:

1. DIF-save the Chicago data under the name CHICAGO.DIF; upper left is C6 and lower right is E9. (Note that there is no good reason to save the 'TOTALS' Row, which are just @SUM formulas.)

} C6: /S # S: OCTOBER.CHICAGO: E9: «RETURN»

2. DIF-save the New York data, the same way.
3. Clear the screen (/**CY**) and enter the following commands:

> I6: (A6 + D6)
> I6: /R: I7.I9: RR
> I6: /R.I8: I6.K6:RRRRRR

Enter the report headings and line descriptions in Columns G through K, Rows 1 through 5. Also, enter the Sizes in H6 through H9 and the TOTAL label on Row 11. Now enter the **@SUM** formulas at I11 to K11. The result of all of this is a template which will add the contents of A6 to D6 (the first data columns, BLUE, of the New York and Chicago Templates) and place it in I6, A7 and D7; and place it in I7, and so forth. Save this Template (/**SS**) under the name Consolidate for future use.

4. While Consolidate is still on the screen, DIF-load CHICAGO.DIF starting in A6 and NEWYORK.DIF at D6.

You now have a Template reflecting the consolidated New York and Chicago inventory figures.

Of course, these few examples have not fully explored the capabilities of DIF. However, we hope that your Fear-of-DIF has been alleviated, and that, as with the rest of VisiCalc, you will be able to solve your own problems with it.

VisEXEC Files

Consolidating files may also be accomplished with VisEXEC files. These are text files 'Printed to Disk' from a VisiCalc Template as standard DOS text files. Let's assume the same facts as those of the retailer above. The New York and Chicago stores submit their inventory reports on VisiCalc Templates. However, in this case, each store's Templates are contained on a different series of Rows. This will allow the Templates to be overlaid and the data from each combined into a consolidated matrix. The New York report would appear just as it did in the DIF example above and is shown here as Figure 19.

	A	B	C	D	E
1					
2		NEW YORK INVENTORY OCTOBER, 1979			
3		==========	==========	==========	==========
4	COLOR		BLUE	GREEN	YELLOW
5	SIZE				
6		6	13	13	12
7		8	8	23	15
8		10	34	13	7
9		12	12	6	4
10			------	------	------
11	TOTALS:		67	55	38

Figure 19: New York Inventory

The Chicago report would begin on Row 13. Rows 1 through 12 would be left blank and the report would appear as shown in Figure 20.

	A	B	C	D	E
13					
14		CHICAGO INVENTORY OCTOBER, 1979			
15		==========	==========	==========	==========
16	COLOR		BLUE	GREEN	YELLOW
17	SIZE				
18		6	10	5	3
19		8	20	12	7
20		10	30	7	5
21		12	40	3	16
22			------	------	------
23	TOTALS:		100	27	31

Figure 20: Chicago Inventory

Now, a series of VisiCalc commands would be entered as text on a blank VisiCalc worksheet. The commands will contain leading zeros in order to 'fill' space, as required, to right justify the text when entered into a Template with a Global Column Width of 3. This file can actually be built from a 'Code' file contained on the VersaCalc 16 Utility disk. VersaCalc 16 is a product of Aurora Systems, Inc. The VersaCalc 16 Tutorial disk and the documentation explain the use of these Print to Disk files and the related syntax in great depth. When completed, the file appears as follows:

```
>C30:+C0006+C0018
>C31:+C0007+C0019
>C32:+C0008+C0020
>C33:+C0009+C0021
>D30:+D0006+D0018
>D31:+D0007+D0019
>D32:+D0008+D0020
>D33:+D0009+D0021
>E30:+E0006+E0018
>E31:+E0007+E0019
>E32:+E0008+E0020
>E33:+E0009+E0021
```

Figure 21: "Combining" Commands

This VisiCalc Template would be Printed to Disk (see your VisiCalc manual for instructions on Printing to Disk) and also saved in the normal manner with /**SS**. The /SS file can be used in the future if line numbers are to be added or deleted from the format. This will save the time necessary to fully reconstruct what may be a rather large file.

The New York and Chicago reports would then be overlaid onto a blank Template and the Print to Disk file would be loaded with the /**SL** command. As the file is loaded, each line would be executed as if it were keystrokes being entered at the keyboard. The first line of this file would cause the VisiCalc Cell Cursor to **GOTO C30** and enter the formula + C6 + C18, thereby combining the New York and Chicago inventory of Blue, Size 6 and entering the result at C30 in the Combined Report. Each subsequent line would be executed until the entire Combined Report was completed. Figure 22 is an illustration of the Completed report reflecting the overlaid New York and Chicago reports and the Combined report.

	A	B	C	D	E
1					
2		NEW YORK INVENTORY OCTOBER, 1979			
3		==========	==========	==========	==========
4	COLOR		BLUE	GREEN	YELLOW
5	SIZE				
6		6	13	13	12
7		8	8	23	15
8		10	34	13	7
9		12	12	6	4
10			------	------	------
11	TOTALS:		67	55	38
12					
13					
14		CHICAGO INVENTORY OCTOBER, 1979			
15		==========	==========	==========	==========
16	COLOR		BLUE	GREEN	YELLOW
17	SIZE				
18		6	10	5	3
19		8	20	12	7
20		10	30	7	5
21		12	40	3	16
22			------	------	------
23	TOTALS:		100	27	31
24					
25					
26		COMBINED INVENTORY OCTOBER, 1979			
27		==========	==========	==========	==========
28	COLOR		BLUE	GREEN	YELLOW
29	SIZE				
30		6	23	18	15
31		8	28	35	22
32		10	64	20	12
33		12	52	9	20
34			------	------	------
35	TOTALS:		167	82	69

Figure 22: Combined Inventory

VisEXEC files provide a means to circumvent several of VisiCalc's inherent limitations such as circular references and lack of consolidation functions. With the advent of DIF in the DOS 3.3 version, some of these problems were solved. However, both of these methods continue to serve useful purposes. When space is a major limiting factor and circular references are your problem, VisEXEC may be the answer, since you do not need an interim accumulation matrix that would be required with the DIF method. DIF may be advantageous when you wish to provide the interim matrix for documentation purposes.

We hope that the techniques we have discussed in these articles will provide you with the tools and the insight necessary to utilize VisiCalc more effectively, and to save you considerable time in developing more meaningful applications. Your questions and comments are invited.

Reviews:

SNAPPER and CHOPLIFTER

by Jo Ann Shane

I'm a "game-aholic", so when I arrived at my office the other day and found a stack of game disks that seemed to mysteriously appear I was, of course, elated. But then reality was thrust upon me: I had to *review* all these games, not just play them. Here are two from the stack. First, I turned on . . .

Snapper

. . . by Silicon Valley Systems of Belmont, Ca. Once the game started, all thought of reviews was gone and all I worried about was getting caught by a Whirler or being annihilated in the Gamma Field, or heaven forbid, that I would run out of time before I could get recharged at my base.

The game offers the option of using a joystick or 4 keys on the keyboard. The 4 keys used are **N** for up, **M** for down, **,** for left and **.** for right. By choosing these keys you can use one hand and easily manipulate the Snapper.

For the adult player the instructions are very clear and concise, however for the juvenile player there could be a need to have the instructions read to them (which will probably be followed by the juvenile player explaining the strategy to you).

There is a data line at the top of the screen which gives you all the current data as to the time remaining, the number of points scored by blot (there are two different types of blots, each with its own value), the current score and the multiplier being used (that's for bonus points), the number of lives remaining, the number of protection shields used to protect yourself from the Whirlers and any special messages to the player.

There are nine levels of skill and within each level there are increasingly more difficult mazes. Let's get down to business. You want to know how you play and why. Well, let me tell you, if mazes intrigue you then Snapper adds the suspense of having to avoid the Gamma Field, from which there is no protection. If you're caught, you are just destroyed! There are the Whirlers from which there are only three shields available for protection, through each round. As you move around the grid, at the same speed as the Whirler, eating as many blots as possible within your time limit, you run into other opportunities and obstacles, *i.e.*, as the Whirlers move around the grid they remove sections of the grid blocking off paths. These removed portions are restored only if you catch the Ring, or after The Snapper is destroyed and you go to the next round.

Now it should be obvious to all you would be pros of Snapper that catching the Ring is the more viable solution. Well, you're more right than you know, since along with restoring the missing grid lines, you also get one score multiplier, which affects the current score as well as the rest of the game score. Your score is multiplied by the multiplier and added to your score total. Now if you should catch five of these Rings you will be granted an extra life. There are a possible 12 extra lives and a possible 40 multiplier points.

As the difficulty level increases both within each skill level and the higher difficulty levels the grid lines will change color if you have a color monitor or television, or appearance for those of you who don't. These changed grid lines are now called Slicks. The Slicks allow the Snapper to move at double his normal speed while the Whirlers are not affected. The catch to this added feature is that you can't turn off a slick until you reach the end of it. Of course, for us pros the higher levels end up to be all Slicks, which adds challenge, frustration, and excitement to the game.

It should be obvious by now, that I had trouble getting past this game to even look at the others, but I vowed to put this down and move on. Suffice it to say that on a scale from 1 to 10 Snapper by Silicon Valley Systems gets a 9.

Choplifter

Moving on to Choplifter from Broderbund Software, San Rafael, CA., I was immediately thrust into a war with the Bungeling. Now, I'm sure you are asking the same thing I did: "What's the story here?" Well, apparently the Bungelings have taken 64 delegates as hostages (does this sound familiar?) and have separated them into 4 barracks. One of the barracks doors was blown open and the 16 hostages are running around. It is your mission (if you chose to accept it) to try and rescue these hostages, in spite of the obstacles. Obstacles, you say, what obstacles? The Bungelings have three weapons at their disposal:

They have (1) tanks that amble along the ground firing at both the hostages that have escaped from one of the already blown open barracks, and at your helicopter if it should happen to be on the ground.

They have (2) jet fighters which attack from above by shooting missiles at your helicopter while in the air. Neither the jet fighters nor the tanks can cross your side of the barrier near the post office. But don't get excited, because . . .

Weapon (3) is a bunch of drone air mines which home in on your helicopter on either side of the barrier, as well as at the post office.

Now you know the obstacles, no problem, right!? Except for the ultimate weapon, which is your not killing the hostages by maneuvering to land and squashing the hostages under the helicopter yourself. But not to worry, you'd never do that anyway.

So what's the object? Just get all 64 hostages safely rescued and dropped off at the post office, that's all. To do this "simple" task you need to learn how to maneuver the helicopter, which responds logically to the joystick. The helicopter carries ammunition for defending itself against the tanks, fighters and drones. Button 0 controls the firing. To fire at the tanks you must manuever the helicopter to face the tanks, done by pushing Button 1 once. To shoot at the jets you must be facing the direction of the oncoming jets, by pushing Button 1 again (which all you smartys have figured out means that Button 1 controls your flying direction).

To rescue the delegates trapped in the other three barracks you must manage to blow open the barracks doors without killing anyone. The game ends when the 64 hostages are all rescued, or if you should have all 3 of your helicopters shot down, or heaven forbid, you should get all 64 hostages killed.

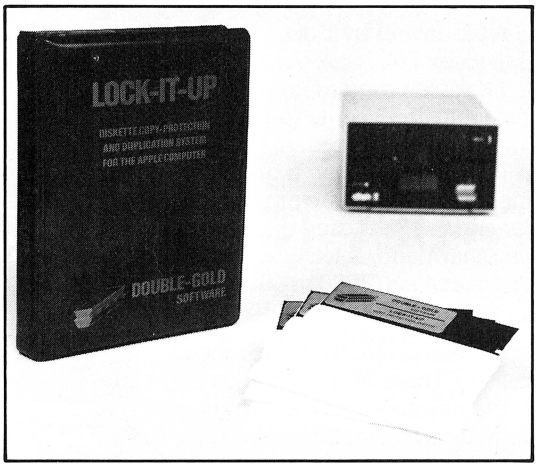
The graphics on this game are incredible, including the delegates, who not only wave their arms to get your attention, but wave good-bye once their are safely dropped off at the post office. On a green screen or a black/white it is easy to play, however, the enemy jets are much more visible in a color mode.

The instructions are clear and concise, although again, the younger player will need a little assistance. For the quick and agile player, the game keeps you interested; as more hostages are rescued, more jets, tanks, and drones are sent your way. No rest for the wicked?

On my rating scale of 1 to 10 Choplifter, by Broderbund Software in San Rafael, Ca. gets a big 8.

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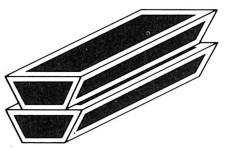
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Reviews: Two Accounting Programs

by Phil Bernheim

One big advantage of the personal computer is that it allows you to do wondrously expert things without being an expert — if you have the right software. Word processing is one example; "spread - sheeting" is another. Now come two programs designed to help you keep accounts for your household or small business without knowing anything about accounting.

THE ACCOUNTANT, Decision Support Software, McLean, VA; $99.95 plus $20 for VisiCalc interface.

FINANCIAL PARTNER, The Denver Software Co., 36 Steele St., Suite 19, Denver CO 80206. Price, $245.

The Accountant

The Accountant, by Decisions Support Software of McLean, Va., is a marvelously flexible program, of which the greatest limitation seems to be that it will only handle 63 accounts and 63 codes. (Codes let you tag transactions as expenses of various classifications for year-end tax deduction categories.) On the other hand, it lets you store a year's transactions (2500 to 4000) on a single diskette.

Documentation for The Accountant is excellent. There is a section to acquaint the novice with accounting terminology, a demonstration of the major features using a demonstration data base that comes on the system disk, a tutorial that leads you to define your own financial data base, a chapter on business applications, specifically, a description of programs and files, and instructions on how to interface The Accountant with VisiCalc, an optional extra feature that's well worth the price if you have VC.

If you're a complete dum-dum or confused or just indecisive, you can use the list of accounts and codes from the demonstration data base and then add to or delete from that as your experience down the line dictates. In short, every thing has been done to make using the program as easy as possible.

For example, you can set up groups of automatic transactions and post them all at once whenever you wish. At the first of the month, you might want to record the deposit of your pay check in the bank, the payment of your rent or mortgage, accruals to social security and income tax, etc. It might all be done by one entry to The Accountant. Then, in mid-month might come payments on the car, garbage bill,or perhaps insurance payments. Again, all entries could be automatically entered with one keyboard entry to the program.

Another convenient feature is the desk top calculator embodied in the program. It can be used by itself as just that, but its greatest usefulness is to call it up as a subroutine when making entries to the books. If, for instance, you're taking $100 out of cash and using part of it to pay for groceries, part to buy a commute ticket, and part for lunch money, you can call the calculator subroutine to make sure all your entries add up properly, then automatically transfer the total to the cash account entry when going back from calculator to entry mode.

The VisiCalc interface disc permits you to pick out whatever data you wish from your accounting records and transfer it to a previously prepared VisiCalc template. This can be of almost incalculable value in the preparation of income tax returns, projections of income and expense, etc.

All in all, this appears to be a perfect program for someone who wants a personal record keeping program that will be accurate and complete without requiring any knowledge of accounting. For that purpose, it is ideal. It is also useful for a truly small business (such as moonlighting as a computer programmer or consultant), but it is not suitable for any sort of merchandising business because of its inability to handle inventory.

The Financial Partner

The Financial Partner is another home/small business accounting package also designed for the accounting uninitiate. The manual, however, seems to presuppose at least a nodding acquaintance with such terms as debit, credit, and posting. It is certainly written for the computer novice, however, as it guides you through step by step as if you had never seen a computer before. This program also provides a chart of accounts, somewhat more extensive than the other, actually, with a capacity over twice as great — 150 accounts as opposed to 63.

Like DB Master, this program tends to stretch the capabilities of the Apple to the utmost; it comes on three disks, which entails an amount of disk shuffling which is somewhat annoying at times. And the same disk doesn't always go in the same drive, so watch it, Buster! There's a lot of whirring and grinding of disks in this one.

On the other hand, it does do all your check writing for you (on your printer, with sprocket-feed checks) or permits use of both hand-written and machine written checks, providing you keep close track of check numbers. In fact, a packet of sample forms, including checks, comes with the program package, along with an order blank for ordering more.

The documentation — 124 pages in a loose-leaf binder — is detailed, and there is both a comprehensive index and a glossary. There are sample printouts of monitor screens and of all the reports which are available. The program is menu-driven and contains many error-checking "locks" that prevent proceeding until everything is done "according to Hoyle." Incidentally, although the documentation doesn't say so, internal evidence would indicate that the program is written in Pascal, although that is transparent to the user.

In addition, there is a small quick-reference guide with 3 pages and a menu chart showing the relationship of the various menu screens and how to get from one part of the program to another. There are normally 3 levels, but the report menu goes down to a 4th.

The level of sophistication of Financial Partner is considerably above that of The Accountant, which makes it more suitable for a business or an individual with some knowledge of accounting. The suppliers say it is suitable for businesses doing up to $1,000,000 a year. There is nothing in the instructions about inventory. One can, of course, insert accounts for the dollar value of purchases and sales, but there is no provision for inventory control by part and value, which one would not expect of a program at this level, anyway. By a like token, The Accountant is more suitable for family accounts and small moonlighting or personal service enterprises.

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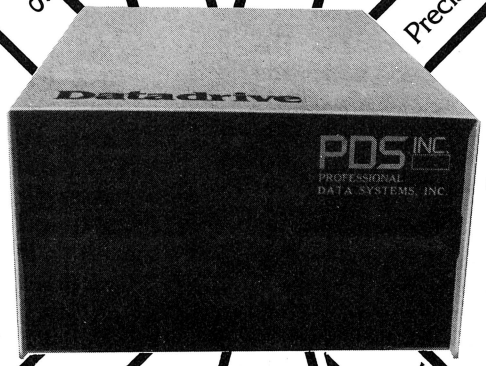
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APPLE PADDLE PROGRAM

by Robin A. Cox

Have you ever wished your paddles could read more than 0 - 255? Have you ever wondered why you have all that free paddle play at each end of the paddle range? Well, it seems that the paddle is just a variable potentiometer (0-150k) and the Apple reads the paddle value by discharging a 22 uf capacitor and then timing how long it takes for it to charge back up, through the paddle. The higher the resistence of the potentiometer, the longer it takes for the capacitor to charge back up. Hence, the higher the paddle value.

The Apple normally reads the paddle value in a monitor subroutine at $FB1E. The subroutine discharges the capacitor in line $FB1E. It then checks memory location $C064 for paddle #0 or $C065 for paddle #1 for the status of the capacitor. If bit 7 is on (1), then the capacitor has not yet been fully charged. If this is the case, then a counter is incremented, and the capacitor status is checked again. When bit 7 is found to be off (0), then the capacitor is fully charged, and the count (paddle value) is stored.

The problem occurs when the count reaches 256. The subroutine subtracts one from the count, making it 255, and then stops. Therefore, there is a limit of 255 for a paddle value. If we write a machine program which will not default at 256 but continues to count until the capacitor is charged, then we may get a larger paddle value range. (Approx. 0-370)

PROGRAM 1 shows a short BASIC program which will illustrate the larger paddle value range. Lines 20-90 insert an assembly subroutine in memory spaces 768 ($300) to 810 ($32A). This method of inserting machine code from a BASIC program is described in the June, 1979 issue of CALL - A.P.P.L.E. The assembly program need only be loaded once at the beginning of the program, and then the subroutine is called instead of the PDL( ) command.

A listing of the assembly subroutine that the BASIC program inserts in memory is shown in PROGRAM 2. Notice that the program defaults at a paddle value of 512. It does this to avoid a very long wait in the case of no paddle being present.

```
>LIST
   20 DIM Y$(255)
   30 Y$="300: AE 2A 03 A9 00 8D 28 03
       8D 29 03 A8 AD 70 C0 EA EA"

   35 Y$( LEN(Y$)+1)=" BD 64 C0 10 0D
      C8 D0 F8 EE 29 03 AD 29 03 C9 02
       D0 EE 98 8D 28 03 60"
   40 Y$( LEN(Y$)+1)=" N E88AG"
   50 FOR I=1 TO LEN(Y$)
   60 POKE 511+I, ASC(Y$(I))
   70 NEXT I
   80 POKE 72,0
   90 CALL -144
  100 TEXT : CALL -936: TAB 5: PRINT
      "EXTENDED PADDLE RANGE PROGRAM"

  110 PRINT : PRINT "      THIS PROGRAM
       HAS INSERTED IN MEMORY($300-$32
      A) A SUBROUTINE THAT WILL FAKE T
      HE PDL(X) FUNCTION AND MORE."

  120 PRINT "TO READ A PADDLE VALUE. D
      O THIS..."
  125 PRINT : PRINT
  130 PRINT "  1. POKE THE PADDLE NUMB
      ER (0-3) IN          MEMORY SPACE
       810 (POKE 810,X)"
  140 PRINT "  2. CALL SUBROUTINE BY '
      CALL 768'"
  150 PRINT "  3. THE VALUE WILL BE  P
      V=256*PEEK(809)      +PEEK(808)"

  160 PRINT "  4. THE LINES WHICH INSE
      RT THE ROUTINE       ARE LINES 20
      -90"
  170 PRINT : PRINT : PRINT
  180 PRINT "      THIS DEMONSTRATION W
      ILL SHOW THE   EXTENDED PADDLD R
      ANGE!"
  190 PRINT
  200 INPUT "WHICH PADDLE # TO READ FR
      OM",X
  210 IF X>3 OR X<0 THEN 200
  215 CALL -936
  220 PRINT "TURN PADDLE #";X;" TO EAC
      H END PLEASE"
  230 PRINT "HIT CNTL-C TO END"
  240 POKE 34,2
  250 POKE 810,X
  260 CALL 768.
  270 PV=256* PEEK (809)+ PEEK (808
      )
  280 PRINT "PADDLE #";X;"= ";PV
  290 FOR I=0 TO 5: NEXT I
  300 GOTO 260

>PR#0
```

PROGRAM 2
PADDLE SUBROUTINE

```
0300-  AE 2A 03   LDA  $032A  FETCH PADDLE NUMBER
0303-  A9 00      LDA  #$00
0305-  8D 28 03   STA  $0328  CLEAR COUNTERS
0308-  8D 29 03   STA  $0329
030B-  A8         TAY
030C-  AD 70 C0   LDA  $C070  DISCHARGE CAPACITOR
030F-  EA         NOP         WAIT
0310-  EA         NOP
0311-  BD 64 C0   LDA $C064,X CHECK CAPACITOR STATUS
0314-  10 0D      BPL $0323   JUMP IF CHARGED
0316-  C8         INY         INCREMENT COUNTER
0317-  D0 F8      BNE  $0311  TRY AGAIN
0319-  EE 29 03   INC  $0329  INCREMENT COUNTER (HIGH)
031C-  AD 29 03   LDA  $0329
031F-  C9 02      CMP  #$02   COUNT=512?
0321-  D0 EE      BNE  $0311  NO, TRY AGAIN
0323-  98         TYA
0324-  8D 28 03   STA  $0328  SAVE LOW COUNTER
0327-  60         RTS         RETURN TO BASIC
0328-  ??                     LOW PADDLE COUNT
0329-  ??                     HIGH PADDLE COUNT 256*(0-2)
032A-  ??                     PADDLE NUMBER (0-3)
```

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The Back of the //e Bus

(The Auxiliary Connector)

by Frank Curtin

Good day, ladies and gentlemen, welcome to Trans Apple Express, The Rainbow Line. I am your tour guide, Jean Pommepit. Before we get started on our tour today, let me introduce you to the Land we'll explore and explain some of its historical roots. I'll try to balance my comments so that they are neither too obscure for you newer travellers nor too elementary for the accomplished travellers.

Apple //e Land was founded by pilgrims from Apple II Land. These pioneers were generally happy with their homeland, but were dissatisfied with several important traditions, including the "single case display system" and the "40 character text screen." In striking out on their own they brought with them most of their homeland's culture.

One of the aspects of Apple II Land that motivated the founders of Apple //e Land to set out on their own was the division between information (signals) that was available in the I/O slots (above the board, so to speak), and information that was secreted in circuits in the lower regions.

Some of the first dissidents of Apple II Land (there are *always* dissidents) acquired some of the useful signals by plugging "parasitic" mini-boards into chip sockets on the Apple II motherboard. Many memory expansion boards did that as did several of the 80 column boards and at least one of the multi-function cards.

In maintaining the traditions of Apple II Land and still providing more signals to the sophisticated user, the //e contains no changes to seven of the eight expansion I/O slots. (Well, few changes.) They eliminated Slot 0 because they had included 64k of memory on the motherboard. Then, having paid their respects to tradition, they bowed to innovation and added a new connector that provides all sorts of previously non-existent or hidden signals. In their infinite creativity they named the new connector the "Auxiliary Connector". Catchy name, isn't it?

O. K. Put on your hard hats (or soft hats, depending on your orientation); watch out for runaway bytes, and here we go.

More Than Just More Pins . . .

I expected that the new 60 pin socket would be the same as the 50 pin I/O sockets, but with 10 or 12 additional lines. Prepare yourself for a much more exciting ride than that. Only 7 pins on the new 60 pin socket carry the same signals as do the I/O slots.

The Rainbow Line, unlike other tour lines, is not confined to physical streets and highways. Our tour today will follow a logical rather than physical path. That is, instead of a sequential pass by the various pins, we'll jump around to explain logical functions.

Data Bus

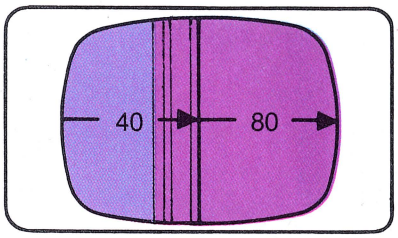
Our first stop is to inspect the data bus. Eight of the sixty pins are dedicated to data. They are labeled MD0-MD7. Please note the unfiltered quality of these data lines. Also note their fragility. These data are unbuffered. They are directly connected to the microprocessor, the 6502A. The I/O slots are not entrusted with such raw data. The data bus to them is buffered to protect the processor and keep the system from "loading".

The eight data lines fall into a logical unit, yet they are physically separated. They appear on Pins 44, 43, 40, 39, 21, 20, 17, and 16. Lest we confuse you with this uneven terrain, we will make no further mention of pin numbers. The information is well documented and diagrammed.

Addresses

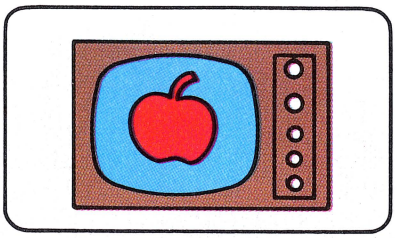
Our next stop is to view the way the data is addressed. Eight lines, RA0-RA7, constitute the multiplexed address bus. Most

Apple polishers.



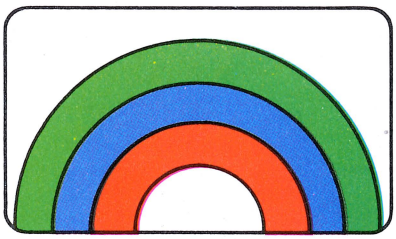
Apple II with 80 column display.

It's yours with M&R's SUP'R TERMINAL, an easily installed circuit that doubles the display size of your Apple II.



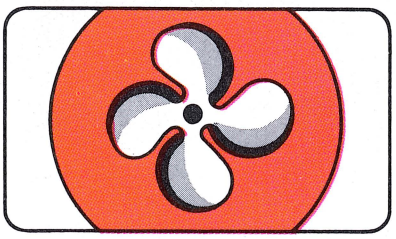
How about a CRT for under $35.00?

Apple owners can use their TV sets for a display with our SUP'R MOD family of adaptors.



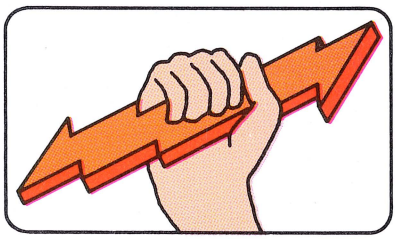
Apple III data in living color.

Yes, with our interface your Apple III can talk with an RGB color monitor.



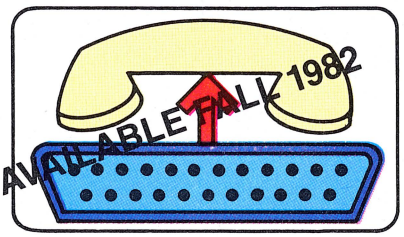
Want to reduce service problems?

Heat is the leading cause of component failures. M&R's SUP'R FAN is a heat reducing insurance policy that fits snugly inside your Apple II.



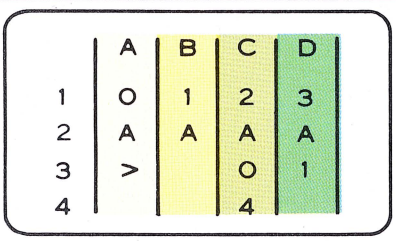
Need more power?

The SUP'R SWITCHER allows you to plug-in *eight peripheral boards.* And while you're computing up a storm...



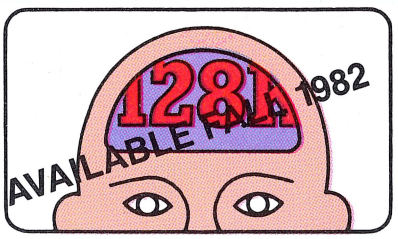
7 x (RS-232) + 1200 BAUD = Sup'R Access-1

... Our latest product, SUP'R ACCESS-1, gives your Apple a new dimension of expandability. Seven RS-232 ports *and* a 1200 BAUD modem.



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First, the bad news. Visicalc only uses 40 columns! Second, the good news. Our SUPERCALC uses 80. Third, it's better.



Thank you for the 128K memories.

Tired of waiting for the disk? Then keep everything in memory with our 128K memory board.

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Fruitful Connections.

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

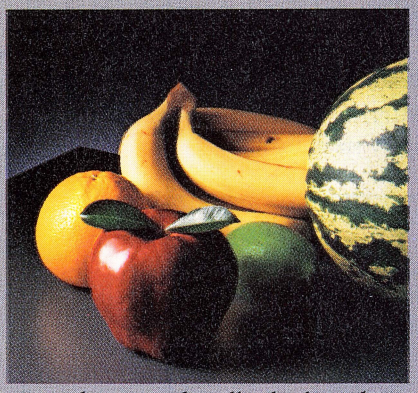
Thanks to those people—in hundreds of independent companies—you can make the humblest 1978 Apple II turn tricks that are still on IBM's Wish List for 1984.

But now we're coming out with our very own line of peripherals and accessories for Apple® Personal Computers.

For two very good reasons.

First, compatibility. We've created a totally kluge-free family of products designed to take full advantage of all the advantages built into every Apple.

Second, service and support.



Now the same kindly dealer who keeps your Apple PC in the pink can do the same competent job for your Apple hard-disk and your Apple daisywheel printer.

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

Now you can add Apples to Apples.

A joy to behold.

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

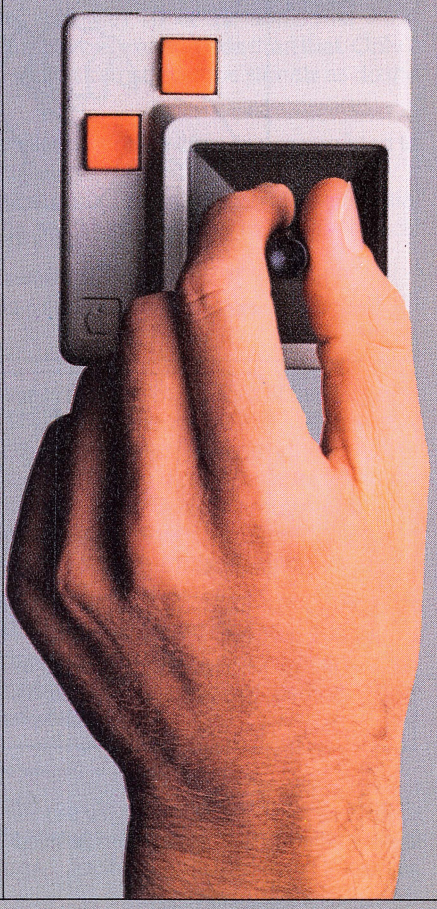
Why is it such a joy to use?

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

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

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

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



Gutenberg would be proud.

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

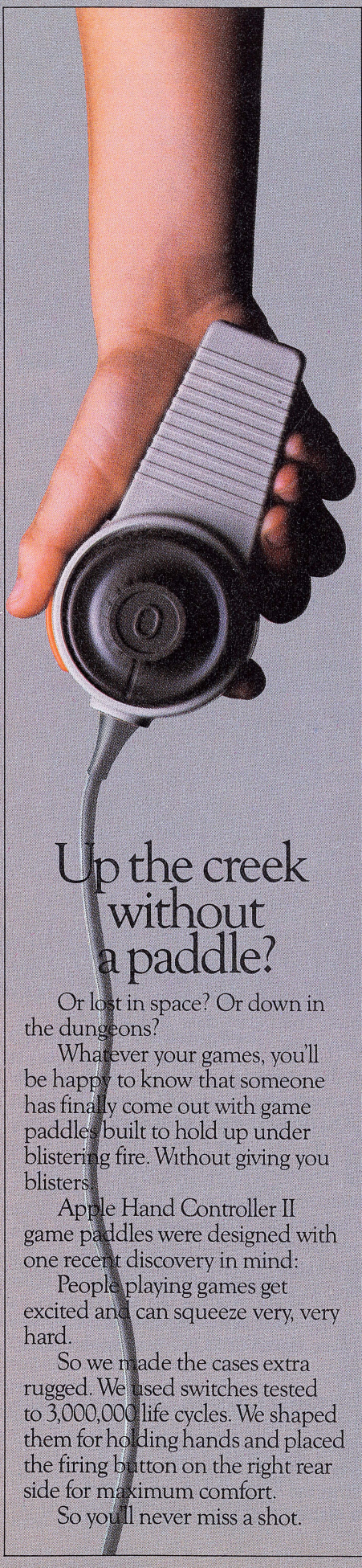


So now, whatever your budget and your needs, you can hook your Apple to a printer that's specifically designed to take advantage of all the features built into your Apple. With no compromises.

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

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

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Up the creek without a paddle?

Or lost in space? Or down in the dungeons?

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

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

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

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

So you'll never miss a shot.

A storehouse of knowledge.

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

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

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

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

Apple.



Launching pad for numeric data.

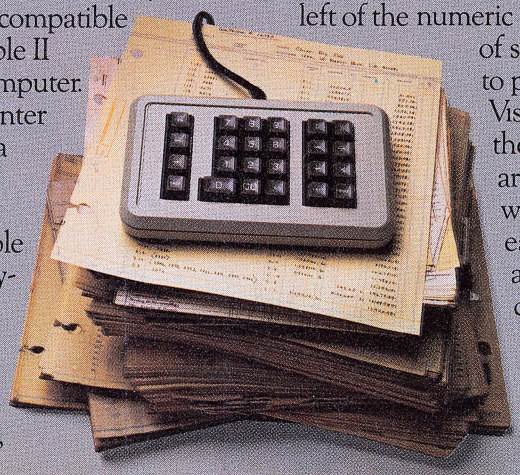
Good tidings for crunchers of numerous numbers:

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

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

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

With one hand tied behind your back.



VisiCalc is a registered trademark of VisiCorp. Inc.

of our travellers question how an 8-bit address bus can address a 64K memory. 64K of memory takes a 16 bit address, doesn't it?

Each of the eight 64K memory chips down on the mother-board has only 16 pins. If you assume that ground, +5 volts, data, and Read/Write take up at least four of these pins, you are left with 12 pins to address 64K bits. Impossible? Well, yes and no. It is impossible if you view the memory chip as 65535 sequential bits that must be individually addressed. However, that's not the way they are addressed.

Within each 64K RAM chip the memory is laid out in a matrix, usually 256 X 256 or 128 X 512. There are 256 or 128 rows and 256 or 512 columns. The multiplexed address lines alternately select a row, then a column. The the chip either reads or writes the selected matrix intersection. The Row Address Strobe and the Column Address Strobe (signals PRAS' and PCAS') determine whether the data on the address bus is meant to address a row or column.

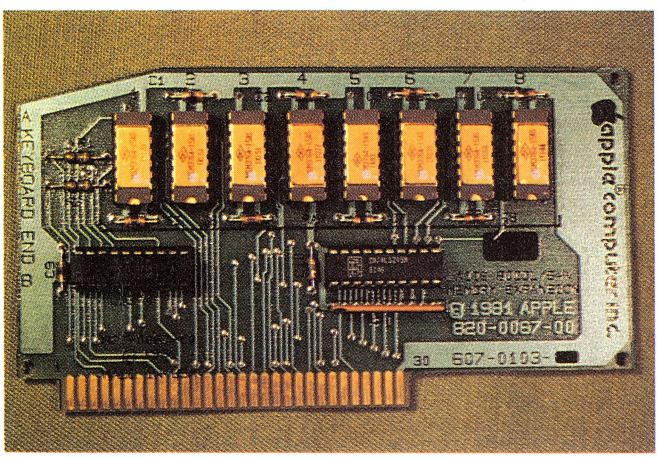
Those of you who may have toured the standard I/O connector slots may long for the simplicity of a 16 bit address bus. You folks who have contemplated building a board to expand the Apple's memory probably sigh over the availability of PRAS' and PCAS'. In Apple II Land, most memory expansion boards (which increased the standard 48K Apple to a full 64K) had cables that had to be plugged into a memory chip socket. That was necessary to get the signals RAS and CAS up to the memory card. They were needed both for addressing the expanded memory and for "refreshing" the memory. Memory chips are very forgetful. They must be reminded to remember. RAS and CAS remind them.

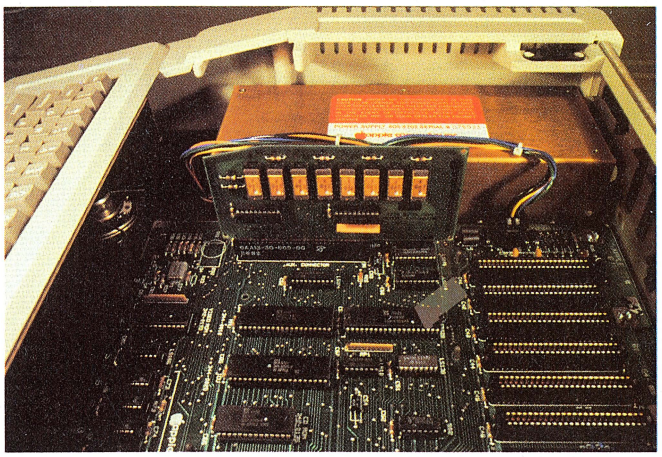
While we're studying the memory access lines, please note our old friend R/W', the Read/Write line. When high, this line tells the memory chips to put their data onto the data bus. When low, the chips are to write the data from the data bus into the addressed memory cell.

We won't stop for some of the signals common to both the standard peripheral slots and the Apple //e's Auxiliary slot. I'll just point them out as we drive by. Over there is Ground. No circuit could exist without it. Over to our right is +5 volts. To the left are the timing signals Phase0 and Phase1, Q3 and 7M.

Special Timing

Let's pull up next to the newer timing signals that are available on the Auxiliary Slot. The Auxiliary Slot was devised for memory expansion and for expanded video, especially an





80 column screen. To make video generation easier, (and to make it very easy to test and detect problems) other timing signals have been "brought up" to the Auxiliary slot. These include 3.58M which is the 3.58 Mhz video color reference signal. It enables color signal production. VID7M "clocks" the video dots through a parallel-to-serial shift register in the video section, and finally, 14M which is the master clock signal.

A complete description of video circuits is beyond the scope of this tour. Yet, there are many signals available at the Auxiliary Slot that pertain to video.

In TEXT mode the video circuits read the memory dedicated to text screen display and present the contents to a character generator. The character generator translates the character from the data bus and the vertical position of the character into a pseudo-character containing the horizontal bit pattern that should appear on the screen when the character is printed.

The character in screen memory is presented to the character generator a number of times, once for each possible vertical dot. The character generator outputs the dots to be printed to a shift register which, in turn, releases a bit stream to the video circuits that produces the picture on the screen.

The video display memory access occurs during time when the CPU is not accessing memory. Therefore the video circuits do not hold up processing. In order for this time division to function properly, the video data bus must be separate from the processor data bus. The video data bus VID0-VID7 is available on the Auxiliary Slot.

The signals that tell the character generator which line of dots to release for its character are SEGA, SEGB and VC. They are generated by the IOU (input/output unit) on the mother-board.

Please notice ENVID'. ENVID' is normally low and allows the normal text mode character generation. Pulling ENVID' high inhibits the character generator. This allows the user of the Auxiliary slot to take over the video output using ALTVID'. (This is rough stuff if you haven't studied some video and electronics but it really is interesting to those who have.)

Over to your right are the video status signals. SYNC' is the horizontal and vertical sync signal. CLRGAT' is the color burst gating signal.

WNDW' is the video non-blank window. This signal is high during times when nothing is being written to the screen. In the Apple //e, this signal can be read by testing a softswitch at location $C019. If data is written to the screen memory during active screen display time, the display may appear torn or may flicker. Writing data to display memory when the screen is in

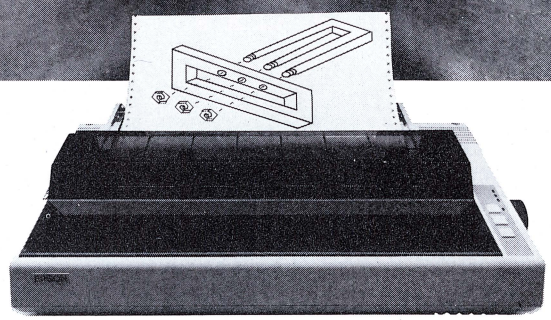
IMAGINE IT...

NEW

NOW WITH DUAL HI-RES GRAPHICS



CAPTURE IT.



ACTUAL APPLE II PRINTOUT USING GRAPPLER AND EPSON MX100.

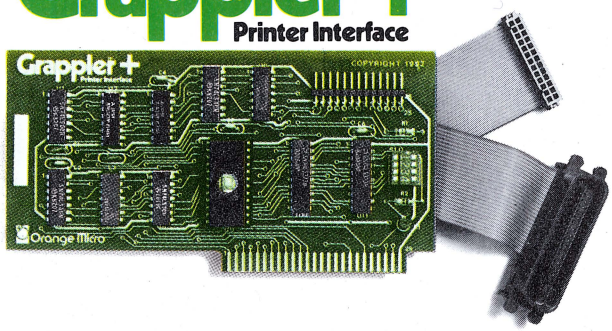
Completely Redesigned. Now, the Grappler+.

The original Grappler was the first graphics interface to give you hi-res screen dumps from your keyboard. The new Grappler+ with *Dual Hi-Res Graphics* adds flexibility with a side-by-side printout of page 1 and page 2 graphics.

Interfacing the Grappler+ to a wide range of printers is easy as changing a dip switch. 4K of exclusive firmware makes the Grappler+ the most intelligent, full-featured Apple® Printer Interface made. And, the Grappler+ is Apple III compatible.*

The imitations are many, so insist on the #1 Apple Graphics Interface on the market. Insist on the Grappler+. Available now at most Apple dealers.

With The Grappler+™ Printer Interface



The Grappler+ Features:

• Dual Hi-Res Graphics • Printer Selector Dip Switch • Apple III Compatible* • Graphics Screen Dump • Inverse Graphics • Emphasized Graphics • Double Size Picture • 90° Rotation • Center Graphics • Chart Recorder Mode • Block Graphics • Bell Control • Skip-over-perf • Left and Right Margins • Variable Line Length • Text Screen Dumps.

The Grappler+ also works with Pascal and CPM.

The Grappler+ interfaces with the following printers:

• Anadex • Centronics • Datasouth • Epson** • NEC • C-Itoh • Okidata**

The original Grappler is available for IDS 460, 560, Prism, Microprism.

Orange Micro Inc.

1400 North Lakeview
Anaheim, California 92807
(714) 779-2772

Foreign Dealer Inquiries Welcome TX183511 CSMA

*Requires additional software driver.
**Requires graphics upgrade.

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blanking phase will prevent flicker and tear. It is quite useful, therefore that the on/off condition of this signal has been made available to software programs. Graphics packages will improve once again.

SEROUT' is the serial data being output to the video device.

GR' is the graphics mode enable signal.

LDPS' strobes data from the character generator into the shift register.

H0 is the low order horizontal bytes counter. In 80 column mode the odd numbered horizontal positions come from main memory and the even numbered horizontal positions come from the alternate memory on the 80-column card. H0 is the bit that determines whether the horizontal position is even or odd.

RA9' and RA10' are generated by the IOU. They are control signals for the character generator to select alternate character sets.

The signals that present the 80 column mode soft-switches to the Auxiliary Slot include:

80VID' which can be used to enable the 80 column timing (14M instead of 7M)
EN80' which can be used to enable the auxiliary RAE associated with an 80 column display.
R/W80' which determines the data direction for the 80 column auxiliary RAM.

Memory Expansion Signals

Our next stop is to inspect the signals that can be used to expand the memory of the Apple //e to 128K (or beyond).

ROMEN1' and ROMEN2' enable the motherboard ROMs.

The MMU (Memory Management Unit) manipulates these signals. When these signals are high the ROMs are disabled and the addresses D000-FFFF access auxiliary memory. The Auxiliary Slot can disable the ROMs by pulling low the signal called ENFIRM.

CASEN' is held high during accesses to the memory on the Auxiliary card.

Well, that's about it for our tour of the Auxiliary slot. On our way back to your hotel I'll draw your attention to the last three signals.

C07X' - goes low when an address between $C070 and $C07F is accessed. These are the addresses that set the strobe for the paddle timers. When the address is out of the $C07X range of the address bus this signal is held high, providing a nominal 260 Ohms to +5 volts. The device in the auxiliary connector could pull this signal low in order to trigger the paddle timers.

AN3 - presents to the Auxiliary Slot the annunciator input number 3.

ENTMG' - is probably the most dangerous signal available to any slot. It permits the Auxiliary Slot to disable the master timing in the Apple //e. Disable timing for too long and memory will clear. ENTMG' controls PRAS' and PCAS' which remind memory chips not to forget.

Ladies and gentlemen, it has been a pleasure being your tour guide today. I hope that the Rainbow Line has helped to brighten your day and leave you better informed about Apple //e's underpinnings. As my grandfather used to say, "Plant enough seeds and they'll name an orchard after you." You may have heard of him; he was called Johnny Appleseed.

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Fix Your Disks

An appliance operator's guide to relief from disaster.

by Barry D. Bayer

WELL, it finally happened! After two years of operation with my Apple disk drives, suddenly everything was the dreaded "I/O ERROR", and suddenly three disks containing about 25 files were inaccessible. Well the first thing to do was to trace down the reason for all of this.

I finally noticed the only different thing that I had done was to place the top on my Apple, a practice almost never heretofore indulged in. Obviously, I had a weak chip or two on my motherboard, and the heat buildup did it in. I tried two separate remedies. The first was to take the top off again; the second, an RH Electronics fan. While I have turned into a fan fan, (it looks pretty, and the nice sturdy switch on the front as opposed to the ugly easy to break switch on the back) taking off the top is a lot cheaper.

But I still had the problem of what to do with the blown disks. Two of the three (having already displayed my stupidity in allowing the heat to build up unimpeded, I won't go into the reasons that I blew more than one disk) were program files which were backed up elsewhere. The last disk, however, contained about 10,000 words of VisiCalc articles and book drafts, and that was a complete disaster. No backup at all.

At this point I should pause and give you a bit of my background. I've used the Apple for a couple of years, but consider myself to be pretty much an 'appliance operator' — I like to turn it on, boot a program, and go. Oh, I've done a little programming, and try to browse through the magazines, but I never before had thought of actually digging into the disk storage, and seeing if it was possible to recreate my lost, and sorely needed, data files.

So I dipped into my library, to see what I might have to do. *Beneath Apple DOS* by Don Worth and Pieter Lechner, Mark Pump's articles in the Northern Illinois Apple Users Group *Harvest*, and the Apple Pugetsound Program Library Exchange's *Call -A. P. P. L. E.*, an idea or two from the APPLE ORCHARD and of course the Apple Computer, Inc. *DOS Manual*. Each contributed some basic information as to how files are stored on a disk, and what might go wrong badly enough to cause "I/O ERROR". I had glanced at all of this before, but had never found it necessary to understand the details. Assuming that you may some day have similar problems, let me outline what a law school professor of mine used to call "The Big Picture".

Apple disk data are laid out on 35 concentric circles called 'tracks', which are numbered (in typical computer jock fashion) from $0 to $22. (Hexadecimal 22, which is a '34' in Base 10. That's still one short of '35', but remember we started with Track '0', which is the same in Base 10 and Base 16 by the way. But I digress.) Track 0 is the outermost ring, and the numbers increase consecutively as we travel toward the center of the disk.

Each track is divided into 16 (in DOS 3.3) or 13 (in DOS version 3.2.1 and earlier) sectors. (The sectors are numbered $0 through $F hexadecimal (15 decimal),--although adjacent sectors are not numbered consecutively. Don't worry about that, though, as DOS knows where to find them.) The divisions between sectors, and between tracks, for that matter, are not marked by the gross physical characteristics of the disk (with holes, as on some systems), but are marked by distinctive information encoded onto the disk during the initialization process called by the INIT command.

Each sector really consists of an Address area or 'field' and a Data field. The Address field contains a 'prologue' which indicates the beginning of the field, the Volume, Track and Sector number of the sector, and a 'checksum' which is a number calculated by reference to the Volume Track and Sector numbers. Finally, an 'epilogue' marks the end of the Address field. The Data field also consists of a beginning marker, followed by 256 bytes (for some reason by the time the authors of the books and articles referred to above get around to talking about numbers of Bytes they use the decimal '256' rather than '$100' Hex) of actual data, another checksum and an 'epilogue' end marker. (Actually, none of this data is in standard 8 bit 'bytes', but rather in substandard 4 or 5 bit 'nibbles', but that's another story.)

Now even assuming that the actual data is correctly encoded on the disk, Apple DOS will NOT recognize it if any portion of the address field, or the beginning and end markers or checksum of the data field doesn't check out. Let me say that again. All of the actual *data* can be OK, but Apple DOS will not read the sector if any of the rest of the 'not data' portion of the sector is somehow damaged. Now I am not going to talk about Nibbles, and how to change them with Nibble editors. I will assume that if an actual data sector has a bad checksum that the sector is lost, and save the resurrection of the dead sector for another article.

But just as a sector can have good data, with no way for DOS to read it, a sector can be perfectly intact in all of its particulars, and still be unreadable, if DOS is unable to find and read a file's Track and Sector List.

A track and sector list is data in a sector which tells DOS which sectors (and tracks, of course) contain the various sectors of a file. Apple DOS, when asked to access a particular

file just proceeds from Sector to Sector on the Track and Sector list, until notified that the last sector has been reached (or, in effect, until DOS gets to the end of the Track and Sector list. Really large files may have more than one Track and Sector List, but let's assume that our lost file has only one. If DOS cannot read the Sector containing the Track and Sector List sector it will never be able to find the data sectors of the file, (hence I/O ERROR).

But how, you may well ask, does DOS know where the file's Track and Sector List is? Well, that information is found in the disk's Directory Sectors, which contain information on the type (Applesoft, Integer BASIC, Binary, Text, or 'R', whatever that is), length, and name of the file, as well as the first sector of the Track and Sector list, for each active file on the disk. Each Directory Sector also contains the address of the next Directory Sector, although the common setup is to have the first Directory Sector on Track $11 (Track 17, decimal), Sector $F (Sector 15, decimal), and to decrement the sector number each time, going through Sector $E, $D, $C, $B, $A, $9, and the like, but the Directory sectors could be loaded anywhere, in any order.

```
TRACK 11   SECTOR F      SLOT 6   DRIVE 1
           BUFFER 0800   DOS 16
=========================================

    0 1 2 3  4 5 6 7  8 9 A B  C D E F
   -----------------------------------
00- @ Q N @  @ @ @ @  @ @ @ J  O B H E
10- L L O
20-                              G @ T O
30- A A N I  M A L S
40-                                    R
50- @ U O @  A P P L  E   P R  O M S
60-
70-      C @  V O A A  P P L E  S O F T
80-
90-            F @ W  O A A P  P L E V
A0- I S I O  N
B0-                  Z @ X O  A B I O
C0- R H Y T  H M
D0-                        Q  @ Y O D
E0- B O O T  1 3
F0-                              J @
```

```
TRACK 11   SECTOR F      SLOT 6   DRIVE 1
           BUFFER 0800   DOS 16
=========================================

    0 1 2 3  4 5 6 7  8 9 A B  C D E F
   -----------------------------------
00- 00110E00 00000000 0000000A 0F02C8C5
10- CCCCCFA0 A0A0A0A0 A0A0A0A0 A0A0A0A0
20- A0A0A0A0 A0A0A0A0 A0A0A0A0 0700140F
30- 81C1CEC9 CDC1CCD3 A0A0A0A0 A0A0A0A0
40- A0A0A0A0 A0A0A0A0 A0A0A0A0 A0A0A012
50- 00150F80 C1D0D0CC C5A0D0D2 CFCDD3A0
60- A0A0A0A0 A0A0A0A0 A0A0A0A0 A0A0A0A0
70- A0A00300 160F81C1 D0D0CCC5 D3CFC6D4
80- A0A0A0A0 A0A0A0A0 A0A0A0A0 A0A0A0A0
90- A0A0A0A0 A0060017 0F81C1D0 D0CCC5D6
A0- C9D3C9CF CEA0A0A0 A0A0A0A0 A0A0A0A0
B0- A0A0A0A0 A0A0A0A0 1A00180F 81C2C9CF
C0- D2C8D9D4 C8CDA0A0 A0A0A0A0 A0A0A0A0
D0- A0A0A0A0 A0A0A0A0 A0A0A011 00190F84
E0- C2CFCFD4 B1B3A0A0 A0A0A0A0 A0A0A0A0
F0- A0A0A0A0 A0A0A0A0 A0A0A0A0 A0A00A00
```

But how does DOS know where the first Directory file is? (I know this is getting tiresome by now, but hang on.) DOS gets that information from the Volume Table of Contents (or VTOC). The VTOC contains system information such as the number of tracks and sectors on the disk, the version of DOS used to initialize, a 'bit map' showing which sectors are allocated to current files, and which are available for use, and (most important to us) the Track and Sector of the first Directory sector.

How does DOS know where the VTOC is located? Well, that's built in. Standard versions of DOS are always looking to Track $11, Sector $0 for the required information. (It is possible to set the VTOC up in another Sector, and thus 'hide' the VTOC from a normal copy program, 'protecting' to some degree, the files on the disk from being copied. But such methods of copy protection are primitive, and easily bypassed, these days.)

So let's review the Chain.

The Data Sector's connected
to the Track and Sector List;
The Track and Sector List's connected
to the Directory Sector;
The Directory Sector's connected
to the prior Directory Sector;
The first Directory Sector's connected
to the VTOC;
The VTOC's connected
to a built in function of DOS.

(Now hear the word of Apple Computer Inc.)

When you tell DOS to access a file (for loading, BRUNning, reading, or whatever) DOS goes to the VTOC, the Directory, the Track and Sector List, and finally to the Sector with the actual user file on it. If DOS can't find and read from any single Sector in the chain, you get an I/O ERROR. DOS reads from the VTOC (and writes to it, also) every time it looks for (or writes to) a file. Directory Sectors also get read quite frequently. A file Track and Sector List, however, gets read only when the specific file in question is accessed, and of course an actual data sector is only read when pointed to by the Track and Sector list.

If anything but a Data Sector is damaged, although normal procedures won't access the file, the data is still sitting on the disk, if only you can find it. And even if one data sector is damaged, it should be possible to load the undamaged sectors of the file, and be forced to reconstruct only 256 characters. So let's work backwards and see how to fix each level of damage.

One additional too you'll require is a program which will read from or write to a specified sector on your disk, and which will permit you to review a sector (preferably with choice of ASCII or hexadecimal format), edit the Sector in memory, and write it back (with the resultant changes) onto the disk. I have been using NIAUG member Bill Sefton's The Inspector™, and have found it invaluable, but most of the similar programs on the market would probably do.

Type in **LOAD NIAUG** and DOS begins to look for a program by the name of 'NIAUG'. DOS first goes to Sector 0, Track $11 to look for the VTOC, and an I/O ERROR results because the Sector can't be found (faulty address), or something else is wrong with the Sector. (The VTOC gets written to and read from more than any other Sector on the disk, so it stands to reason that something would go wrong with the VTOC more than on any other Sector.) How do you know the VTOC is the

problem? Use your disk ZAP program to take a look at T11/S0 and see if it can be read from. If an I/O ERROR results, that would be the first problem to correct.

If the address is OK you should be able to write new information into the Sector. Set up a Sector in memory on your ZAP program which is blank, except for the second and third bytes, which have $11 and $0F, respectively, written to them. These are the two bytes of the VTOC which tell DOS where the first Track and Sector of the Catalog resides. The second byte is the Track, and the third the Sector. The VTOC has lots of additional important information on it, but if you can tell DOS where the Catalog starts, you'll be able to follow the chain and begin to read files.

You must NOT write to the disk at this point, because DOS has no idea which Sectors are allocated with active files, and which are empty, and would as soon write to the former than the later. But a LOAD command should now filter through to the Catalog and HIAUG's Track and Sector List, and DOS should be able to find HIAUG.

Now that DOS can track through the chain, initialize a new disk, BRUN the FID program on your 3.3 DOS Master disk, and copy each active file on the disk to the new disk. DO NOT use COPY or COPYA on the DOS 3.3 master disk, because these programs will each copy the entire disk, track by track, including the damaged VTOC. Now that all of your files are transferred, reINIT the damaged disk, and assuming that your problem was not caused by physical damage to the VTOC disk, you may reuse it.

You can't write to the VTOC at all? Chances are there is damage to the Sector address, and there's no way to cure that other than reINITing the entire Track $11. But if you do that, you'll destroy the (presumably good) catalog sectors. Besides, how can you INIT only the one track?

The second problem is solved by a program in *Beneath Apple DOS* called (oddly enough) REFORMAT A SINGLE TRACK PROGRAM. But you don't want to do that, until you have transferred the good sectors of Track $11 onto another disk. INIT a new disk, take your disk ZAP program, and rewrite Sectors 1 through $F of Track $11 on the bad disk to the new disk. Reformat Track $11 on the old disk, and transfer Sectors 1 through $F back to it. Now FID all of your files across to the new disk (it might help to reformat the whole thing, again), and you should have everything working fine. Depending on your ZAP program, the whole procedure should take just a few minutes.

(An alternate procedure would be to use your ZAP program to transfer every readable Sector on the disk to the new disk, Sector by Sector, and then dump the old Disk and try to resurrect the VTOC Sector on the new one.

But let's assume that the VTOC reads properly (with your ZAP program). The problem might then be in the Directory Sectors, themselves. Try a CATALOG command. If you get an I/O ERROR, there's a fault somewhere else in Track $11. Use ZAP to read Sectors $F through $1 to find the problem.

Once again, the Sector that you cannot read is the one which is causing the I/O ERROR. This time, the problem is reconstructing the destroyed Sector, which can contain information on a maximum of 7 files, and of course the link to the Track and Sector of the next Catalog Sector. In a normally initialized disk the next Catalog Sector is the one immediately below the Sector in question. (The Sector next after T11/SA would be T11/S9.) The track number is set up in Byte 1 of the Sector, while the Sector is identified in Byte 2.

As shown in the DOS Manual, the next 8 Bytes ($03 to $0A) are unused, and the entry for the first file in the Sector begins in Byte $0B, and extends to Byte $2D, with the following format:

Relative Byte	Absolute Byte	Entry
00	0B	Track of File's first Track and Sector List for active Files, and FF for deleted files
01	0C	Sector of File's first Track and Sector List
02	0D	File Type
03 to 20	0E to 2B	Name of First File

Looking at this table, it's clear we don't much care what the name of the lost file is (LOSTFILE1, or any other legal file name will do), and for the time being, we don't really care what the file type is. The irreplaceable piece of information, that was lost when the I/O ERROR occurred, was the address of the first Track and Sector List. And while it is impossible to determine that information directly, we can look at the rest of the disk and guess at it.

A Track and Sector List looks like this:

Byte	Entry
00	Unused
01	Track number of next Track and Sector List Sector, if needed, or 0 is last Sector
02	Sector Number of next Track and Sector List Sector, if needed
03 to 04	Unused
05 to 06	File Relative Sector number of first Sector shown on this segment of the Track and Sector List
07 to 0B	Unused
0C	Track of First Sector of File
0D	Sector of First Sector of File
FE	Track of 122nd Sector in File (if exists)
FF	Sector of 122nd Sector of File (if exists)

(A couple of things in this table are a bit cryptic. Bytes $05 and $06 indicate which Sector of the Track and Sector List for the file in question is being read. An **00 00** indicates that this is the first Sector of the List, while an **00 7B** should indicate that this Sector is the second Sector of the List, and so on. The last address in the Track and Sector List is usually followed by 0s to the end of the Sector.)

With the large number of 0s usually at the end of the Track and Sector List Sector, the 00 at the beginning, and the 0s in the 5 Bytes from $07 to $0B, a Track and Sector List Sector looks fairly distinctive in a Hex Dump of a Sector. And if your Disk ZAP program can read and display Sectors in fairly quick order, you can page through the entire disk in a relatively short time, noting the addresses of the Sectors which could possibly be part of a Track and Sector List. (The Inspector does this rather well, as one need only request Track 0, Sector 0 as the first Sector to be read, and then hold down the ';' and '**REPT**' keys together to see each Sector on the disk, in numeric order.

Another way to do it is to run a Find Track and Sector List program, such as printed in *Beneath Apple DOS*, and let the computer do your looking for you.)

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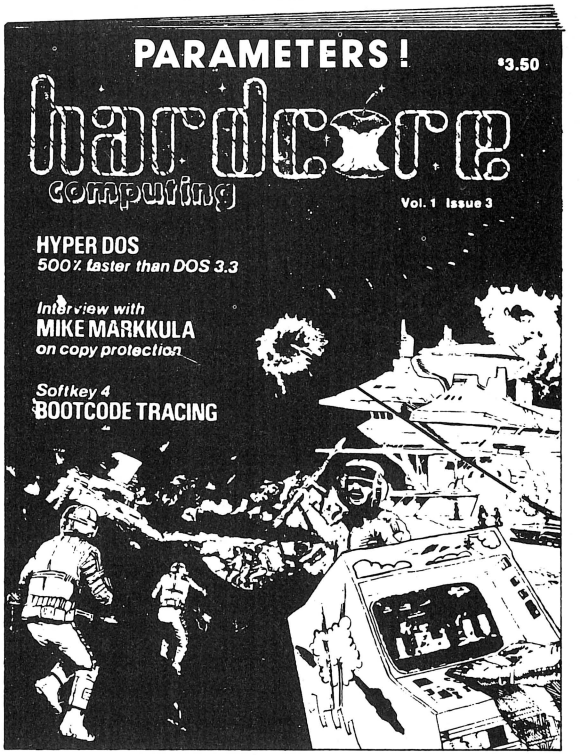
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```
TRACK 11   SECTOR 0      SLOT 6   DRIVE 1
           BUFFER 0800   DOS 16
========================================

    0 1 2 3  4 5 6 7  8 9 A B  C D E F
   -----------------------------------
00- 04110F03 0000FE00 00000000 00000000
10- 00000000 00000000 00000000 00000000
20- 00000000 0000007A 00000000 00000000
30- 0DFF0000 23100001 00000000 00000000
40- 00000000 00000000 00000000 00000000
50- 00000000 00000000 00000000 00070000
60- 03FF0000 00000000 007F0000 01FF0000
70- 00000000 00000000 00000000 00000000
80- FFE00000 FC000000 00000000 00000000
90- 00000000 00000000 00000000 00000000
A0- 00000000 00030000 00000000 00000000
B0- 00000000 00000000 00000000 00000000
C0- 00000000 00000000 00000000 00000000
D0- 00000000 00000000 00000000 00000000
E0- 00000000 00000000 00000000 00000000
F0- 00000000 00000000 00000000 00000000
```

```
TRACK 14   SECTOR F      SLOT 6   DRIVE 1
           BUFFER 0800   DOS 16
========================================

    0 1 2 3  4 5 6 7  8 9 A B  C D E F
   -----------------------------------
00- 00000000 00000000 00000000 140E140D
10- 140C140B 140A1409 14081407 14061405
20- 14041403 14021401 1400030F 030E0000
30- 00000000 00000000 00000000 00000000
40- 00000000 00000000 00000000 00000000
50- 00000000 00000000 00000000 00000000
60- 00000000 00000000 00000000 00000000
70- 00000000 00000000 00000000 00000000
80- 00000000 00000000 00000000 00000000
90- 00000000 00000000 00000000 00000000
A0- 00000000 00000000 00000000 00000000
B0- 00000000 00000000 00000000 00000000
C0- 00000000 00000000 00000000 00000000
D0- 00000000 00000000 00000000 00000000
E0- 00000000 00000000 00000000 00000000
F0- 00000000 00000000 00000000 00000000
```

Now we go back to the good Catalog Sectors, and look at the first and second relative byte (that's relative Byte 00 and $01, of course) of each active file, and compare these Track and Sector addresses to your list of possible Track and Sector Lists. Any Sector on the possibility list not matched from the Catalog, might be the Track and Sector List of a 'lost' file, and you can insert the addresses of those Sectors as the first Bytes for each file entry in the Catalog Sector you are reconstructing.

We can guess at the file type (Relative Byte $02) by taking a look at an ASCII Dump of the first Sector on the Track and Sector List. (With the Inspector, that means hitting the '**A**' key.) Something that looks a lot like meaningful information probably is a text file. (If you have any idea what should have been on the disk, you will probably recognize it. Something completely meaningless is probably a Binary file. Any something that has recognizable English words, interspersed with random numbers is likely a BASIC file (either Applesoft or Integer). Make your best guess, and set Byte $02 as follows:

File Type	Setting
Text	00
Integer	01
Applesoft	02
Binary	04

(*Beneath Apple DOS* also talks about S R A and B file types, but I'm relatively certain that I don't know what they are, and I don't have any on my disks, so let's forget about them, if 00, 01, 02 or 04 works.)

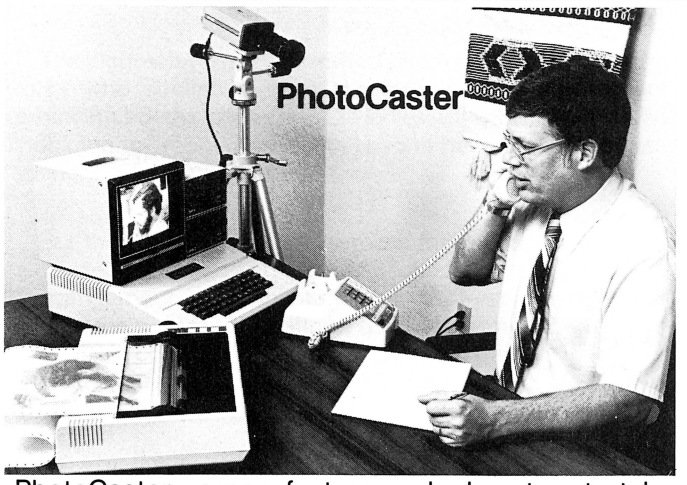
We now have entry information sufficient to let the FID program on your DOS Master disk finish up. BRUN FID, specify COPY (Option 1), FID each of your recreated entries to a new disk, and then try to BRUN or RUN each of the program files, and to read (with a word processor or textfile read program of some sort) your text files. (If you know what type of Binary and Textfiles are likely to be on the disk, that may help.) It may be necessary to go back to the new entry for the resurrected file and change the file type from your first guess (Integer to Applesoft is the most common problem), but if the lost catalog sector was your only problem, the job is probably complete.

The last problem we will address in this article, is what to do with an unreadable data Sector. As indicated, above, it is possible to use a Nibble Editor (such as in *Locksmith*, for example) to correct the Sector's address or checksum, but that is the subject of another article. The next best thing is to read the tracks in the Track and Sector List to find the one that is creating the problem, and change that Number to that of some other (good) sector. (Perhaps you can set the pair to T2/SF and use your disk Zap program to set up that Sector, which is not used by DOS on a INITed disk. It will place the ASCII message "This is the beginning of the bad Sector" at the top of the Sector, and "This is the end of the bad Sector" at the end, with blanks between the two messages. Your file can then be dealt with, and the place where the missing information should be recreated is obvious.)

Although fixing a blown disk is not simple, I hope that I have shown that it can be done without a lot of programming knowledge. My repairs took about 3 hours to figure out, and 20 minutes to do. The Inspector, or some similar program helps, and a study of the reference material I have mentioned will also make the job easier. Of course, if you have backups of all of your files you don't have to bother with all of this, as you need only relNIT the bad disk, and COPY all of the files over from your backup.

Finally, I must stress that this article concerns normal files stored with plain Vanilla, unadulterated DOS 3.3. If your disks have been 'protected' from 'software pirates' they also may have been 'protected' from the quick and dirty repairs suggested here. (Too bad they can't 'protect' a disk from I/O ERROR.)If you have such a disk, you may have no alternative but to go back to your manufacturer, and thank him for whatever backup program he has established.

So be careful with your disks, and be sure to back up your important files. But just in case you're human, I suggest that you clip this article. Because I'm sure that you'll need it, someday.



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Did the Applefests Go Sour?

by Donna Caldwell

Computers, assortments of hardware and software, peripherals, furniture, publications, robots, and a mime — The merchandise all being scrutinized, browsed through and passed over by thousands of hobbyists, enthusiasts, home-users, businessmen and teachers — No, this isn't the scene of a computerized circus but rather the four 1982 Applefests.

The first and largest of the Applefests this year was held in Boston. This first show in the series included hundreds of manufacturers, dealers, and distributors exhibiting their Apple-related or Apple-compatible products. Unlike the following three Applefests, the Boston show went much further than an exhibition show case. Visitors found the opportunity to use a hands-on center where individuals could sit down with an Apple computer and see first hand what this Apple business was about. Multimedia presentations demonstrating new business, entertainment, and educational applications were also included along with seminars and workshops conducted by Apple authorities.

This particular show structure gave the public a chance to become familiar with the Apple computer and compatible products, to acquire some degree of training in its applications, and to become acquainted with support groups including Apple related publications. Understandably, the public's and exhibitors' response was positive.

Unfortunately, these workshops and presentations were absent from the following three shows. Consequently, the public was limited to the information and demonstrations given by the exhibitors. And much to the surprise of the spectators, Apple Computer Inc. was also absent from the next two shows, in Minneapolis and Houston. These two middle shows, though the smallest two of the four, brought in Heartland audiences, people not from America's two computer-intensive regions and eager to find out more about the Apple computers and their industry. They weren't called Applefests, despite being advertised as such by the promotor; it must be remembered that Apple Computer owns the name but did not manage these particular shows.

In response to questions regarding Apple's absence, Apple's Marlin Whiteman explained that due to a heavy trade show schedule, Apple Computer was committed elsewhere, prohibiting their participation in the second and third Applefests. Marlin also stated that she felt the Boston show was the better of the two that Apple attended (Applefest/Boston and Apple/-San Francisco), the reason being that Boston was the only show which included presentations and seminars encouraging more public involvement and computer awareness.

The User Groups in the four cities also benefitted from the Fests, gaining both members and revenue from their booths; but after Boston, the opportunity for the groups to do more than run a booth wasn't present. Many of the commercial exhibitors welcomed the User Groups' presence; they provided a place to send a person with a more general question or problem.

The final Applefest took place in San Francisco. During the weekend, the days were filled with steady and enthusiastic crowds. Several exhibitors commented on the qualified audience this show drew, which is not suprising with the San Francisco site being so close to the heart of the computer industry, Silicon Valley.

The public seemed to be happy with the variety of software and hardware. The lack of enough educational software for school age children drew the largest number of dissatisfied and dissappointed sighs. Otherwise, most individuals could be directed to a booth displaying a product to fit their need, or at least to someone who could lead the questioning party in the right direction.

The biggest hit among the crowd pleasers was the exhibiting robot who strolled through the fests giving details about exhibiting booths, showering the ladies with whistles and even indulging in "robot-disco" with anyone he could coerce into taking a twirl around the floor.

But the exhibitors saw more room for improvement. They too were confronted with the many schedule changes and the rearrangement work involved due to Fest management changes in advertised locations, dates, and times. Even within each Fest, booth assignments were solid, then flexible. One exhibitor stated it best: "It seemed that the schedule was on a blackboard or in a hat; nothing was solid."

Show length became a negative conversation topic among the exhibitors. Though the Boston show spanned three days, the following three shows were scheduled for four days, going from Thursdays through Sundays. It became obvious that four days was at least one day too long. By Day Four (the allusion to a hostage situation was theirs, not ours), the wear on exhibitors' faces showed.

The San Francisco Applefest was complicated by an additional time factor when exhibitors were notified that Friday and Saturday hours would extend to 9 PM. By 7 PM, the crowds had dwindled to a small interrupted flow and the last two hours became wearisome. Only a small percent of exhibitors, the larger firms, were able to provide enough booth persons to enable work shifts. Therefore, many questioned the worth of the productivity level in comparison to the mental toll resulting from the length in hours.

In addition, the Fest management changed the Sunday exhibition times late Saturday night. An announcement was made declaring that the show would start an hour *earlier*. Because of the late notice, many exhibitors were unaware of the change. When they arrived the following morning, they had an abrupt surprise finding the public walking through the auditorium while their booths and equipment were unmanned, unprepared, and unprotected. This last incident did little to uplift the atmosphere or improve the management/exhibitor relationship. None of these factors were helped by the generally abrasive attitude of the Fest management.

One exhibitor's comments summed up many feelings expressed at this year's Applefests. She stated that she was satisfied with the shows, but felt that any dissatisfaction or criticisms she had stemmed from her measure of expectations. These expectations were created largely from her involvement in past shows by other promoters, including Jim Warren's "West Coast Computer Faires", where she said the exhibitors are "spoiled" by good promotion, and by management which encourages cooperative and mutual good feelings between management and exhibitors, and between exhibitors.

In considering the positive and negative points of this year's Applefests, the general feeling seems to have been that "These shows could have been managed much better." There are hints of a change in Applefest management next year; we look forward to what next year's computer show promoters will bring to Apple users and exhibitors in the line of Apple-related computer shows. And we look forward to everyone's cooperation in viewing past experiences and future expectations to make next year's computer shows even better!

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Wizardry

A complete role-playing campaign in Runtime Pascal.

by Paul Meyer

WIZARDRY, released by Sir-tech Software for the second time in late 1981, is one of the most impressive adventure games on the market. It is almost a complete implementation of a version of the original Dungeons & Dragons rules, on an Apple. Characters can be of several different character classes: Fighters, Mages, Priests, Ninja, Samurai, Thieves, Bishops, and Lords. An adventuring party can be formed from up to six adventurers, and then can enter the mysterious depths of the dungeon. This dark maze contains more varieties of monsters than most, and is continually repopulated between adventures, but it also boasts tricks, traps, mysterious statues, teleporters (obvious and sneaky), areas of darkness, chutes, pits, and randomizers. As if this plethora of capabilities wasn't enough, provisions can be made (and often are) to call in special subroutines for even more unusual puzzles and traps from within the database. To top this all off, provisions are made for characters to be moved to new scenarios (one of which has just been released) after they are done with the first. On the whole, although certain aspects of the game are not quite what they could be, the game is much more interesting and varied than any other I have seen, and has such capabilities for expansion that it should never pale, even after a hundred hours of playing time.

The game was originally released for marketing tests in early 1981, then was withdrawn from the market for polishing and for replacement of the original, small scenario by a full, ten-level dungeon. Several new types of tricks and traps were added, the monster listings were lengthened enormously, and provisions for showing pictures of monsters were added. The ability to transfer characters was retained, so that those who had purchased the original version could move their already-existing characters to the new, full-blown scenario. This bodes well for the claim that characters will be transferable from scenario to scenario in all the coming releases for the game. The ability to so transfer characters is important for the sole reason that Wizardry is a complete role-playing game, and just as in human-refereed games, a player grows attached to,and begins to identify with his characters.

The game plays very smoothly, and although sometimes the delays waiting for the disk can be irritating, provisions are made for adjusting the length of time that messages stay on the screen during combat, so that beginners can see what is going on, but advanced players do not need to wait forever. Once the party has been formed, all commands are combinations of single keystrokes. Most situations supply menus, and clarification can be found in the rulebook. The screen layout allows for a menu area, an area where long-term spells in effect are shown, and a complete status display of the vital statistics of each character in the party, as well as a three-dimensional perspective view of what is seen by the party. Movement turns are fairly straightforward, with options such as **F**(orward, turn **L**(eft, turn **R**(ight, **K**(ick down a door, etc. Combat rounds are handled similarly, but each character can perform one action per round, so that the front row may attack with weapons while spellcasters throw fireballs and healing spells from behind. Extensive use seems to have been made of Pascal's automatic swapping and overlay (S++) option to allow the game to flow smoothly. Monsters can be encountered in place in rooms or wandering about the halls. The former type often keep their treasures in chests, which can be protected by more than a dozen different traps, while the latter have substantially less treasure, carried about on their persons (beings?). As the party goes deeper into the dungeon, fewer and more powerful monsters are found, and the traps become deadlier and deadlier, but the treasures also become progressively richer, so that when a party becomes so powerful that they find no challenge on a given level, they may seek out a route downward that will allow them to fight foes worthy of their abilities for larger sums of money and an occasional item of magical power.

The game includes some elementary economic factors: There is a general store where adventurers may equip themselves, and where a wealthy person may purchase minor magic items. Adventurers can sell items they find to the store as well, to get extra money, and in all cases the store keeps inventory. When a party buys up all of some magic item, no more will be available until such time as they are found in the dungeon and/or are sold back to the store. Money is necessary to pay for lodging between adventures, as well as to pay the temple to resurrect the dead, revive the stoned or paralyzed, or perform other such miracles when the party cannot. (Woe unto the impoverished party when their only Cleric capable of curing paralysis is himself paralyzed!)

Errata

The manual to the game has a few incorrect pieces of information, presumably because the game was modified after the manual was being printed. While these errata are not "official", they represent the findings of players, often players who became very irritated when the misinformation caused harm to characters.

First of all, some clarifications: age is one of the most important aspects of the game, although it is played down in the characteristic descriptions. Long before a character reaches age 50, he/she begins to lose characteristic points as well as gain them when going up a level of ability. (*Tell us about that! —PCW*) The chances of losing and gaining seem to be based on age more than any other attribute. The ten years aging that can occur because of reset/power failure, as explained in the rulebook, is more catastrophic than it sounds.

Also, although a character ages a week for each week spent in the inn

regaining hit points, he/she does not age at all when spending a night, or any number of nights, in the stables just to regain spells. It is thus to the player's advantage to use up all of the party's healing spells before resorting to the inn to heal up characters.

Note that the LOMILWA spell (third-level cleric) has the same duration as the MAPORFIC spell (fourth-level cleric) — the entire expedition. Nobody has ever had LOMILWA run out on them, except in areas of darkness. This leads to a second point: both MILWA and LOMILWA (light and continual light) will be negated if the party enters an area of darkness.

Although the Cleric spell DIALKO (cure paralysis, sleep, and hold) can, as the spell description states, be cast at any time, *it will not cure paralysis if cast in combat. It must be cast* ***in camp*** *to work against paralysis.*

Unlike all other potions, the potion of LATUMOFIS (neutralize poison) does not run out after one use. Again, nobody has ever had a LATUMOFIS potion stop working.

On the topic of potions: a potion or scroll (other than LATUMOFIS) that is used once will become a useless "broken item," which takes up space on a person's list of items carried, but has no useful purpose. As soon as you use a potion or scroll, be sure to make camp and throw the pieces away.

Important: The seventh-level cleric spell MALIKTO only affects one group of monsters, rather than all groups as the description reads. Also, it IS TOO possible for monsters to resist MALIKTO, but it does seem that the spell cuts through the monsters' resistance to other spells going off later in the same combat round.

The clerical raise-dead (DI, fifth level) and resurrection (KADORTO, seventh level) spells cost two spell points of their respective levels to cast. If you have any spell points of the level left, you may cast the spell, but two points will be subtracted. If you only have one point left, you can cast the spell and have negative one left afterwards, and this does not seem to have any untoward effect on the game.

The spell descriptions for several of the damage-causing spells, especially the high-level ones, seem to leave out some factor that adds to damage done. I have seen MALIKTO do as much as 100 hit points of damage to a monster, rather than 72, and TILTOWAIT has been known to do as much as 125 or 150 points in some cases.

A final note on spells: When the MALOR spell is used from camp, directions for teleportation are given in relative terms: so many squares up, down, north, south, east, and/or west from the party's *current* position. If you don't have a very good idea of where you are, it can be suicidal to use MALOR.

Finally, beware of constantly changing classes on characters. This capability can allow you to build a massively powerful character, but it also has several drawbacks: Whenever a character changes classes, he/she is aged 5 years. This adds up quickly. Equally important, the character's attribute scores will be reduced drastically, and most often to levels below the ones he/she started with.

Some Notes and Hints on Playing Wizardry

Due to the long-term nature of the game and the continual swapping and overlaying, the scenario side of your disk might wear out after a few dozen hours of play. The best cure for this is to make a back-up of the disk. Although the boot side of the diskette is locked, it is not used that often anyway. The scenario side, however, is in standard format. This means that someone with Pascal could use the Filer, or someone could use [CENSORED] (from the Evil Davalpus), or whatever, to copy the more-used scenario side to another disk. (A utility option is available within Wizardry to do this, but it seems to only work on the first run. Whatever method you use, be sure to check your copy out before trusting it.) Once you have a copy of the scenario side, it can be used instead of the original during play, with certain limitations, and can also be used for other purposes:

First, to play with the copy instead of the original, you must change the boot procedure slightly. First boot the original (locked) boot-side normally, and **S**(tart game. Next, when you are prompted to insert the scenario side, flip the disk and use the original one. At this point, instead of going ahead with play, immediately select **E**(dge of town, and go to the **T**(raining grounds. As soon as the disk stops spinning, you may switch your copy of the scenario into the place of the original, and then go ahead normally.

A second use for copies of the scenario disk-side requires a third copy which is, in all essence, a backup of your working copy. The Apple Filer, or [censored] or whatever, can copy a scenario disk full of characters just as easily as a new one, and you can feel a little safer from what wargamers term "rule-crocks:" such things as having an undead drain one level from your character, and watching the program reduce his hit points to the level they were at six levels earlier, take a point off of each of his attributes even though only one of them went up when he gained the level he lost, and so on.

When such things happen, you can restore the character, provided you have a backup taken just before the adventure wherein he was "crocked." The easiest way is to finish the adventure and go to the training grounds (so that the other characters are marked as returned from the adventure), insert the backup copy, go to Gilgamesh's tavern, **A**(dd the character, switch back to the working copy, **R**(emove the character, go back to the training grounds or to the leave-game option, and remake the backup copy from the active disk, which now has the character restored. Although no problems have been found with this procedure, it is also possible to have the afflicted character give all of his non-transferable (see the manual — this category includes keys, statues, blue ribbons, and other items) items to other party members, go to the training grounds, delete the afflicted character, switch disks, load up the party from the backup, again give away all non-transferable items, leave the game, reboot, use the transfer utility to move the backup character to the working disk, start the game, have the party give back the items, and leave the game. It is advisable to make a new backup before starting play again after using either of these techniques, because you will no longer have a backup of the afflicted person.

Of course, as with any backup, you have the option of restoring everything to the way it was at the time of backing up by simply copying the backup back onto your active disk. This is especially valuable if your entire party of very-high-level characters, which may have taken around a hundred hours of playtime to achieve, is killed by, for example, being surprised by six greater demons, two high wizards, four high-level bishops, and a high priest (the like of which is far from unheard-of down on the tenth level, the domain of the fell lich Werdna).

In the actual play of the game, by far the most important hint is to make a map of the dungeon. The entire labyrinth is laid out in squares, and although

such nasty things as teleporters and randomizers make mapping difficult in some places, it is very nice to have a chance to find yourself after running away or being teleported by a trap on a chest. When making maps, a higher-level mage can afford to use a few DUMAPIC spells, and when lost he almost always can afford one to find himself. The act of drawing out a map of a level on graph paper also helps to clarify one's memory of the map, so that often you will recognize a well-travelled section of the dungeon after only a few steps. It also helps to realize that the world *does* make sense, after you find yourself wandering for forty or fifty squares, only to be teleported back to where you came from.

Be very cautious about venturing down to a new level. Avoid the mistake of going too deep for your abilities. While a party of six third-level characters will begin to be bored on the first level, and will rarely lose people, that same party has only about a ten percent chance of surviving on the second level. Be aware of the differences between levels, and always make a backup before trying something new.

Don't be discouraged if your first two or three, or even six or eight parties are slaughtered to a man on their first adventures. Even the slightest bad luck can spell the doom of a low-powered party. Each time disaster strikes, you learn a little, and you are better prepared for the next try. By the time you reach second level, you will be strong enough that, if you are careful, at least some or most of the party will return alive, and you have a good chance of being able to afford the price of resurrection of dead characters.

Most of the levels of the dungeon have underlying purposes, either in the eyes of the players or of the universe. One level contains both a minor goal of the party and some places that are death-traps for parties who cannot teleport out. One level has very few special features, but is a good place to pick up magic items by wandering about, killing monsters. Another is somewhat dangerous, guaranteed to kill at least one party before you learn its secret, but is a very good place to pick up experience points for high-level characters by wandering about, using up all their attack spells on monsters, and finally teleporting or walking out. If you can find a pattern in what you see on a level, you should be able to "go with the flow" of that pattern.

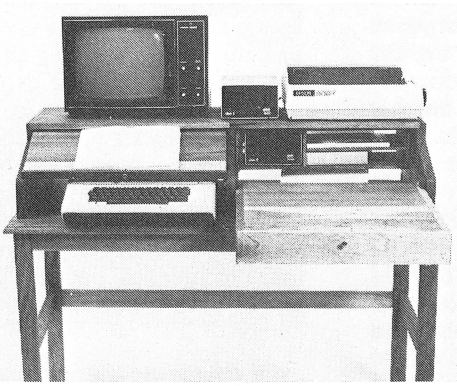
When disarming traps, both luck and agility (characteristics) are useful. Characters with high luck tend to notice traps accurately more often, while those with high agility and luck have better chances of disarming. Of course, thieves have much better chances than other characters with the same characteristics and levels. Also, it *is* possible to disarm "anti-magic" and "anti-cleric" traps: Try "anti-mage" and "anti-priest."

One final note about monster encounters: Encounters come in two types, which can be called "room monsters" and "wandering monsters." Room monsters are met only on the first time a party goes into a given room on a visit to the level, while wandering monsters can be met any time. Wandering monsters do not put treasure in chests, and generally have less treasure than do room monsters. Furthermore, wandering monsters rarely, if ever, have magic items in their treasures, while room monsters do (more and more often the deeper you are in the dungeon).

If the procedures suggested above sound complicated, that's a large part of Wizardry. Precisely because of this complexity, this is not a game of which *afficionados* tire after a few hours . . . or a few months.

May you escape with your life, at least.

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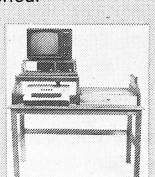
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Review:

WORD JUGGLER

by Dan D. Vanzmeister

Quark Engineering
1433 Williams, Suite 1102
Denver, CO 80218
(303)399-1096
Suggested Retail Price: $295.00

Recently, I had the opportunity to use a word processor for the Apple /// called Word Juggler. The first unusual item noted upon unpacking the software was a set of two keyboard overlays. One of these is to be placed just above the row of number keys, and the other surrounds the numeric keypad to define most of the editing functions. This made learning the system quite easy, without the continuing need to flip pages in the reference manual.

The Command Line lets you set up the way you want the document to print and look by a simple two-key stroke sequence. It then displays the command on the screen by showing the command with an underline below it. This is how Word Juggler differentiates between text and commands on the screen. The keyboard overlay doesn't interfere with the normal operation of the /// for other programs; I'd like to see this type of help item included with other types of programs.

Another item is the ability to format a blank diskette from within the program; that's the first time I've seen this feature in an Apple /// program. What that means is that if you're "trapped" with a long file, panic is prevented. Just put in a blank disk, format, and save the text.

Word Juggler has all of the regular features found in good word processors, and a few that are new and/or unusual. Standard features include block moves, find/replace, tabs, editing commands, etc.

Unusual features? For example, let's say that you want to type a label or envelope. With Word Juggler's **TYPEWRITER** command,your Apple keyboard becomes a typewriter; each key pressed is directly output to your printer, then and there. Another command, **TRANSMIT LINE**, lets you transmit a title line from your text directly to your envelope or label.

The program supports incremental spacing. If you have one of the letter quality printers like a Qume or Diablo, it will allow for bold, underline, superscript, and subscript.

One of the items every word processor should have is a preview feature that lets you see the document on the screen as it will appear in print. This is called "what you see is what you'll get." With Word Juggler, you press one key for preview. You also press one key to print out a document.

Another of the advanced features included with the program is a **LET** command, with which you can redefine variables from within a document. You can create a simple data base and merge it into your documents. In this way, you could have a list of names and addresses; the program inserts those names in multiple letters. It even has the ability to sort the file, print mailing labels, and select part of the file for merge or print functions. With a 128K Apple ///, the capacity is about 130 records of 6 fields per file. With a 256K Apple ///, the capacity is 250 records per file. Many files can be stored on one disk.

Supplementals

Quark has just released another package, at additional cost ($195.00). The **LEXICHECK** spelling checker program contains a 30,000-word dictionary and offers the ability to make up your own dictionary as well, and add words to an existing one. It will check your document at about 9,800 words per minute (with the display off: Ctrl-5), and quite a bit faster with a hard disk (14,000 wpm with the display off). To use LEXICHECK, just put it in Drive 1 (without hard disk), press the command, and it checks the document. You make changes based upon the display, and are even offered the option to add the word to the directory if you wish.

Another Quark program is TYPEFACE, which allows the word juggler to interface with a typesetter. That's one I couldn't evaluate.

One other item is worth mentioning. Quark is about to release a version that will allow true proportional spacing on Diablo, Qume, and NEC Spinwriter letter-quality printers, directly from within the Word Juggler software. It will support four of the most used proportional print wheels and their sizes. That will save the cost of special PROMs for the printer which are now required.

All in all, the word juggler is a quality program, with the best instant reference system I've ever used, right there on the keyboard.

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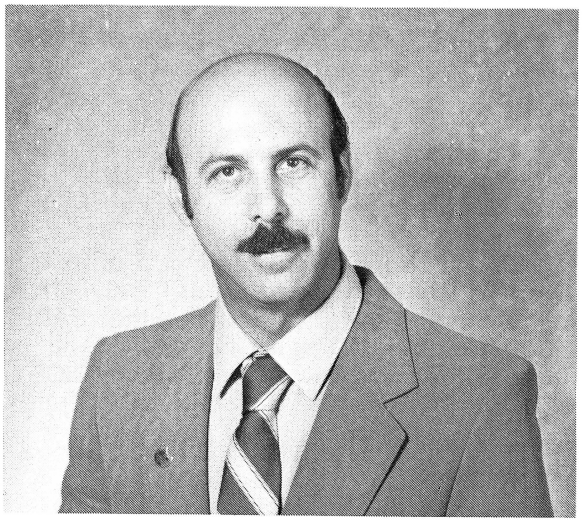
1. Apple Orchard (0277-1950).
2. Filing Date October 1, 1982.
3. Published bi-monthly in 1982, $15.00 for six issues.
4-5. Office of publication and general business offices are located at 908 George Street, Santa Clara, CA 95050.
6. Editor and Publisher: Peter C. Weiglin, 908 George Street, Santa Clara, CA 95050. Managing Editor: Donna Caldwell, 908 George Street, Santa Clara, CA 95050.
7. The owner is the International Apple Core, Inc., a non-profit California corporation. There are no stockholders. Mailing Address is 908 George Street, Santa Clara, CA 95050.
8. Bondholders, mortgagees, and other security holders: none.
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10. Circulation:

	Average number of copies of each issue during preceding 12 months	Actual number of copies of single issue published nearest to filing date
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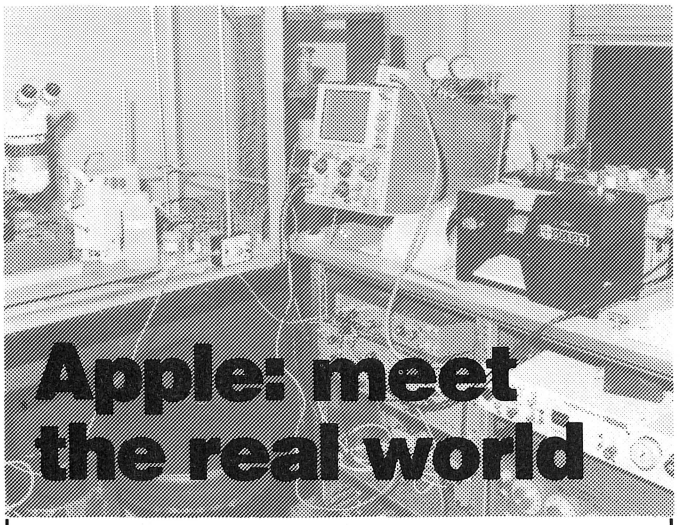
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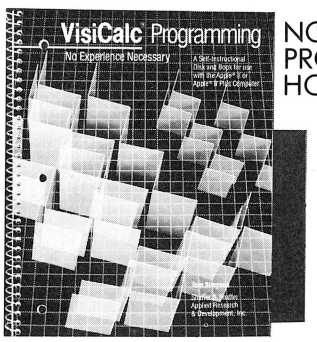
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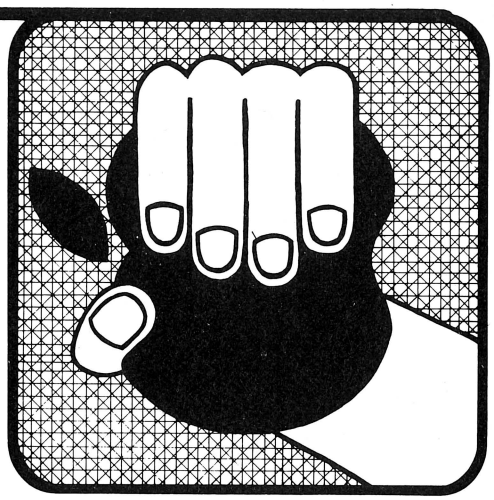
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Mark L. Crosby

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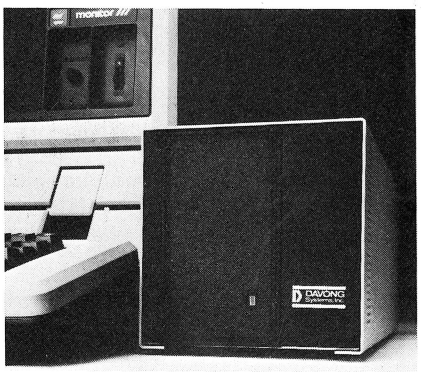
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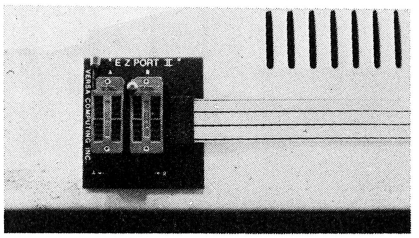
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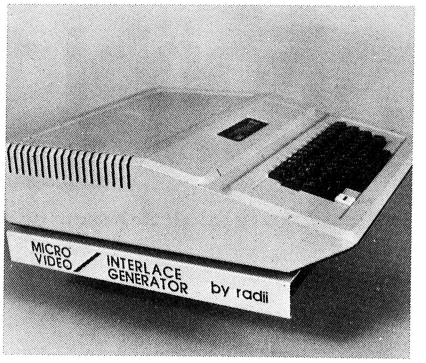
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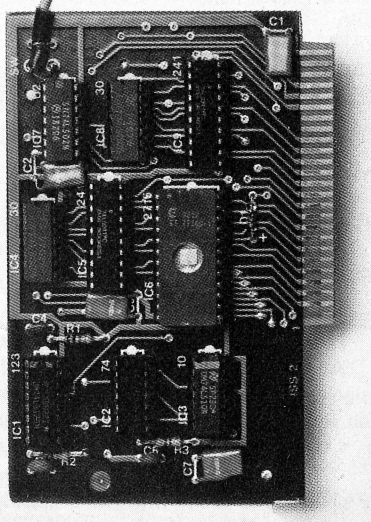
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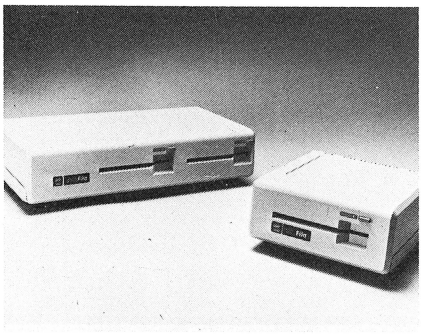
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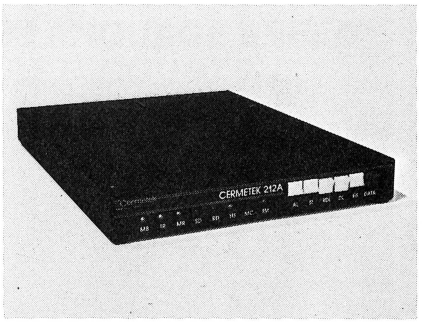
disk system. The most prominent design feature of the new drives is variable disk speed; the disk rotates faster on the outer tracks than on the inner tracks, to allow for greater density on the outer tracks. Data transfer rate is 62 Kilobytes per second, four times faster than conventional floppy disk drives. New floppy disks are being made for the system by Verbatim, 3M, and other suppliers. To be available in Spring 1983, UniFile's expected price is under $1,000; DuoFile will sell for less than $1,700, at Apple Computer dealers.



The **Software Automatic Mouth (S.A.M.)** is a brand new, all-software, high quality speech synthesizer which gives you unlimited vocabulary and full inflection, under your control. Effortless access from BASIC. S.A.M. includes a separate pitch and speed control and a thorough, instructive owner's manual. Easy to learn phoneme spelling system and automatic English to speech conversion. Features elaborate internal pronunciation rules for natural sounding speech. For the Apple II or II Plus, S.A.M includes an 8-bit digital-to-analog converter and audio amplifier on a board (amplifies the sound of all your Apple games), disk and complete documentation with an English phoneme dictionary - $124.95 plus $2 shipping and handling.
Don't Ask Computer Software
2265 Westwood Blvd., Suite B-150
Los Angeles, CA 90064
(213) 397-8811

The **Vista V1200 6 Megabyte hard disk alternative** offers a removable Vista-Pak cartridge that holds five 5 1/4-inch diskettes with 1.2 Megabytes each. Selection of the diskette is made by a special diskette loading system. The drive automatically senses improper loading, and reclamps the diskette automatically. Microstep servo control calibrates the drive automatically to each diskette individually, assuring interchangeability of media between drives, and making drive alignment a thing of the past. The special servo can move in increments as small as 1/100th of a track, and can even track diskettes recorded off-center. Microprocessor controlled spindle speed ensures accurate recording and retrieval of your valuable data. Includes software for DOS 3.3, Pascal, and CP/M. An enhancement to DOS, "Quickcharge" enables a 5X speed increase. $1,549 at your local dealer or contact:
Vista Computer Company, Inc.
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A **low cost 300/1200 baud modem** for small business or personal computers, the Cermetek model 212A uses the latest in microprocessing and signal processing technology. Features auto-dialing, auto-answer, auto-parity sense and auto-speed sense. The modem can be used as a front-end communications processor in applications that connect local area networks together or in electronic mail distribution, or for simple access to software timesharing facilities. Compatible with Bell's 103/113, 300 baud standards as well as with the Bell 212A, 1200 baud standard. It communicates with the host using a RS-232C interface. $595.00 from:
Cermetik Microelectronics, Inc.
1308 Borregas Avenue
Sunnyvale, CA 14086
(408) 734-8150



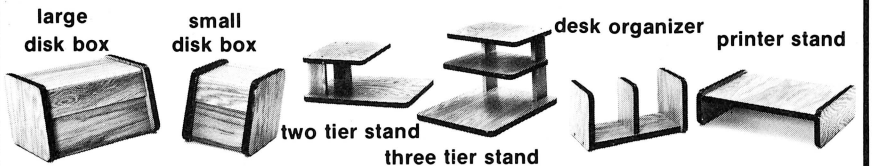
The Keypad converts the Apple keyboard to one of eight 10-key or hexadecimal keypads. It is a hardware conversion that is compatible with all software - decals are provided. Works with any revision Apple II or II Plus and instantly switches between standard keyboard and keypad. Custom layouts are available. Installs easily with no soldering - $79.95. The Magic Keyboard gives everything The Keypad gives you plus: at the flip of a switch you can select between standard QWERTY keyboard and your choice of Dvorak, A.S.K., Montgomery, Left & Right One-Handed, and Alphabetical Order. An easy modification and optional PROM allows true upper/lower case entry - $89.95.
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Goleta, GA 93118
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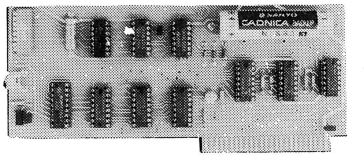
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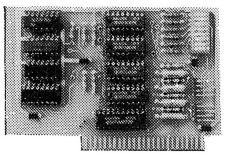
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- We give you lots of software. In addition to Compose and Play programs, the disk is filied with songs ready to run.
- Easy to program in basic to generate complex sound effects.
- Four white noise generators which are great for sound effects.
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- Will play songs written for ALF synthesizer (ALF software will not take advantage of all the features of this board. Their software sounds the same in our synthesizer.)
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- 8 Channels
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The analog to digital conversion takes place on a continuous, channel sequencing basis. Data is automatically transferred to on board memory at the end of each conversion. No A/D converter could be easier to use.

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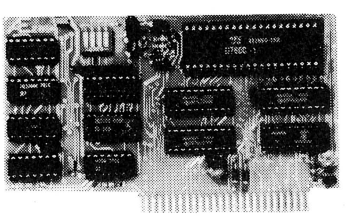
DIGITAL INPUT/OUTPUT BOARD

- Provides 8 buffered outputs to a standard 16 pin socket for standard dip ribbon cable connection.
- Power-up reset assures that all outputs are off when your Apple is first turned on.
- Features 8 inputs that can be driven from TTL logic or any 5 volt source.
- Your inputs can be anything from high speed logic to simple switches.
- Very simple to program, just PEEK at the data.
- 4 other outputs are also provided. User 1, reset, interrupt request, non-maskable interrupt.
- Now on one card, you can have 8 digital outputs and 8 digital inputs each with its own connector. The super input/output board is your best choice for any control application.

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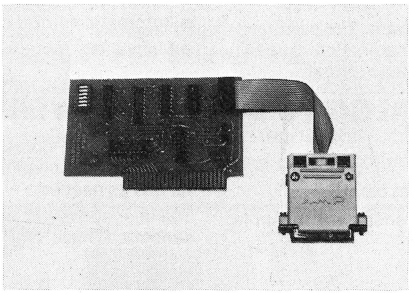
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SPOOL/64 is a 64,000 character hardware print spooler. It buffers print output and transmits the information to your printer at the printer's specific print rate. It buffers up to 13 minutes of print output (at 80 characters per second). SPOOL/64 plugs directly into both your printer and computer, accepts input from parallel Centronics cables (serial RS-232 available soon), and its user programming feature allows you to download your own programs so SPOOL/64 can handle sophisticated print routines. SPOOL/64 is priced at $399.
Apparat
4401 S. Tamarac Parkway
Denver, CO 80237
(303) 741-1778

Time Machine II is a real-time clock and calendar. Their new Apple Spool software option lets your Apple execute two programs at the same time. Apple Spool uses transparent interrupts to spool files to your printer, leaving the computer free for other tasks. Or, use their DOS Date-Stamper software to automatically add the date when disk files are created or modified. Current time is displayed as part of the disk catalog. Time Machine II is a sophisticated 1 second to 99 year clock peripheral. Read, write, format, set and interrupt routines are contained in a powerful 2K ROM driver. The basic system comes complete with clock, battery, 50 page manual and demo disk with DOS Date-Stamper - $139.00. Apple Spool Software - $19.95. Pascal Software Option - $19.95. Distributed by:
The Computer Room
1879 S. Main St.
Salt Lake City, UT 84115
(801) 486-4839.

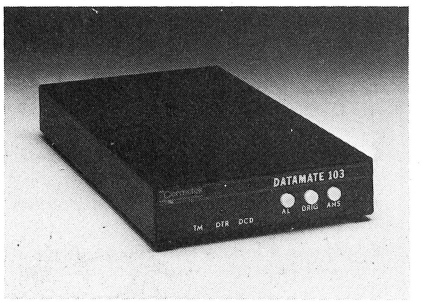
The **SPI card serial I/O: firmware on RAM** allows you to adapt the SPI to virtually any RS-232 serial device with total control. Program it like any other region of your Apple's memory. Examine it, change it, run it. BSAVE your SPI programs on disk. Then BLOAD the one you want directly into the SPI RAM. Dumb terminal, remote computer and printer applications can use the firmware provided with the SPI card. Control characters select the various features and operating modes. Features firmware in 2K x 8 static RAM which can be replaced with a 2716 PROM, full or half duplex, self-test and error detection, standard baud rates, etc. The SPI RAM can be used to store machine language routines, utilities, or even firmware for use by other peripheral cards. No changing HIMEM or LOMEM. No worry about it being written over by another program. It's a new way to use peripheral memory. Only $99.50 including 5 foot cable and documentation. For longer cable lengths add $1.00 per foot.
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P. O. Box 1088
Stone Mountain, GA 30086

The **Versa serial interface** has been designed to function only with those features necessary to operate a serial printer, which means you don't pay for full serial communications capabilities found in most other serial interfaces that will never be used by you. The serial interface operates with the RS-232C protocol and other configurations can also be accommodated at installation time. The unit operates at switchable baud rates of 300, 600, 1200, 1800, 2400, 4800, 9600, and 19,200. In addition to baud rate, the board is equipped with switches for automatic line feed, screen display and line length. The interface package contains a 4.5 x 2.7-inch printed circuit board and a ribbon cable with eight female pins crimped on one end and a 16 pin dip header on the other. The crimped pins are inserted into the female connector to interface it to a particular printer.
Versa Computing, Inc.
3541 Old Conejo Road, Suite 104,
Newbury Park, CA 91320
(805) 498-1956.



The new **Lab Data Manager 1 (LDM1)** software package facilitates single or multichannel acquisition, storage, display and output of data from lab instruments, using the Apple II Plus microcomputer equipped with IMI's ADALAB interface card. LDM1 is an extremely useful tool for chromatography, spectroscopy and many other lab instrument applications. Lab Data Manager permits data acquisition from 1 to 16 analog-to-digital converter channels. Extended memory commands allow use of 16K, 64K, or 128K RAM cards for bulk data storage. Data processing features include a wide variety of math operations for data reduction and transformation. Up to four data sets of 1,024 values may be displayed on the CRT screen and scrolled in any direction. The stripchart recorder features of LDM1 allow printout of continuous, four-channel stripchart of any length in a wide variety of formats, using a dot matrix printer. Includes 3 disks and 3 instruction manuals for $250. The manuals are available separately for $15, deductible if software is purchased later.
For additional information, write:
Interactive Microware, Inc.
P.O. Box 771
State College, PA 16801-0771
(814) 238-8294.

The **Datamate 103 intelligent auto-dialing Bell 103/113 type modem** communicates at 300 baud, full duplex over standard dial-up telephone lines. Features on-board serial operation system which offers menu driven features such as auto-dial and auto-answer. Its dialing technique distinguishes it from other auto-dialing systems because it adapts to the needs of the local telephone switching system by automatically selecting either a DTMF (Touch-Tone) or a rotary-type pulse dialing method. This enables the Datamate 103 to access commercial long distance carrier facilities such as MCI and SPRINT. The auto-dialer allows the host data terminal to dial directly from its ASCII keyboard, eliminating the necessity for an associated telephone. Ten different dialing commands are supported, among which are DIAL, DIAL FROM MEMORY, DIAL (N) TIMES UNTIL ANSWERED, DIAL LAST NUMBER, LIST DIRECTORY, AND HELP. Can also detect ring-back, busy, dial, and modem answer. It even recognizes the human voice. A seven number non-volatile memory holds frequently called numbers to aid in speed dialing. Supports both manual and automatic originate and answer modes. It is FCC approved for direct connection to the telephone line. Interface to the host data terminal is provided via an RS-232C type connector. $295.00 from
Cermetek Microelectronics
1308 Borregas Avenue
Sunnyvale, CA 94086
(408) 734-8150



Memory

64K RAM adapter allows the use of 64K RAMs in place of 16K RAMS in the Apple II Plus motherboard. Includes address module, full installation instructions and documentation, and disk software to emulate a full 35 track DOS 3.3 phantom floppy drive. Twenty-four 64K RAM ICs are required in addition to the adapter. Version I requires minor rework of motherboard and is available direct for $79.95. Version II requires no rework and is available direct for $99.95. Either version with the required 24 64K RAMs is available for $349.95 (Fujitsu 8264s or equivalent).
Cramapple
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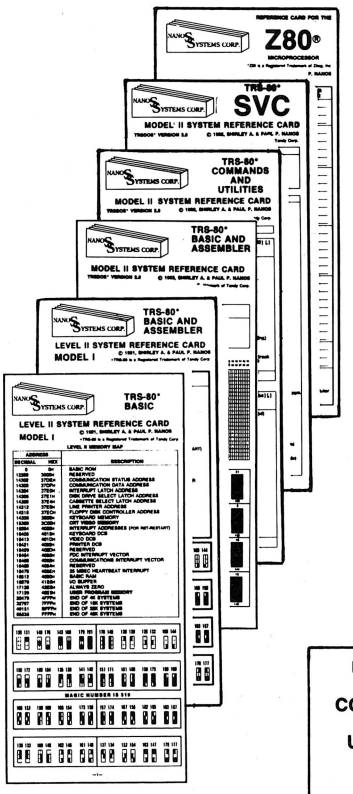
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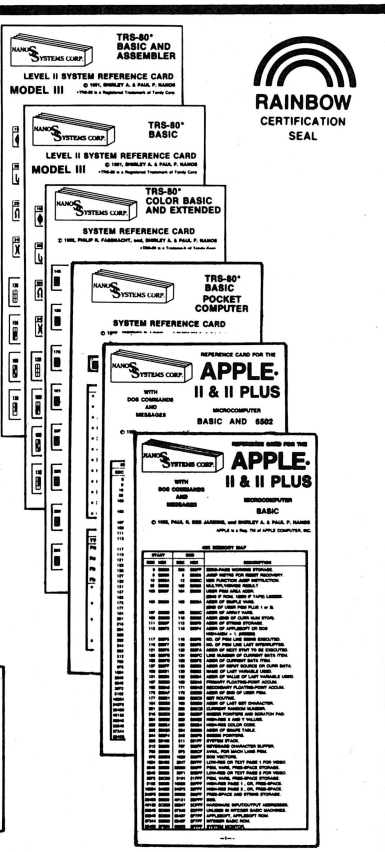
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Omega Microware, Inc.
222 So. Riverside Plaza
Chicago, IL 60606
(312) 648-4844

Memory expansion for the Apple can give you a maximum capacity model for VisiCalc. Add up to 128K to your present workspace (even if you already have a 16K card in use!). 32K RAM card $239, 64K RAM card $425, 128K RAM card with 5 comprehensive software packages - MOVEDOS, RAMEXPAND (for Applesoft, Integer), PSEUDO-DISK for DOS 3.3 or 3.2, CP/M, and Pascal - $599. VC-Expand-/80 ($125) adds 80-column capability to VisiCalc. Works with the Videx 80 column card. Previous owners of VC-Expand can upgrade to VC-Expand/80 for $25. VC-Expand ($100) works in conjunction with one or more Saturn memory cards.
Saturn Systems, Inc.
P.O. Box 8050, 3990 Varsity Drive
Ann Arbor, MI 48107
(313) 973-8422

The Synetix Industries **SSD Solid State Disk Emulator** provides complete plug-in emulation of either a single (147 KByte) or dual (294 KByte) disk drive. The memory board will operate in any Slot, 1 through 7. Total software compatability is maintained for Apple DOS 3.3, Apple Pascal and CP/M. Up to seven SSDs may be used depending on other peripheral equipment in use. The board also provides automatic copying of disks into SSD memory. It can increase speed up to 1000% while adding up to 2 Megabytes of Solid State Memory to the Apple. Requires no external power or modification to the Apple. Single Disk 147 KBytes - $550.00, Dual Disk 294 KBytes - $950.00.
Synetix Industries
call toll free (800) 426-7412

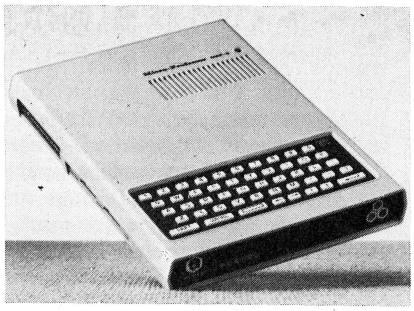
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New **Microprism Printer** from Integral Data Systems features dual speed capability with 75 characters per second in correspondence-quality mode and 110 characters per second in high-speed data mode. It also produces sharp, high-density graphics in an 84 x 84 dot per inch format. Clean, crisp output in a single pass. Other standard features of the Microprism include proportional spacing, text justification and software compatibility with their more expensive Prism Printer line. At your local dealer or contact:
Integral Data Systems
Milford, NH 03055
(800) 258-1386

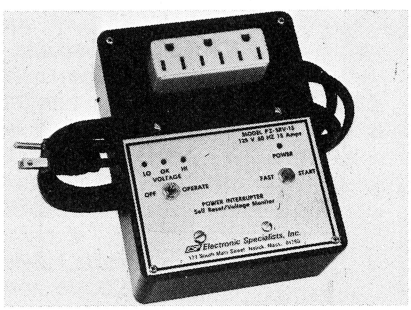
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Strobe, Inc.
897-5A Independence Avenue
Mountain View, CA 94043
(415) 969-5130

Miscellaneous

The **Micro-Professor II** is a new, compact computer from Multitech Electronics. MPF-II has 64K bytes of ROM, including 12K bytes of BASIC interpreter compatible with the Apple II. It also includes 16K bytes of RAM with 7K bytes available for user programming. Optional software cartridges provide other languages including ASSEMBLY, Pascal, and FORT . It offers color graphics and printing capabilities, and comes with a 49-key alphanumeric keyboard, including nine function keys. Cassette tape is used for back-up storage. The Central Processing Unit is a 6502 microprocessor, which is the same CPU used in the Apple II. The powerful video display capabilities include text, low-resolution graphics or high-resolution graphics in 6 colors. The screen format is 960 characters (24 lines, 40 columns), using a 5 x 7 dot matrix. Characters can be displayed in normal or inverse mode. Graphics capability is 40 x 48 dots (low resolution) or 280 x 192 dots (high resolution). An on-board speaker is provided and the MPF-II will connect to any printer with the Centronics interface. A 40-column thermal printer with graphics capability is available from the manufacturer as well. Comes complete with a switching power supply to connect to standard 110-volt AC outlets. Optional joysticks or a remote control box can be attached for game control. Two other computers, the MPF-IIC, a Chinese character version of the MPF-II and the MPF-I, a compact Z-80 based microcomputer system for educational, personal and industrial applications. The MPF-II is ideal for use by other manufacturers in dedicated industrial systems that usually call for special-purpose microcomputers. It is priced at $399.
Multitech Electronics Inc.
195 W. El Camino Real
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(408) 773-8400



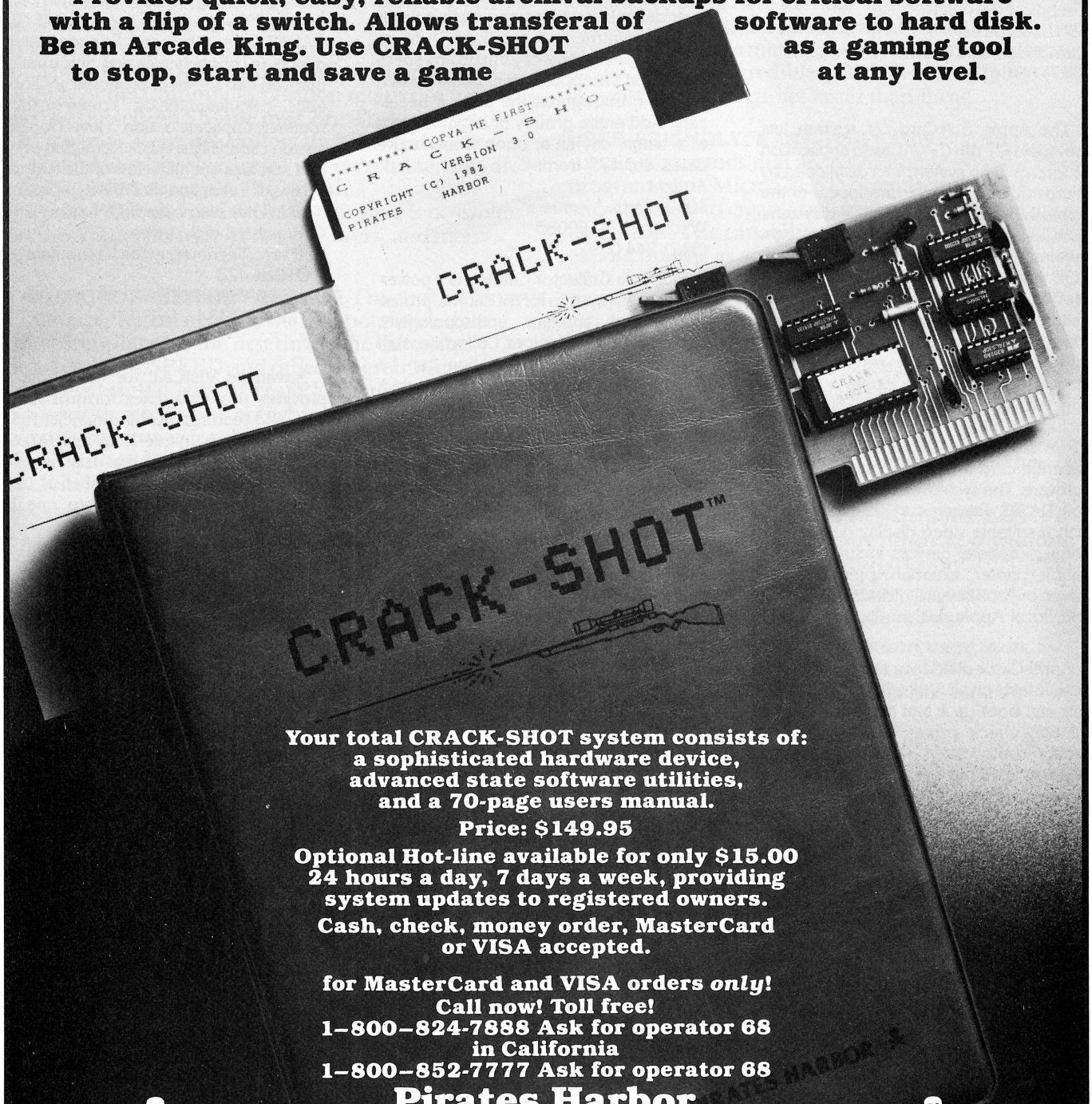
This **Self-Reset Power Line Interrupter** will disconnect the AC power from your computer or other equipment if the AC line voltage is disrupted or exceeds preset safety limits. A 4-minute time delay, followed by automatic self-reset, helps avoid wide voltage fluctuations associated with power line malfunctions. An optional Line Voltage Monitor is available. Intended for installations operating unattended for long periods, the Self-Reset Power Interrupter provides safety and protection for equipment and personnel. Connecting to the AC line with a standard 3-prong plug, the interrupter can accommodate a 15 amp resistive load or a 10 amp inductive load - $185.95. The model with Voltage Monitor is $205.95.
Electronic Specialists, Inc.
171 South Main Street
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advanced state software utilities,
and a 70-page users manual.

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Optional Hot-line available for only $15.00
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for MasterCard and VISA orders *only*!
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Pirates Harbor

P.O. Box 8928, Boston, MA 02114 617–738-5051 MODEM

Apple is a registered trademark of Apple Computer. CRACK-SHOT is the trademark of Pirates Harbor.
System requirements: 48K Apple II or Apple II Plus, 1 disk drive, Ramcard helpful but not required.
CRACK-SHOT is intended to be used as a programmers aid, gaming tool, and legal archival backup of your programs.
CRACK-SHOT should not be used for illegal purposes.

The **Computer Control Center** is a neat compact unit that has six power outlets on the back panel, and six lighted switches on the front panel to give you finger-tip control of your computer and peripherals. There is a specially filtered outlet for the computer, which protects your computer from line noise, spikes and other local interference. Lighted switches show which units are on. Quality wood-grained finish provides stable support for monitor and disk drives. Solid silver switch contacts for long life and reliability. Twin fuse protection with a heavy duty power cable designed for a total load of 1875 Watts.
Technical Services
65 Union Street
Cambridge, MA 02141
(617) 864-4173

The **Apple SoftCard /// system** lets the Apple /// run CP/M based application programs. The system was developed by Microsoft Corporation, developers of the Apple II and Apple II Plus SoftCard system. SoftCard /// supports the Apple 5-megabyte mass storage system, ProFile. Both SOS and CP/M files can be stored on ProFile. No hardware or software modifications of any kind are required to install the system circuit board, which plugs into any of the Apple ///'s peripheral card slots. Operation of the Apple /// is not affected when not in the Z80 mode. Includes a plug-in microprocessor card, CP/M software, and four manuals which describe card installation and use of the software. The system also provides Microsoft BASIC. Requires a 128K Apple /// with a suitable video display device. Optional peripheral devices include a compatible printer, external Apple Disk /// drives or ProFile hard-disk drive. $450 at your local Apple dealer.

Appli-Cator disk drive tester will make 7 basic tests on all Apple drives faster than you can boot up a test program. In one minute, check power circuits, stepper section, write, read, erase, write protect and enable. Eliminates the risk of damage and smoked chips as the power monitor instantly alerts you to overloads or chips put in backwards! Accessory drive status indicators instantly show status of all lines going off the disk analog board. You know immediately of any discrepancy or change, as you test. A detailed guide takes you through the drive section by section, part by part, with helpful hints along the way. Model 4023 - $650. They also carry another model that checks other brands and types of drives (both 8- and 5 1/4-inch). Model 4077 - $395 (requires a test cable from $29 for a 5 1/4-inch 'Single' to $69 for a 8-inch 'Quad').
TEACO
P.O. Box E, 2117 Ohio Street
Michigan City, IN 46360
(219) 874-6234

SOFTWARE

Business

The "**Applointments**" program package allows the user to manage an appointment book using the Apple II computer. Appointments may be viewed directly on the monitor screen or listed on a printer. One day of appointments is visible on the screen, which may be scrolled up or down in order to view the entire day. Features user definable starting and ending times and appointment separations. Add or delete appointments or jump to any specified day in the appointment book. Search by name throughout the book if necessary. Add entire groups of appointments to a single day all at once. Show active dates, etc. $75 from:
Andent
1000 North Avenue
Waukegan, IL 60085
(312) 244-0292

Museum Collector Catalog is a powerful data base system for museums, professional and amateur anthropologists, naturalists and collectors. Collection, staff and administrative information can be entered, deleted, changed, sorted, searched and printed in multiple formats. Holds catalog and accession numbers, category descriptions, value, loan, disposition, etc. Print reports, labels, and catalog cards. Lists staff and associates, their research projects, publications and status. Schedule staff, meetings and day-to-day appointments. Features a literature file, subscription file, library file, staff/phone file includes family and contacts. Powerful text editor for writing labels, letters, reports, and papers. Mail list and file transfer programs also provided. Create your own data base list in your own words using Data Base program. $150 from:
Andent
1000 North Avenue
Waukegaf, IL 60085
(312) 244-0292

MicroCAP circuit analysis software package is capable of drawing and analyzing almost any electronic circuit. Circuits may consist of resistors, inductors, capacitors, bipolar and MOS transistors, diodes, transformers, batteries, and driving sources. Performing AC, DC and transient analysis, the system is comparable in power to mainframe programs such as SPICE, yet retains the inherent interactive feature of microcomputers. The package is available now for Apple II computers.
Spectrum Software
690 W. Fremont Avenue
Sunnyvale, CA 94087
(408) 738-4387

Turn your Apple II into a powerful programmable calculator with **Super Calculator**. Features 9 single keystroke user defined functions; 24 basic arithmetic functions; special memory operations; immediate calculator mode; program mode. Has a powerful calculator based program language. Software includes a printer interface, built-in functions, and a Program Editor. $24.95 from:
SRA
P.O. Box 44018
Tacoma, WA 98444

IFO DBMS is a new type of data base management system for the Apple computer. IFO employs the use of the CAPASS algorithm and Soundex intelligence to phonetically find information that you can't spell or pronounce. Global edits, calculated fields, screen-building routines, duplicate option, 3 level Boolean search capabilities, quick formatted prints and sort files are just a few of the features of the IFO-Version II DBMS program - $200. They also have IFO-Version III for Corvus hard disk drives.
Software Technology for Computers
P.O. Box 428
Belmont, MA 02178
(617) 923-4334

Advanced VisiCalc for the Apple III provides more complex formula handling, and features built-in financial functions. Includes unique Help and Protection facilities, guiding the user step-by-step through its use. A number of templates may be combined into one by using a simple command. $400 from:
VisiCorp
2895 Zanker Road
San Jose, CA 95134
(408) 946-9000

VIP-II is an unusual companion to your VisiCalc planning. Produces hard copy printed reports of your Grid Data and Formulas: by column; by row; in Grid Format - the way your spreadsheet is presented. A new machine language grid reader and sorter whip the big jobs into order in seconds. Using your Disk for temporary storage, VIP-II handles very large grids and lets you switch back and forth easily between a variety of report formats. VIP-II handles asymmetrical grids and automatically compensates for long formulas by segmenting and printing them in clear, contiguous blocks. The Grid Format handles spreadsheets up to 63 columns wide with any number of rows (depending on available memory). If you already own VIP Versaon I, they will upgrade it for you if you'll return your original dask and $10.45.
Specify DOS 3.2 gr 3.3 version.
Micro-Sparc, Inc.
P.O. Box 639
Lincoln, MA 01773

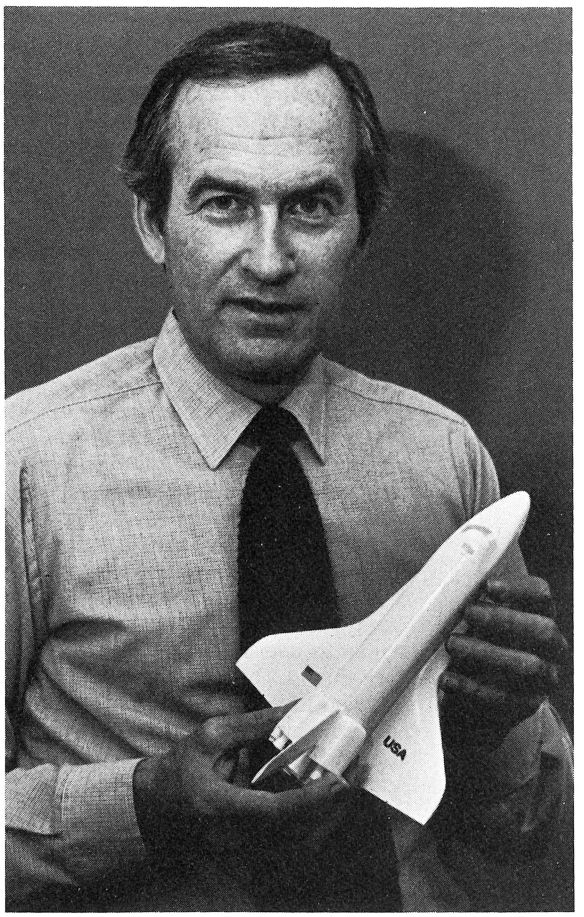
TRACK THE SPACE SHUTTLE ON AN APPLE? YES. WITH MICROSPEED!

At the Jet Propulsion Laboratory in Pasadena, NASA scientists have discovered the power of MicroSPEED. Using this remarkable hardware/software system with an Apple II, they produced a continuous graphic display of the Columbia's position relative to the earth during the second Shuttle mission. This enabled the JPL team to accurately follow the spacecraft in *real time,* and to precisely control its powerful sensors at critical points along the flight path.
Surprised that such a demanding project is possible on the Apple? So were JPL's engineers, and many others who have discovered . . .

THE MICROSPEED DIFFERENCE This extraordinary Language System exploits the real potential of the microcomputer for the first time. The difference between MicroSPEED and other programming languages is that with MicroSPEED, there is virtually *no limit* to what you can achieve. It may well be the ultimate language for the Apple II and III (and soon the IBM Personal Computer). MicroSPEED literally combines the performance of a *minicomputer* with an exhaustive set of user-friendly capabilities: hardware math processing, fast hi-res graphics and text, turtle graphics, print formating, two text editors, unlimited data types, and incredible FORTH extensibility—all at speeds up to 100 times faster than Basic.

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DEMANDING JOBS AT LOW COST MicroSPEED has been put to the test in fields as diverse as medicine, the stock market, oceanography, and the arts. In even the most challenging applications, MicroSPEED users have been unanimous in their praise of the System and manual. Typical comments are:



". . . we are more than pleased with MicroSPEED . . . I can't imagine using BASIC on any future applications."
Roger Guevremont, National Research Council of Canada.

"I continue to marvel at its versatility and power."
Carl R. Schramm, USCG Base, Kodiak, Alaska.

"An excellent package . . . No other language than MicroSPEED . . . could perform this well."
David Whittington, Boeing Computer Services.

"If you plan to use a personal computer for <u>any</u> demanding task, then we built MicroSPEED for <u>you</u>."
Sam Cottrell, President of Applied Analytics.

MicroSPEED requires the Apple Computer with single disk. MicroSPEED II includes 2 MHz math processor. MicroSPEED II + includes 4 MHz math processor.

Applied Analytics Incorporated
8235 Penn-Randall Place
Upper Marlboro, Maryland 20772 (301) 420-0700

Please send me:

_____MicroSPEED II, $495.00 _____160 Page Manual, $15.00
_____MicroSPEED II+, $645.00 _____Detailed Information

Name: _____
Company: _____
Address: _____
City_____ State_____ Zip_____ Phone No. ( )_____

μSPEED™

APPLE IS A TRADEMARK OF APPLE COMPUTER, INC.

Quick File /// is an easy to use filing system for managing small to medium size collections of information on the Apple /// personal computer. With Quick File ///, a doctor, small business owner, homemaker, or scientist can quickly turn receipts, notes, lists, and schedules into coherent files and reports. Quick File /// allows simple arrangement of records in alphabetic, numeric, date, or time order; saves time and effort in producing repetitive reports, calculations, and corrections. Two types of report formats - tables (rows and columns) and labels or index cards - can be easily created and printed. Can selectively search, display, and summarize records. Calculates totals and subtotals of numeric information. Requires an Apple /// system with at least 128K bytes RAM - $100. At your local Apple dealer.

Mass Mailer 6-1 is a menu-driven package that links automatically to MicroPro's WORDSTAR and works on Apples with CP/M. Mass Mailer stores and retrieves a wide variety of information, changes descriptions, sorts, prints, adds or deletes, and selects an entire list or any portion of it. As the user-definable label or category code is changed, all the menus in the system change to reflect the new label or code. Allows for storage of multiple lists plus splitting and merging of files. Manages and organizes many varieties of lists, accesses by any stored information and prints it out in nearly any format. Mass Mailer has a storage capability of 11 alphanumeric fields and 14 category codes per list record, and is adaptable to a wide range of uses without programming changes. The Manager's Manual contains suggested or possible enhancements to the system, known system limitations and problems/solutions encountered by users. Enhancement examples include easy setup instructions for maintaining municipal voter registration, inventory lists, mailing lists, and lists of stamp or coin collections. $199.95 at your local dealer or contact:
Alternative Software, Inc.
1165 Barbara Drive
Cherry Hill, NJ 08003

JACK offers a personal filer, calc package, word processor, and mailing label capabilities all in one unique package. JACK is an alternative to separate packages to perform these functions, each package turning the computer into a single function tool with a set of commands and terminology that make it incompatible with other software. JACK performs all functions with a simple integrated set of commands. The word processing capabilities allow creation of letters, memos, and reports. Inserts, deletes, and copies text with automatic word wrap and flush-right margins. Generates neatly formatted records which can include items that are automatically calculated as the document is being prepared. Users can arrange information in files they design themselves using the personal filer. The records can be as small as a mailing label or as large as 60 sheets of legal sized paper. As many as 1,000 records can be stored on a single disk. The calc features enable users to build decision making logic into their files. With English language calculation rules and a powerful IF THEN ELSE function, it's possible to perform complex calculations instantly. Requires Apple II with 16K memory extension (64K total memory) and two disk drives. $79.00 from:
Business Solutions, Inc.
60 East Main St.
Kings Park, N.Y. 11754
(800) 645-4513 or (516) 269-1120

DocuCalc will print documentation of your VisiCalc models including the new Advanced VisiCalc features currently on the Apple ///. DocuCalc prints single rows or columns, or whole models either by row or column, in correct sequence (i.e., 1,2,3 or A,B,C etc.). All formats are printed in words. There is multi column layout which will print even long equations but preserve the spread sheet layout. The Apple programs require an Apple II Plus with 48K, 16 sector (or Apple /// emulator mode). Only DocuCalc will read DOS or SOS files directly, the others require you to convert any Apple /// SOS files to DOS. DocuCalc also works with the IBM PC. It requires 64K and will operate with single or double sided drives. $95 from:
Micro Decision Systems
P.O. Box 1392
Pittsburgh, PA 15219
(412) 276-2387

Energy Monitor is an energy use tracking tool for the microcomputer. Accounts for energy units, energy expenditures, and energy use relative to climatic variables. Energy Monitor can handle from 1 to 90 independent energy consuming buildings, and produces a set of 6 reporting formats. Each report illustrates energy use and documents energy conservation activity by fuel type at each building and for the system as a whole. It organizes the information needed for intelligent energy decision-making. For example, the energy manager can use it to identify and set energy conservation goals and objectives, prepare the energy budget for next year, provide reports for committees, verify invoices for proper billing and fuel delivery, and document the performance of energy saving capital investments. Energy Monitor is easy to learn and simple to use; it requires no computer background. The accompanying manual contains all the information users will need. Available for the Apple II; requires 48K and Applesoft BASIC. $245 from:
Addison-Wesley Publishing Company
Reading, MA 01867
(617) 944-3700

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(515) 224-1992

Both PPT II and PPT /// are sold on unprotected diskettes and can be included in your own programs. (Programs using PPT that are to be sold nationwide may require registration and payment of a token licensing fee.)

Communications

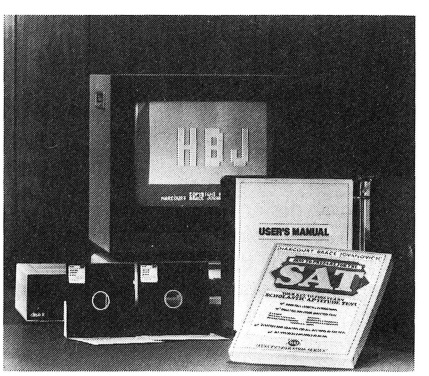
Ham Radio software for the Apple II computer includes an all-in-one CW, RTTY, ASCII Transceive Program. Uses a split screen to display incoming text on the top half of the screen and typed text on the bottom half. One line is reserved in the center to display characters as they are transmitted. Anything received can be saved on disk and any text file may be loaded off the disk and transmitted. A complete logging program is supplied at no extra charge. All interfacing is done through the game I/O socket, and an external demodulating device is required - $39.95 supplied on disk. A Slow Scan TV Program is also available that can display slow scan TV pictures on your Apple. No interface is required. Simply run a cable paralleling your rig's speaker into the cassette in-jack on the Apple. Block letters and shapes can also be transmitted. A cassette with sample pictures is supplied with the program - $24.95 supplied on disk and cassette.
Computer Systems
3763 Airport Blvd.
Mobile, AL 36608
(205) 344-7448

Texterm data transfer program makes no assumptions about the transmission codes of the remote system. Instead, these codes can be conveniently customized from the Apple II keyboard. Field tested at a university for two years, Texterm has been used for data transfer between Apple II's and a variety of mainframe, mini, and microcomputers. It allows you to enter anything, e.g., Fortran programs, messages, data, etc., and then send it to a remote computer. You can also receive and save any type of program or data. A powerful text editor supports the familiar cursor commands, including the right arrow and backspace, to help make editing (on or off line) easy. Applesoft programs can be captured in text files, then edited with Texterm. For extensive numeric data entry, Texterm provides a soft numeric keypad on the Apple keyboard. Additional features include a fast machine language search, full or half duplex, underscore, full or partial file merge, 110 or 300 baud rate, parallel and serial printers both supported. Requires a 48K Apple II with Applesoft in ROM, at least 1 disk drive with DOS 3.3, Micromodem II. $50 from:
Simpac
Suite 11-C, 1105 North Main Street
Gainesville, FL 32601

Teletransfer allows you to transfer any DOS 3.3 file from one Apple to another with no special file preparation. A file to be transferred is 'lifted' directly off the host Apple's diskette and transmitted over the telephone lines to the remote Apple's diskette sector by sector at the rate of 6 sectors per minute. A comprehensive CRC-16 error checking routine is used to ensure the reliability of the transmitted information. Teletransfer is an alternative to using the mails for exchanging programs, word processor files, VisiCalc files, etc. Both Apples must be using the Teletransfer software in order for a transfer to take place. Versions are available for the Hayes Micromodem and the Novation Apple-Cat. $40 for one or $75 for two (specify Micromodem or Apple/Cat version when ordering).
Rocky Mountain Software Inc.
#214-131 Water Street
Vancouver, B.C. Canada, V6B 4M3
(604) 681-3371

Education

Score high with "How to Prepare for the SAT". It combines computer software, review textbook and user's manual into the most comprehensive SAT study program available. It has 1000 electronic vocabulary building flash cards and 560 specially designed computerized drill items. Scores and times your performance, calculates college board equivalent score, and diagnoses your strengths and weaknesses in 15 key areas of study. The book is a 470 page text with four full-length exams - enter answers in computer for instant scoring and diagnosis. Educator's Edition available with 4 sets of software programs and 20 textbooks. Requires an Apple II or Apple II Plus with 48K and Disk (DOS 3.3). Available at B. Dalton and other fine bookstores or your local computer store.
Harcourt Brace Jovanovich, Inc.
1250 6th Avenue,
San Diego, CA 92101
(714) 231-6616

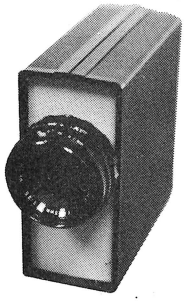


Note Trespassing is a musical game for the Apple II microcomputer. Hi-Res graphics are used to display manuscript-quality notes which dynamically move across the musical staff. The object is to eliminate all of the notes, by matching them with their letter names, before they can reach the end of the row. As each note is identified, its actual pitch is played through the Apple speaker (no additional hardware is required). Options include: choice of clefs (treble, bass, soprano, alto, tenor), three levels of difficulty, and muted response. Complete instructions are contained on the disk, enabling the beginner to quickly and enjoyably learn how to read music. Advanced musicians can practice sight-reading and review some of the less-common clefs. Note, Trespassing runs on Apple II or II Plus microcomputers with DOS 3.3 and 48K of RAM, Applesoft, and game paddles. $25 from:
Notable Software
P.O. Box 1556
Philadelphia, PA 19105

The program, "**The Dimensional Analysis of the Great Pyramid**," was written as a result of 25 years of research in Ancient Metrology. They contain a great amount of information and an orderly presentation of many calculations. The programs reflect a mixture of theory and history. People with an interest in mathematics or ancient geography and history, as those in High Schools and Colleges. This is an ideal system Features the dimensional analysis of the Pyramid of Cheops and a proposed solution to Archimedes' cattle problem. A program on the Rhind Mathematical Papyrus is presented that illustrates Egyptian methods of solving problems and shows how doubtful or obliterated hieroglyphs may be verified through math ematics. Written in Applesoft BASIC. Requires an Apple II with 48K and DOS 3.3. Backup copies may be made. Remark statements have been interspersed in the programs to guide one wishing to review or modify the routines. $25 (add $5 outside U.S.) from:
Louis K. Bell
P.O. Box 7
Augusta, GA 30903
(404) 790-6854

The **Eureka Learning System** is a courseware authoring system for the Apple computer. The Shape Editor allows course authors to create line drawings utilizing the Apple's high resolution graphic capabilities. These drawings can be incorporated in lessons written with the Eureka Learning System. The Character Editor provides facilities for creating special characters and symbols for incorporation in lessons. The creators will update system licenses at no cost for one year and for a nominal yearly charge thereafter. The Eureka Learning System is a departure from the Pilot-type frame and branch authoring system. The course material is presented through declarative and interrogative sentences, designed by the course author. The computer is used to combine

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Scottsdale, AZ 85261
(602) 948-9817
Telex 165 750

the facts being presented with sentences designed by the course author. Thus, a variety of presentation styles are available to meet the requirements of the material being presented. Requires an Apple II or II Plus with 48K, Applesoft in ROM with DOS 3.3 and one drive. Demonstration package - $25. License to use the Eureka Learning System - $495.00, each additional computer - $49.50. Documentation includes a Teacher's Guide to the System, a Tutorial manual and reference notes - $10.00. Software Maintenance (second and subsequent years) - $100.00.
Eiconics, Inc.
211 Cruz Avenue, P.O. Box 1207
Taos, NM 87571
(505) 758-1696

Here are several music activity lessons for the Apple II computer, including Music Note Name Drill, Pitches On The Keyboard, and Key Signature Drill. This series also includes a new ear training game entitled Ear Challenger. As with all ECS products, the materials have been student tested and offer high quality instruction at an economic price. Cost of each lesson in the series for the Apple II (48K, one disk drive) is $39.95. The music series is also available for other computer systems.
Electronic Courseware Systems, Inc.
P.O. Box 2374, Station A
Champaign, IL 61820
(217) 359-7099

Financial

The **OPTIONX option analysis program** is for experienced option writers and speculators. Incorporates both the Cleeton model and Bookstabler's extension of the Black-Scholes model. Automatic calendar, stock data base manager, recursive calculation of volatility, and much more. 65 page manual completely describes the program and the equations used. Requires DOS 3.3 and 48K. $95 for the program and manual. Satisfaction guaranteed.
Crawford Data Systems
350 N. Lantana, Suite 561 E
Camarillo, CA 93010

Cash Register and Inventory System (CRICS) is a point-of-sale inventory control system for the Apple II Plus that is capable of handling 1200-plus stock items. While preparing a sales receipt for your customer, CRICS automatically updates your stock on hand, plus daily, monthly and yearly sales figures. The following statistics are kept for all stock items: stock number, description, vendor, buy price, selling price, margin, number on hand, number on order, number sold this month and this year. A maintenance routine is included in the system, allowing manipulation of these statistics. CRICS also produces a variety of reports such as daily, monthly and yearly sales reports, price lists, margin reports and many others. The system requires a 48K Apple II plus, two disk drives, a monitor and a 80 column printer. CRICS, complete with user's manual, retails for $99.95. The manual alone is $10.00 (refundable with order).
Canuck Software
P. O. Box 11984
Edmonton, Alberta T5J 3L1, Canada.

ProForma is a new powerful financial projection and forecasting system for Apple /// microcomputer users. The program as also available for CP/M and MP/M based operating systems. It is ideal for accountants, manufacturers, or any business owner and decision maker. The newly developed program uses more than 700 pre-programmed conditional commands and can calculate literally tens of millions of possible variations. Allows businesses to prepare plans, budgets, forcasts and analyses that can take into account numerous "what-if" situations. Free demonstrations of the new program are available to businesses.
Management Control Concepts, Inc.
124 St. Mary's St.
Boston, MA 02116
(617) 267-4920

The **Systems Plus Business Accounting Package** handles every aspect of business information management. Incorporates state-of-the-art programming, i.e., dynamic disk allocation. Ten complete interactive module programs provide maximum control of your business. Eliminates double entries, saving time and effort; when an order invoice is generated to a customer from Order Processing for an Inventory Item, the System will update the Inventory file for that item. It will also issue a back order if out of stock, then update the Accounts Receivable and B/O file quickly. If the Inventory Item has a commission built in, it will update Payroll and the System posts everything to the General Ledger. It is impossible for the General Ledger to be out of balance. It is easy to learn and use. No prior computer experience is necessary. The System incorporates many error checking routines which safeguards the integrity of the data. Available in standard 5-inch floppy version and hard disk drive versions. Hard drive capacities are extended and is made possible by Dynamic Volume Allocation. Also handles Fixed Assets and Banking functions. Requires an Apple II with 48K or more of memory or an Apple /// with 128K or more of memory. Uses optional Corvus or Davong hard drives in 5, 10 or 20Mbyte versions.
GOCI Software
7710 Computer Avenue, Suite 115
Pentagon Office Park
Edina, MN 55435
(612) 835-4271

Job Costing/Tracking will control your costs. Up to 10 labor files and up to 10 material files can be defined, each containing many separate cost elements, up to 1000 total. Offers user defined overhead rates, escalation rates, escalation compounding and a user defined printout. Solves "what if?" questions by simply changing any cost element or rate to determine the bottom line effect. Instructions are given on screen; no need to continually look at the reference manual. Get an up-to-date report any time on quantities of materials and hours used and by percentage of job completed, including percentage complete of the whole job and dollar cost balances. Requires an Apple II with 48K, Applesoft, DOS 3.3 with two disk drives and a 132 column printer. $189.95 plus $3 shipping and handling.
Software Solutions
9124 Highway 17
Scotts Valley, CA 95066
(408) 438-2433

Cost Accounting Series from KBS generates an in-depth, up-to-date report in less than an hour instead of days needed using a manual system. Features automatic balance sheets, automatic income statements, complete entry journals, checks, cash, accounts payable/-receivable. Automatically posts all entries to general ledger. Also boasts a check writer. Job cost ledger automatically posts income and expense for each job. Gives listing for budgeted expense and income. Compares budget amount to actual expense, calls out problem areas with a special "arrow-head". Improves the user's ability to estimate a job. Aids in making on the job decisions by having up-to-date cost information - $1,795.00. Project Manager uses the Critical Path Method (CPM). Information is provided which fully covers all aspects of a project, enabling quick and effective project progress analysis allowing the contractor to concentrate his efforts on items critical to project completion. Will handle 500 activities. Produces Gantt charts and cash flows and a 3 year date table - $2,495.00. Estimator provides a handy tool to estimate projects. Estimates can be directly interfaced to the KBS Cost Accounting Program. Allows you to tailor itemized breakdowns to meet your specific needs. Its total estimating capability is unlimited. Provides a master project estimate plus unit costs, lumber, square footage and cubic yardage - $295.00.
KBS
P.O. Box 1065
Morro Bay, CA 93442
(805) 772-2766

Financial Management Models are a series of 11 VisiCalc financial templates that will assist the manager of service firms in such fields as Engineering, Advertising, Architecture, Consulting (or any firm selling time as a source of revenue) to determine billing rates, estimate fees, forecast cash needs, budget projects, determine staff assignments, monitor billable time, invoice clients and control project time and costs. These models are set up to be easily modified and adapted to the individual firm's needs. Includes a 175 page manual in a three ring binder with extensive and clearly written instructions. Each model is explained in detail and a glossary of key financial terms is included. Requires an Apple II or II Plus with 48K or an Apple /// with 128K (specify which) and a disk drive and VisiCalc. A printer is recommended. $295.00 plus $6 shipping and handling UPS surface mail.
Pro-Pac
P.O. Box 219000
Houston, TX 77218
(713) 496-1179

"**Engineering Applications of Micros**" is a collection of techniques and programs for applying micro's and computer graphics to engineering - structural mechanics, kinematics, heat transfer, systems analysis, Fourier analysis, optimization, CAD/CAM, and more. Theory with listings in BASIC fully documented. Book with listings - $28.50, Disk (DOS 3.3) with

Supercharge Your APPLE II*



The Axlon RAMDISK™ 320K Memory System for the Apple II and Apple II Plus* provides access speeds never before available. The Axlon memory system is designed to interact with Apple DOS 3.3* and Apple Pascal 1.1* like two standard floppy disk drives while delivering the lightning fast access speeds of RAM memory. This also leaves 32K of RAM for advanced programming techniques. The interface board is slot independent and draws no power from your Apple. The rechargeable battery system built into the unit provides three hours of backup in the event of a power loss. Drop by your local Apple dealer or contact Axlon, Inc. for more information.

* Trademark of Apple Computer, Inc.
* Pascal is a Trademark of U.C.S.D. Regents

- Plug-in compatibility
- 320K bytes of RAM (200NS) memory designed to function like two 35 track floppy disk drives
- Compatible with Apple DOS 3.3 and Apple Pascal 1.1
- Same size as the Apple Disk II* Drive
- Invisible memory refresh - even with the Apple turned off
- Rechargeable battery system built-in to provide 3 hours of auxiliary power
- Slot independent interface board - draws no power from your Apple
- All firmware is in static RAM on the interface board
- Includes software for diagnostic, fast load and copy routines, and business applications

AXLON

170 N. Wolfe Road,
Sunnyvale, CA 94086
(408) 730-0216

programs - $19.95. "**Structural Analysis on Micros**" provides theory and program listings in BASIC for matrix structural analysis of rigid frames. Graphical output shows displaced configuration. Member loads are determined. Use software as is or modify for your special applications. Book with listings - $39.95, Disk (DOS 3.3) with programs - $24.95. Add $2 per item shipping in U.S.
Kern Publications
Duck Hill Road, PO Box 10229C
Duxbury, MA 02332
(617) 934-0445

Games/Simulations

Real-time Air Navigation Simulator uses Hi-Res graphics and sound effects to teach visual and instrument navigation. The Air Navigation Trainer features Wind Magnitude and Direction Adjust and a ground track map. VOR and NDB simulation, resetable elapsed time indicator, and a VOR demo program are included. $40 from:
Space-Time Associates
20-39 Country Club Drive
Manchester, NH 03102
(603) 625-1094

TAX BREAK

TURNS YOUR APPLE© INTO A TAX CONSULTANT

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

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



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

PROFORMA SOFTWARE
2707 HARBOR BLVD. – SUITE 200
COSTA MESA, CALIFORNIA 92626
(714) 641-3846

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Ken Uston's Professional Blackjack is a complete and realistic blackjack game. You'll meet the same playing opportunities that you'd face at a real blackjack table - at your choice of over 70 Nevada and Atlantic City casinos, each with its own set of rules and variations. Or you can create your own casino, manipulating sixteen different game parameters to produce over 39 million different playing environments. You can select the number of decks in the shoe, vary the dealing speed, choose and name competing players, set their wallet sizes and much more. And all your data is accurately displayed, so you can play the strategy you like and get the feedback you need to win. $89.95 plus $2 shipping and handling from:
Intelligent Statements, Inc.
Box 600
Holmes, PA 19043
(800) 345-8112;
in PA (800) 662-2444

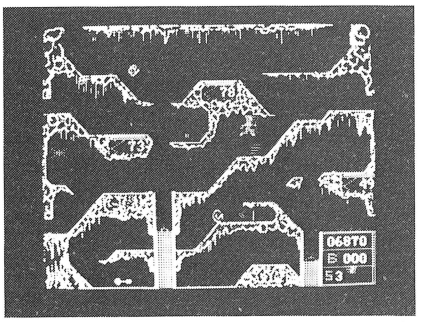
Telengard is a computerized fantasy and role-playing game where players descend into a 50 level dungeon. Includes a full color poster depicting the Frazetta-type box art claiming the game can become so intoxicating that participants may suffer great losses, such as spouses, jobs, sleep, and even some of their marbles! Players choose their character attributes such as weapons, intelligence, strength, and experience before their journey into the dungeon. The basic premise of this game is to vanquish the horrible monsters within the Telengard and return with great wealth and power. Demands quick decision making because the game is in real-time. On diskette for the Apple II with 48K of memory for $28.00.
The Avalon Hill Game Company
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300

In **Seafox**, you are in control of a lone submarine out after a convoy of enemy ships and its escort. You dodge exploding depth charges, avoid menacing mines, and evade speeding torpedoes in your desperate effort to eliminate the foe. You will need superior maneuvering ability, great courage... and a most welcome aquatically... in order to survive. Requires an Apple II or II Plus with 48K. Keyboard, joystick, and paddle controlled. $29.95 from:
Broderbund Software
1938 Fourth Street
San Rafael, CA 94901
(415) 456-6424

Moon Patrol is intended for the arcade fervor in all of us. It's a fast, furious, and fun solitaire or two player game requiring split-second decision making. Players choose one of four difficulty levels and attempt to destroy as many alien invaders as possible in their ultimate goal to circle the lunar surface and touch down on their landing site. The challenge focuses on the airborne moon patrol ship dodging and shooting alien invaders as they fall down from the sky. The graphic presentation is state-of-the-art and rivals any arcade type seen. Moon Patrol for the Apple II - $25.00 from:
The Avalon Hill Game Company
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300

V.C. is Avalon Hill's name for its microcomputer game of operational level combat in Vietnam, blending high resolution graphics with precise levels of challenge and playability. The player commands the ARVN (Army of the Republic of South Vietnam) units vs. the computer controlled VC (Viet Cong) and NVA (North Vietnamese Army) guerilla forces. You must win the hearts and minds of the people and cut off and destroy the V.C. units in your province. Under the human player's command is the air mobile and heavily armed 1/509th Air Cavalry, a chopper based unit adding an interesting dimension to the game as the player sends his helicopter to selected locations on the map (presented on the screen) to resolve battle action. Also at the player's disposal as the 9/15th Field Artillery for fire support and ten well-equipped and American trained ARVN units. It is with these units that the player must carry on his campaign against a highly motivated yet militarily weaker enemy. Their terrorist tactics against you are sporadic but fierce. Taking full advantage of the computer's color graphics and sound, V.C. is ready to run in diskette form on the Apple II Plus with 48K of memory.
The Avalon Hill Game Company
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300

Crisis Mountain is a new arcade-action game for the Apple II. This colorful, high resolution game combines sound effects, explosive color graphics, and arcade action into one challenging computer game. Scenario: A terrorist has planted nuclear bombs in an active volcano somewhere in the Pacific Northwest. Players must defuse the bombs before the entire West Coast is blown to bits. You run, walk, and crawl your way through the volcanic caverns. Bombs can be reached and defused, but only if the red hot boulders, falling debris, and molten lava are avoided. There is secret loot scattered throughout the caverns which can be collected to boost your score. There are nine levels to Crisis Mountain with bombs ticking away on each level. The game, which becomes progressively more difficult, is complicated further by the presence of Bertrum, the crazed radioactive bat. Being bitten by Bertrum spells doom. Requires an Apple II or Apple II Plus with 48K, game paddles or a joystick and the cost is $34.95.
Synergistic Software
830 North Riverside Drive, Suite 201
Renton, WA 98055
(206) 226-3216.



The Blade of Blackpoole is an illustrated adventure game. Legend sayeth this mighty blade rests in the caverns beneath the lake at Blackpoole, where evil serpents and horrid plants have a taste for the flesh of humans. And yea, even man has taken arms against his fellow man in search of Myraglym. Travel with wisdom and cunning and the magic powers of Myraglym shall be for none other than thee. Features a myriad of challenging situations and colorful, detailed graphics. Playable with keyboard and requires an Apple II or II Plus computer with 48K, one disk drive and a 16 sector controller. $39.95 at your local dealer or contact
Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827
(916) 366-1195

Shuttle Intercept is a daring rescue mission into deep space. The player's spacecraft is directed to retrieve friendly satellites bearing vital data and must fight or avoid enemy crafts, satellites, missiles and meteors. Provides four exciting quantum levels of play. Each of the first three levels has a hyperspace transition between them. The player's spacecraft can survive only two direct hits before a third one ends the game. Once the player reaches 5,000 points, higher points are given and the missiles fly at a faster pace. After 10,000 points, the meteors travel even quicker. Requires an Apple II disk, Applesoft with 48K. $34.95 from:
Hayden Software Company
600 Suffolk Street
Lowell, MA 01853
(617) 937-0200

Graphics

The Printographer works on every combination of printer (including daisy wheels) and interfaces with the Apple II or II Plus computer to print graphics in several different formats (horizontal, vertical, magnified, inverse, normal, etc.), simple horizontal and vertical cropping and uncropping, horizontal placement, oval and diamond cropping, and all the options generally found in other dump programs. The Printographer also features an option to print pictures directly to disk and then from disk without loading the file. Using ASCII Express, you can have your graphics printed out at a remote site via a modem. It is simple for the user to put Printographer routines in your own programs so that Hi-Res printing can be accomplished during graphic creation without having to save graphics to disks. A condense routine is provided that allows you to save graphics in less than 34 sector files. Also loads graphics files fast. Includes a clear complete manual with plenty of examples.
Southwestern Data Systems
10761-E Woodside Avenue
Santee, CA 92071
(714) 562-3670

Graphics Processing System is a highly versatile program with unlimited application for architects, scientists, contractors, sales representatives, interior designers, art directors, teachers, or anyone whose work involves the use of graphics. Graphics Processing System creates, manipulates and edits images in the same manner word processors work with text. After two years of testing and development, the Graphics Processing System is the ultimate in easy-to-use computer graphics. With a little practice, even a beginner on the Apple II Plus can produce professional quality graphics quickly, and at low cost. Features a grid maker that lets you draw images to scale and alter dimensions in proportion. Color can be mixed and changed at will for the draw line, object and background. Modify or erase a portion of an image without having to start from the beginning. Enlarge any portion of an image 4 or 16 times - then reduce for enhanced detail. (Image stored in program has greater definition than is visible on-screen. Resolution on printed copy depends on printer/plotter capabilities). 2-D rotation gives positioning of an image up to a full 360 degrees. Supports unlimited duplication of images on screen, to disk, and from disk. Duplicated objects can be edited separately from the original. Enlarge and reduce images or

change proportion vertically and/or horizontally. Print separate overlays in different colors. Produces upper case text A-Z, 0-9, and all characters on the Apple keyboard. Can produce large, decorative characters. Uses a 16K RAM card (if you have one) to increase memory. A professional version is compatible with Apple Graphics Tablet, Symtec Light Pen, Strobe 100 Plotter, Houston Instruments HiPlot, HP7470A, IDS 460 and 560 graphics printers, Epson MX-80 printer with graphtrix. Also speaks directly to the Apple Silentype printer. Requires a 48K Apple II Plus, one or two disk drives, monitor and one or of the drawing tools mentioned above. Standard version - $69.00. Advanced version - $179.00 from your local dealer or contact:
Stoneware, Inc.
50 Belevedere Street
San Rafael, CA 94901
(415) 454-6500

The Apple II personal computer can now create and transmit graphics and text pages for videotext networks with the introduction of the **Telidon Graphics System**. When used with the Apple II, it can edit and store text and graphics, and utilize a graphics routine library that makes graphic program development a simple task. In addition, the system will allow the user to tie into Telidon-generated data bases as they become established. The system's graphics are displayed by the alphageometric method, an advantage over other systems' alphamosaic method. Graphics can be displayed in 15 colors at a dot resolution of 128 x 96, while the non-colored text mode generates 256 x 192. Text can be displayed in eight sizes a four rotations. Available in mid-June '83 from authorized Apple dealers for a suggested retail price of $595.

3DRB is a 3-dimensional graphics, animation, and red/blue stereo package for Apple II 48K systems. You can do Hi-Res plots of 3-D figures with arbitrary rotations for viewing, with an option for perspective. You can choose "Euler angles" for arbitrary orientations of solid objects, various Hi-Res colors, and various view depths. Label your Hi-Res graphs with full ASCII English labels. Experiment with red/blue stereoscopic displays, to be viewed through red/blue glasses (provided) for true 3D depth effect. An editor is provided that is designed for red/blue viewing. It is also possible to do animation of 3D figures, using special machine subroutines and BASIC programs for true 3D games and displays in which the pieces move in all three dimensions. A 3D game, "Moth", is included for your enjoyment. $59 from:
Metaresearch, Inc.
1100 SE Woodward
Portland, OR 97202
(503) 232-1712

WHAT ARE YOU WAITING FOR???

Are you tired of waiting for DOS to load and save files? Are you tired of waiting for DOS to finish so you can type again? Are you tired of waiting for your printer? When you buy **Diversi-DOS™**, you won't have to wait any more! Here's why:

1. DOS speed-up: Apple DOS 3.3 takes 18 disk revolutions to read a single track, whereas **Diversi-DOS** reads or writes a track in just 2 revolutions. This speeds up file processing tremendously (see table).

2. Keyboard Buffer: **Diversi-DOS** allows you to type at any time, as fast as you can, without missing a single character.

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Diversi-DOS, the TRIPLE utility, requires a 48K Apple II or II+ with DOS 3.3. A simple, menu-driven installation program is included on the un-protected disk. So what are you waiting for?

Send $30 to:

Diversified Software Research, Inc.
5848 Crampton Ct.
Rockford, IL 61111
(815) 877-1343

Visa/Mastercard accepted
Illinois residents add 5% sales tax.

Apple is a registered TM of Apple Computer, Inc.

	APPLE DOS	DIVERSI-DOS
SAVE ‡	27.1 sec.	5.9 sec.
LOAD ‡	19.2 sec.	4.5 sec.
BSAVE*	13.6 sec.	4.1 sec.
BLOAD*	9.5 sec.	2.6 sec.
READ**	42.2 sec.	12.4 sec.
WRITE**	44.6 sec.	14.9 sec.

* Hi-res screen ‡ 80-sector BASIC program
** 52-sector random access text file

"**Graphics Software for Micros**" is a self-teaching guide that will show you how to write your own 2D and 3D graphics software. Contains 61 programs for elementary to advanced graphics operations - translation, rotation, scaling, clipping, stretching, hidden line removal, shading, perspective intersections, animation and more. Also includes practice problems for classroom use. Program listings in BASIC fully explained and presented alongside theory. Perfect for students, professionals and software developers. Book with listings - $21.95, Disk (DOS 3.3) with programs - $18.95. "**Engineering Applications of Micros**" is a collection of techniques and programs for applying micro's and computer graphics to engineering - structural mechanics, kinematics, heat transfer, systems analysis, Fourier analysis, optimization, CAD/CAM, and more. Theory with listings in BASIC fully documented. Book with listings - $28.50, Disk (DOS 3.3) with programs - $19.95. "**Structural Analysis on Micros**" provides theory and program listings in BASIC for matrix structural analysis of rigid frames. Graphical output shows displaced configuration. Member loads are determined. Use software as is or modify for your special applications. Book with listings - $39.95, Disk (DOS 3.3) with programs - $24.95. Add $2 per item shipping in U.S.
Kern Publications
Duck Hill Road, P.O. Box 10229C
Duxbury, MA 02332
(617) 934-0445

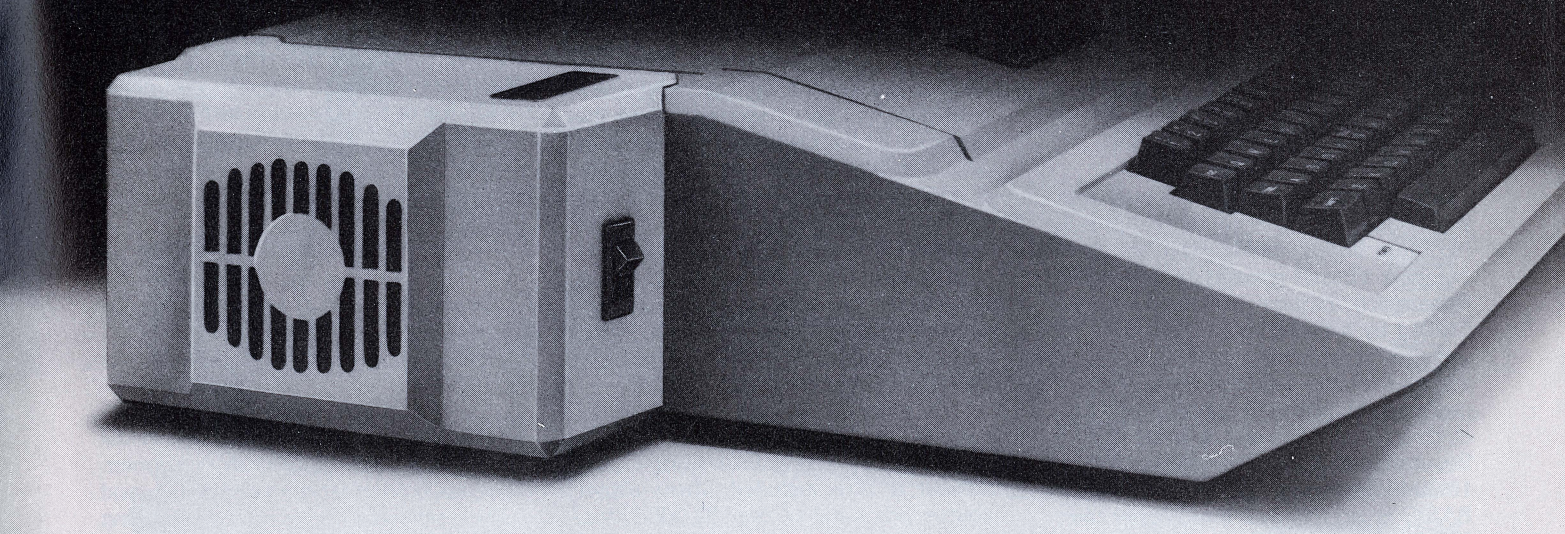
Languages

Compiler Plus for Applesoft runs faster in serious number-crunching because no compiler offers its unique array-vector lookup technique. Features DOS relocation software that lets user compile and execute larger programs using the added memory. Permits disk overlays, calling of compiled programs as subroutines, sharing of variables in a common data area and the library of routines is fully relocatable - loads anywhere in memory or as part of the compiled code. Also supports the " & " token - so interfacing with Assembly language routines is easier. $99.95 at your local dealer or contact:
Hayden Software
(800) 343-1218; in MA call (617) 937-0200

Assembler/Teacher program makes your Apple teach you Assembler. We assume you know BASIC already, and now you'd like to learn Apple Assembler. Shows your CPU running in slow motion on your screen, so you can see exactly what the operations are doing to the registers and the stack (a great debugging tool). Exposes the mysteries of hexadecimal, two's complement, character

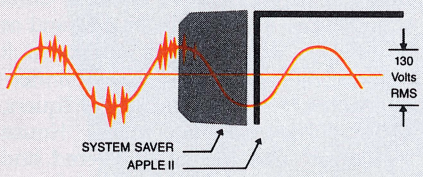
System Saver™

The most important peripheral for your Apple® II.



For Line Surge Suppression

The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

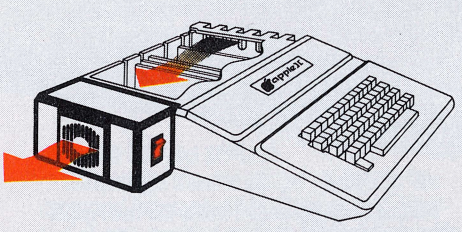


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise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

For Cooling

As soon as you move to 64K RAM or 80 columns on your Apple II you need SYSTEM SAVER.

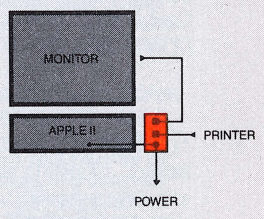
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.

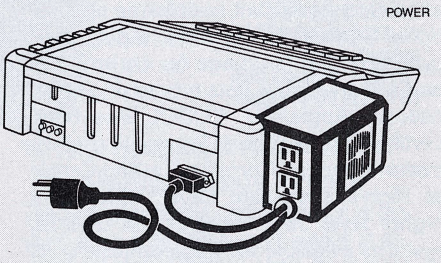


SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.

For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. As shown in the diagram, the SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer.

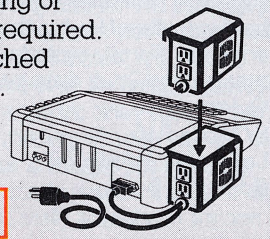




The heavy duty switch has a pilot light to alert when system is on.You'll never use the Apple power switch again!

Easy Installation

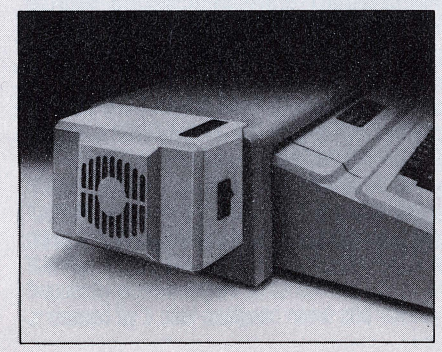
Just clips on.
No mounting or hardware required.
Color matched to Apple II.



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and other data representations, instantly translating from any version to all others. Gives you the concepts you need to cope with assembler, using simple on-line lessons that grab you by the keyboard and make you play your way to knowledge. A RAM Mini-Assembler is included. $44.95 at your dealer or from:
Computer Works, Inc.
P.O. Box 1111
Harrisonburg, VA 22801
(703) 434-1120

Alcor Pascal works in harmony with your Z-80 card CP/M equipped Apple II. No more floppy shuffle. Fast one pass compiler doesn't generate intermediate files which require further assembly. Crafted by a project team with over 15 years of Pascal programming experience. Includes all the features necessary for professional program development including random files and dynamic strings. Resultant stand alone programs execute 10-20 times faster than the equivalent BASIC or up to 4-1/2 times faster than UCSD programs. Includes a powerful text editor, 250 page documentation package - $199 plus shipping. Optional advanced development package includes optimizer and Native Code Generator for even faster executing programs - $125 plus shipping.
Alcor Systems
800 W. Garland Avenue
Garland, TX 75040
(214) 226-4476

Apple Computer has released **Apple /// COBOL**, the first personal computer based COBOD language capable of executing significant mainframe applications. COBOL is the most widely used programming language for commercial and administrative data processing applications. Apple /// COBOL has been certified by the General Services Administration's Federal Compiler Testing Center at High-Intermediate Level, which is a higher level than many of the COBOL systems available for minicomputers. Its features take advantage of the large memory, advanced input/output, and the other capabilities of the Apple ///'s Sophisticated Operating System (SOS). Features Animator, a powerful screen-oriented source-level debugger. Animator provides an "animated" view of actual program execution, and allows the programmer to run a program one statement at a time or continuously while watching its execution. The program can be stopped and the value of any data item checked and changed before continuing. Also featured is FORMS-2, a COBOL source-code generator which lets the programmer begin with a blank screen and end with a fully-operational program. FORMS-2 interactively creates data entry screens and generates COBOL source for use in a program. Requires a 128K Apple /// system, a video display device such as the Monitor ///, and at least one external floppy or hard disk drive. Full use of the Animator requires 256K of memory. $500 at your local Apple dealer.

S-C Macro Assembler is the latest version of SC's popular product the S-C Assembler II Version 4.0. It provides a new level of power and performance for the beginner and professional programmer alike. Features 29 commands, including a convenient EDIT command with 15 subcommands. COPY and REPLACE commands further simplify entry and modification of even the most complex programs. Also provides 20 assembler directives (Pseudo-Ops) including conditional assembly and macro generation. Operates in any Apple II or Apple II Plus with at least 32K RAM and one disk drive. Any additional memory or disk drives will be used as required. A Language Card version is also included which allows source programs of over 32,000 bytes. Much larger programs can be edited and assembled using the "INCLUDE" and "TARGET FILE" capabilities, up to the limit of on-line disk storage. Both the editor and assembler are co-resident, allowing rapid cycles of modification, reassembly, and check-out. All DOS and Apple Monitor commands are active as well, providing a familiar interface to the standard Apple features. Only $80 which includes a diskette with Macro Assembler and sample programs, a 100-page Reference Manual, and a Programmer Reference Card (Registered owners of S-C Assembler II Version 4.0 may purchase the upgrade package for only $27.50).
S-C Software Corporation
2331 Gus Thomasson, Suite 125,
P.O. Box 280300
Dallas, TX 75228
(214) 324-2050

M. L. E. is a powerful utility for the Apple II that greatly reduces the time, effort and frustration usually required to enter machine language programs published in various computer magazines and books. Designed to aid both the novice computer user and the experienced Apple owner, M.L.E. offers an extremely easy method for entering and editing sequences of hexadecimal numbers from listings. M.L.E. automatically inserts spaces and carriage returns into entered data, allowing program entry in just one sitting. M.L.E. Displays machine language programs in a convenient 8 column format, and powerful editing features enable the user to insert and delete code, as well as correct mistyped or erroneous entries. Files may be automatically saved or retrieved from the disk. Lamp, a companion utility provides simple decimal to hexadecimal conversion, parameters of previously BLOADed files, location of in-memory Applesoft lines, as well as ASCII conversion of desired character codes. "Cal" is a program for printing calendars for any month of any year, from 1981 to 2000. The user may also schedule appointments and holidays to appear on the calendar for easy viewing. Major holidays through 1987 are automatically printed. Requires Applesoft with 48K and either DOS 3.2 or 3.3. Files may be MUFFINed to a 16 sector disk. $29.95 from your local dealer or:
Nibble, Dept. P
P.O Box 325
Lincoln, MA 01773
(617) 259-9710

Personal

Micro Cookbook includes the usual recipies, nutrition guides, calorie counter, and other food related information, and offers the convenience of easily entering one's own personal recipies, a shopping reminder, and recipe selection via three different methods - by recipe name, by category, and/or available ingredients. In other words, you can tell the computer what ingredients are on hand or what type of meal you want and it will select the recipes you can make - $30. Also, **Micro Barmate** allows you to select a drink according to the ingredients on hand or by category, i.e., all drinks with vodka. It also features party planning, useful measurements, how to make your own liquers, and a holiday beverage guide. "House specialties" can be easily entered and stored for future use - $30.
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Rockport, MA 01966.



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P.O. Box 216
Lexington, MA 92173
(617) 862-0404

Emulates these terminals exactly.

IBM 3101
DEC VT100, VT52
Data General D200
ADDS Regent 20, 25, 40
Hazeltine 1400, 1410, 1500
Lear Siegler ADM-3A, ADM-5
TeleVideo 910
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Apple Super Serial Card
Bit 3 Dual-Comm Plus™
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Hayes Smartmodem™ 300, & 1200
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Mountain Computer CPS Card™
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Computer Stop Omnivision™
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STB Systems STB-80™
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Vista Computer Vision 80™
Wesper Micro Wizard 80™

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Softerm provides an *exact* terminal emulation for a wide range of CRT terminals which interface to a variety of host computer systems. Special function keys, sophisticated editing features, even local printer capabilities of the terminals emulated by Softerm are fully supported. Softerm operates with even the most discriminating host computer applications including video editors. And at speeds up to 9600 baud using either a direct connection or any standard modem.

Unmatched file transfer capability

Softerm offers file transfer methods flexible enough to match any host computer requirement. These include *character protocol* with user-definable terminator and acknowledge strings, block size, and character echo wait, and the intelligent *Softrans*™ protocol which provides reliable error-free transmission and reception of data. The character protocol provides maximum flexibility for text file transfers. *Any* type file may be transferred using the Softrans protocol which provides automatic binary encoding and decoding, block checking with error recovery, and data compression to enhance line utilization. A FORTRAN 77 source program is supplied with Softerm which is easily adaptable to any host computer to allow communications with Softerm using the Softrans protocol.

Softerm file transfer utilizes an easy to use *command language* which allows simple definition of even complex multiple-file transfers with handshaking. Twenty-three high-level commands include *DIAL, CATALOG, SEND, RECEIVE, ONERR, HANGUP, MONITOR* and others which may be executed in immediate command mode interactively or from a file transfer macro command file which has been previously entered and saved on disk.

Built-in utilities

Softerm disk utilities allow DOS commands such as CATALOG, INIT, RENAME, and DELETE to be executed allowing convenient file maintenance. Local file transfers allow files to be displayed, printed, or even copied to another file without exiting the Softerm program. Numerous editing options such as tab expansion and space compression are provided to allow easy reformatting of data to accommodate the variations in data formats used by host computers. Softerm supports automatic dialing in both terminal and file transfer modes. Dial utilities allow a *phone book* of frequently used numbers to be defined which are accessed by a user-assigned name and specify the serial interface parameters to be used.

Online Update Service

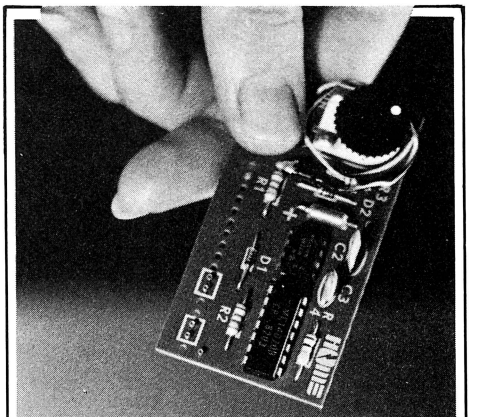
The Softronics Online Update Service is provided as an additional support service at no additional cost to Softerm users. Its purpose is to allow fast turnaround of Softerm program fixes for user-reported problems using the *automatic patch facility* included in Softerm as well as a convenient distribution method for additional terminal emulations and I/O drivers which become available. *User correspondence* can be electronically mailed to Softronics, and *user-contributed* keyboard macros, file transfer macros, and host adaptations of the Softrans FORTRAN 77 program are available on-line.

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Fairfield, OH 45014
(513) 874-4550

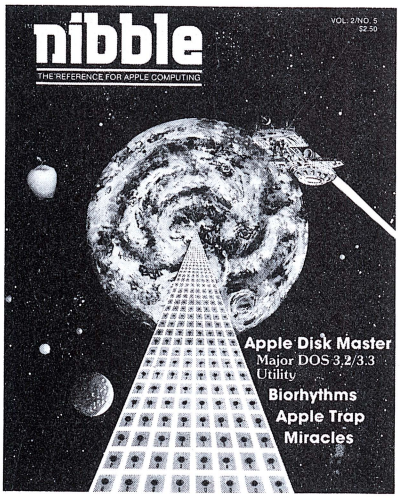
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Utilities

ASORT is a versatile machine language sort, combining flexibility and speed, for Applesoft arrays. Sort up to 25 one-dimensional arrays. Allows any mix of reals, integers, and fixed or variable length strings. You provide up to 7 keys in any combination of ascending or descending order. Substrings may be used as keys. Sorts 10,000 integers in less than 40 seconds. You may also specify beginning and ending subscripts of the array to be sorted. Requires only a single call statement from a program or the keyboard. Other arrays can be tied in parallel to the array being sorted so they are kept in the proper, sorted, order too. Takes less than 1000 bytes of memory. Requires Applesoft in ROM or a 16K RAM card and at least 16K of main memory, and DOS 3.3. Automatically relocates according to memory size. $30 from:
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Disk Organizer is a friendly utility to organize the files on your diskettes. You can order the files on a diskette alphabetically or in any order. Titles can be entered, describing a file or group of files on the diskette. These titles may be entered in normal, inverse, flashing, and lower case letters. All work is done on a RAM version of the Directory, so if you decide the changes you made are not correct, you can simply abort the process and keep the old catalog. Disk access is therefore kept to a minimum; hence, Disk Organizer is extremely fast. Includes the following functions: Dynamic display of all the file names in the Directory; renaming the HELLO program; Alphabetizing the file names; undeleting deleted files; purging deleted files; renaming files; locking and unlocking some or all files; deleting files; deleting DOS for increased data storage. Requires an Apple II or Apple II Plus with 48K and one or more Disk Drives. $30 from your local dealer or contact (with $1.25 postage and handling per diskette).
Sensible Software
6619 Perham Drive
West Bloomfield, MI 48033
(313) 399-8877

CP/M Power is a series of 45 user friendly CP/M programs in one 12K package that allows you to manipulate files from a numbered menu. The package prevents typing mistakes and traps errors, and allows you to switch at will between different disks and densities. Price for the Apple version is $149 from
Computing!
2519 Greenwich Street
San Francisco, CA 94123
(415) 553-0204

Apple File Sort will sort all Apple TEXT files, sequential and random. This program is easy to use and is menu driven. You may specify up to ten sort keys. No special hardware is required. Written in fast machine language for a 48K Apple II with DOS 3.3 and 1 or 2 disk drives. $59.95 from:
Data-Tec Systems
8101 Juniper
Prairie Village, KS 66208

PenultiCopy doesn't make bad copies. Its duplication process includes a bit by bit comparison of the original and the copied disk. PenultiCopy copies 13-sector disks in less than 40 seconds, 16-sector disks in less than 45 seconds - all with one program. It won't leave you wondering if your backup copies are good or if your other drive can read them. $34.95 at your local dealer or contact:
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Denver, CO 80215
(303) 234-0871

Hyper-DOS is a high-performance add-on to DOS 3.3. LOAD/RUN, BLOAD-/BRUN and SAVE/BSAVE up to five times faster. See unused sector count during catalog. Excellent for overlay or CHAIN programs, BLOADing graphics and other data. BLOAD a 129 sector file (which normally takes 31 seconds) in 7.4 seconds! Works with standard DOS 3.3 disks - no reformatting required. Installs permanently into any reasonable standard 48K DOS 3.3, including systems for 8-inch floppies and hard drives. No special HELLO programs or boot disks needed. $35 (Documentation alone $2) from
BURT Microsystems
14221 Matisse
Irvine, CA 92714
(714) 559-5097

MasterSort for the Apple II consists of a user friendly Sort Parameter Editor, and a fast machine language Sort/Merge program with these features: Sorts random or sequential text files up to 125 KBytes. It merges 2 to 5 presorted files into one file. You may specify up to 10 independent ascending or descending sort keys. Interfaces directly to the DOS 3.3 File Manager. Uses a fast Shell Sort and N-way buffered merge. This diskette is not copy-protected so you may make your own backup. Sorts one thousand 25 byte long records (2 keys) in 3.5 seconds plus 51 seconds for disk reading and writing. MasterSort is $39.95 and comes with a manual. Guaranteed to perform or your money back.
Marshall Associates, MasterSort Dept,
P.O. Box 12042
Huntsville, AL 35803
(205) 881-7801

Charset-Editor permits you to load a Pascal character set into the Sup'R Term. Subroutines for loading and patching the Sup'R Term (to be called from Pascal) are provided. Edit and create a character set using this system. You can also convert a DOS Toolkit character set to the Pascal system. The package is written in Pascal and requires a 48K Apple II. A language card is not necessary. Pascal source code, a new ASCII character set and a German character set are provided. $35 plus postage - Visa and MasterCard accepted.
Apple User Club Austria
P.O. Box 51
A-1181 Wien, Austria, Europe

Snapshot is a hardware/software system for the Apple II that makes it possible to interrupt a running program, examine and manipulate it, save it to disk, and resume running it from the point of interruption. Snapshot is an essential tool for debugging or analyzing programs in Assembly and other languages. You can make a backup copy of almost any program that runs on the Apple II. Other features give you the ability to manipulate programs that load from protected disks; move a DOS 3.2 program to a DOS 3.3 disk; interrupt a running program in order to use the computer for something else, and then resume the interrupted program; take a "snapshot" of the current state of the program, dump the snapshot to disk, then load it back from disk into memory and resume running it; disassemble the program in memory to screen or printer; create a disk that when booted will load and execute the snapshot on it; move protected programs to hard disk or other media. Requires an Apple II or II Plus with 48K, DOS 3.3 with one disk drive and a 16K RAM card. $109.95 from:
Dark Star Systems
P.O. Box 140
Amherst, MA 01004
(413) 584-7600

VC-Documenter gives the user greater flexibility when documenting his VisiCalc models. Uses row and column heading of a VisiCalc model to print in English the definition of each cell address. For example, what VisiCalc would list as)B3:+B1−B2 would instead be listed by the row and column heading defined by the user, such as 1983 GROSS = +1983 SALES−1983 COST. Thus, the user has the tool he needs to easily verify his own models, as well as more quickly understand the structure of unfamiliar models. Features include the ability to list by row/column or column/row, and the option to print all or part of a model. There is no limitation to the size or complexity of model that VC-Documenter will handle, and the program runs independently of VisiCalc. Requires an Apple II or II Plus with DOS 3.3 and 48K. $49.95 from:
Desktop Solutions
P.O. Box 35659
Houston, TX 77235
(713) 723-6170

COMPress is a data compression program for CP/M files. Now archival storage requirements may be reduced by 30 to 40% using a compression technique which finds the best possible code based on byte-to-byte encoding. Data compression is normally accomplished by employing Huffman's logarithmic relation between relative frequency and bit length. COMPress can be used wherever there is a need to reduce storage requirements or connect time, for both ASCII and non-ASCII files alike. COMPress increases the number of files that can be stored on a single disk by reducing the storage requirements of each file and thereby reducing storage costs. Cost savings may be further realized if files are transferred via communication channels, such as modem transfers, by reducing transmission time and transmission costs. COMPress requires CP/M. $59.95 from:
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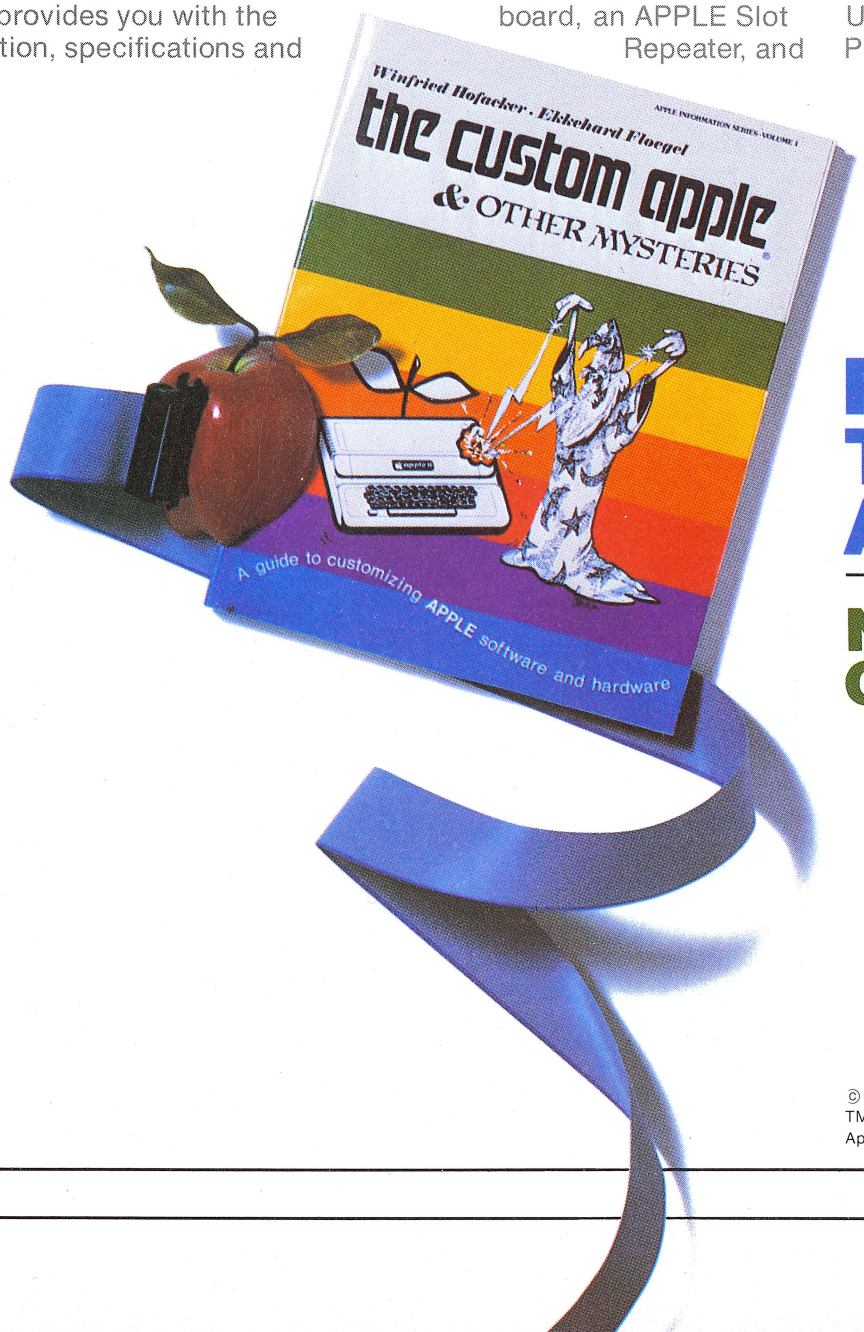
THE CUSTOM APPLE & OTHER MYSTERIES includes a number of data acquisition and control projects with printed circuit layouts like an 8-Bit D/A and A/D Converter, a 6522 application interface board, a sound and noise generator board, an EPROM Burner board, an APPLE Slot Repeater, and includes information on the APPLE as a square wave generator, the control of stepper motors, connecting two 6502 systems, and lots more.

The Custom APPLE & Other Mysteries is a valuable tool for all APPLE or APPLE II computer users and is available for $24.95 at computer stores, B. Dalton Booksellers and independent book dealers. If your dealer is out of stock, order direct from IJG.

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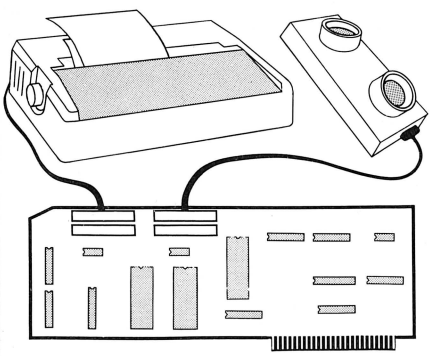
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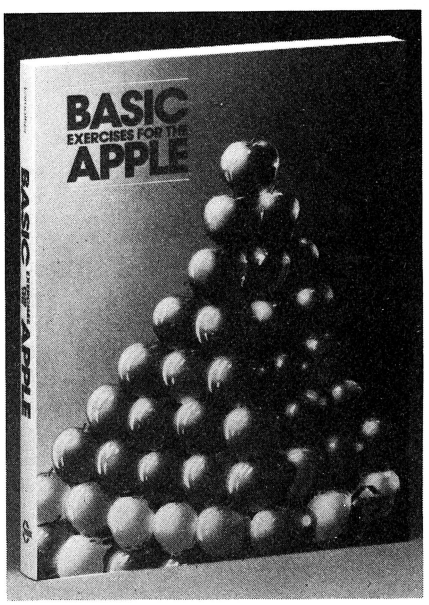
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The "**Political Science Micro Review**" comes in two parts. A newsletter focuses on items of interest to political scientists using microcomputers and includes listings of programs which subscribers may type in and use directly. A disk containing programs written for the Apple II Plus contains at least one of each of the following programs: a politacal science program, a public administration program, a tutorial on programming, a public domain utility program, and bonus programs. The review is a nonprofit service. The newsletter may be subscribed to alone for $10. Please send payment with your order.
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Micro Review, PSPA Link 215
Raleigh, NC 27511
(919) 737-2481 (Dave Garson)

Apple Tech Notes is a whopping 450-page loose-leaf reference book, compiled from the responses to thousands of letters and telephone calls to Apple Computer, Inc., and the International Apple Core. This is the most comprehensive source of technical information available, anywhere, at any price. There are more than 50 categories covering computer internals, software, peripheral hookup and operation, languages, etc. Apple Tech Notes will be updated four times a year, to keep your information current. Information about subscribing to this continuing update service is contained in the Apple Tech Notes binder. $64.95 from your local dealer ($7.50 discount if you belong to an Apple User's Group which is a member of the International Apple Core - see your club for a coupon).

"**BASIC Exercises for the Apple**", a new book from Sybex for Apple users, is designed to rapidly teach BASIC programming through actual practice. It contains a series of exercises which increase in terms of challenge as the book progresses. In addition to developing the reader's programming proficiency, this book will also demonstrate a wide range of applications techniques including flowcharting, financial computations, operations research, statistics and games. All programs are written in Applesoft BASIC and will run directly on the Apple II. Each exercise includes a statement and analysis of the problem to be solved, a solution and flowchart with commentary which pinpoints certain subtleties inherent in BASIC. A useful set of appendices completes this programming tutorial. $12.95, 258 pages.



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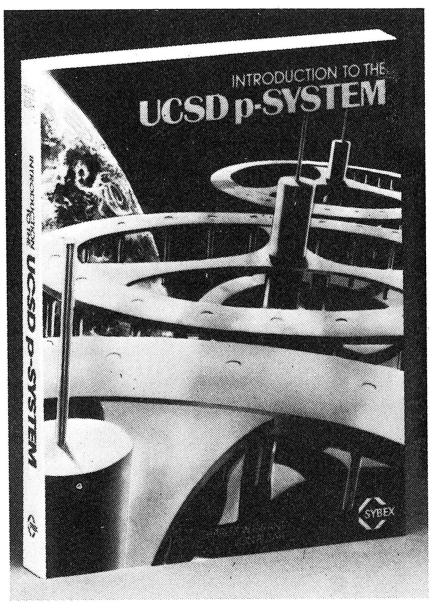
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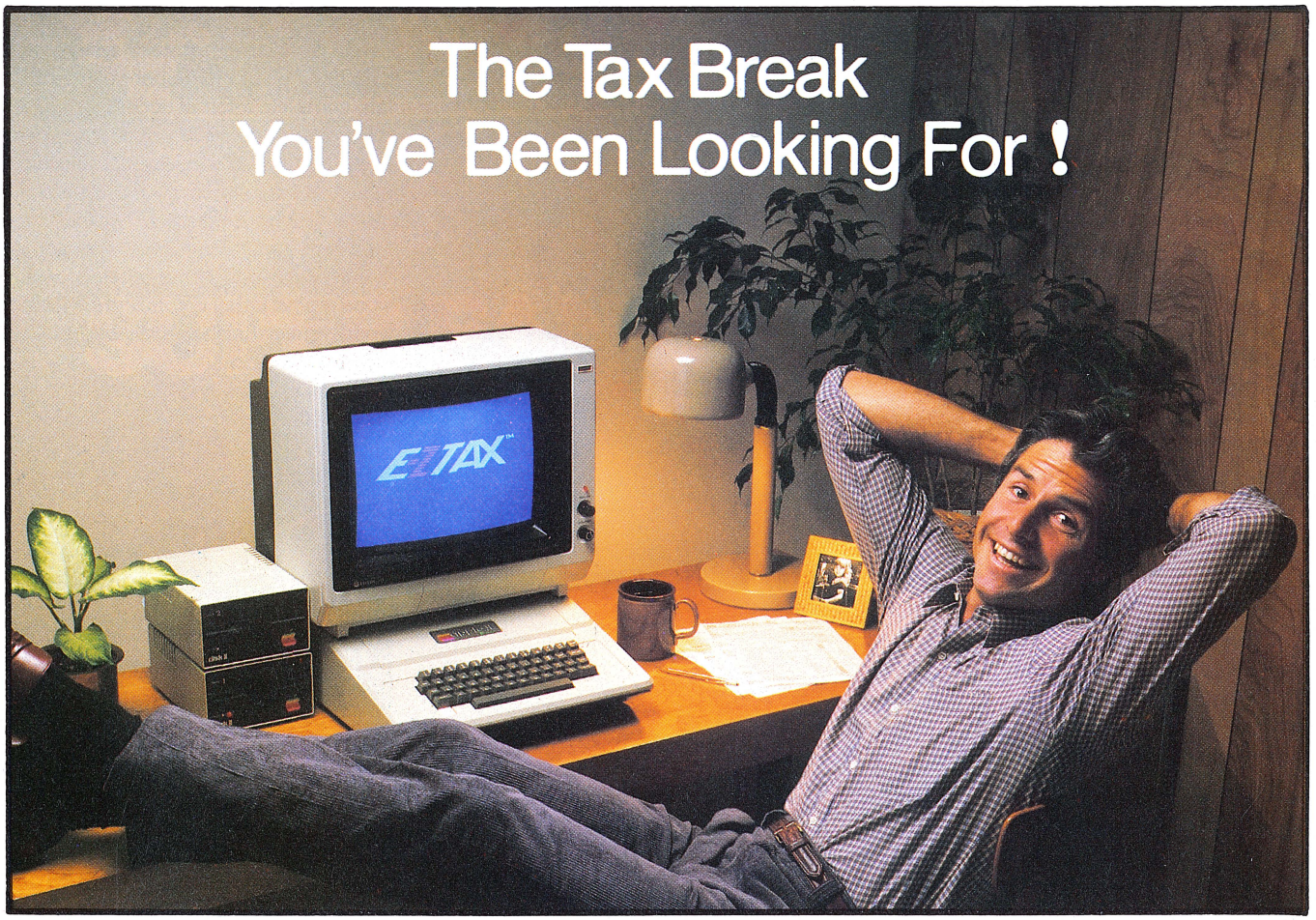
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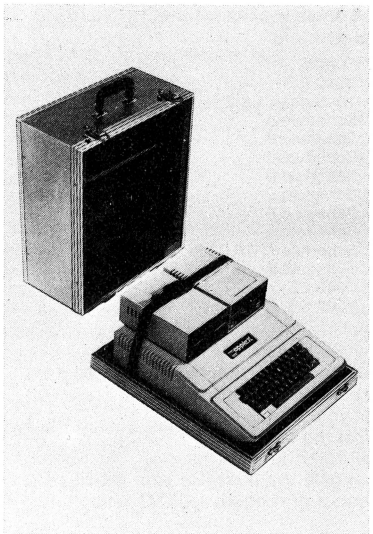
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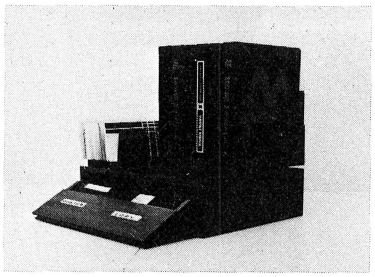
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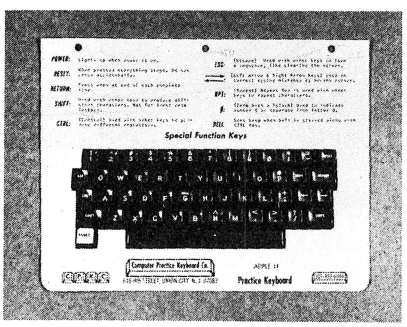
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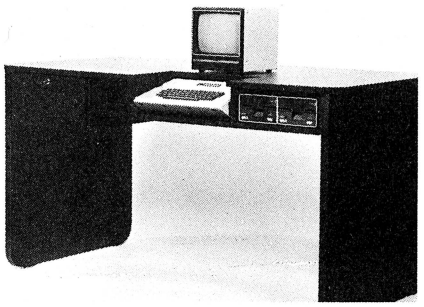
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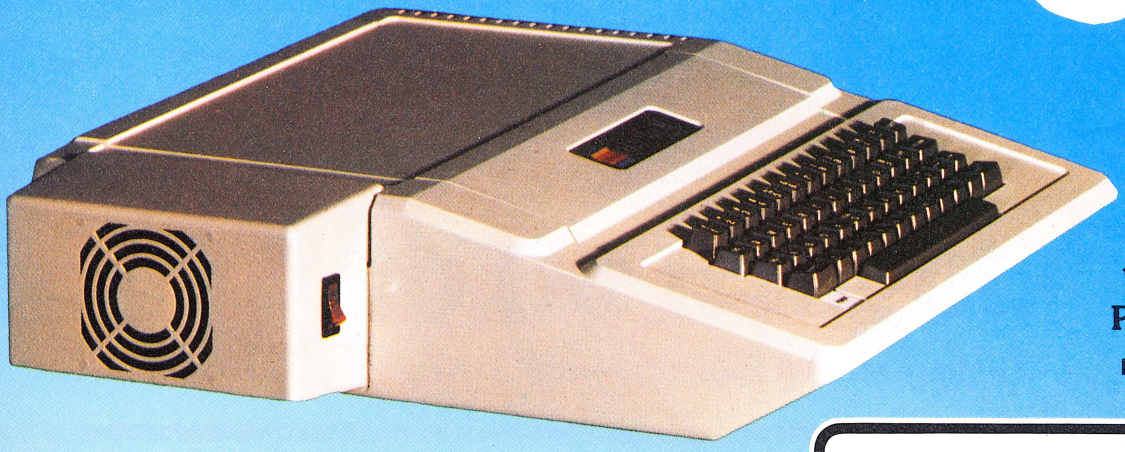
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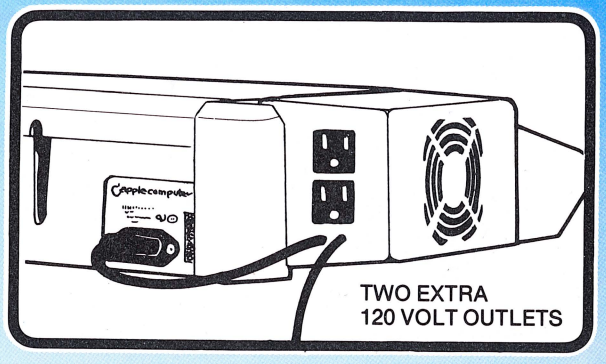


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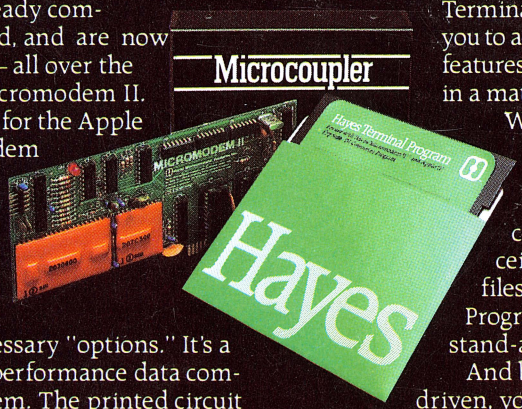
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