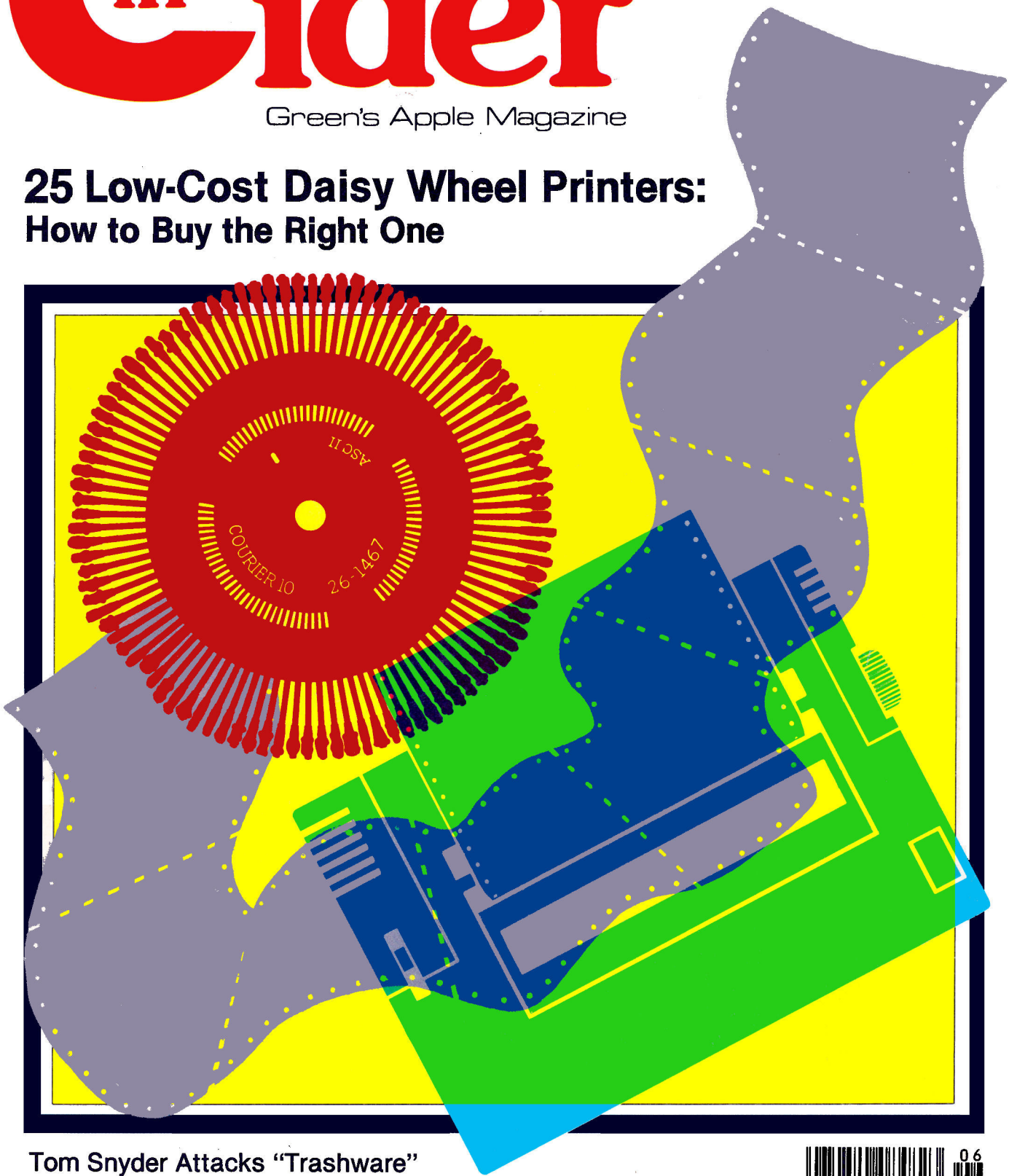
June 1984 USA $2.95

inCider

Green's Apple Magazine

25 Low-Cost Daisy Wheel Printers:
How to Buy the Right One



Tom Snyder Attacks "Trashware"

Ultima III: New Hope for the Dead

Scout Search: Don't Feed the Bears!

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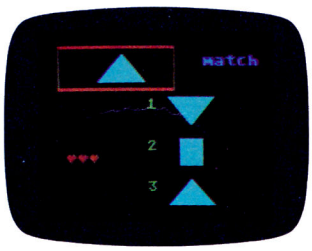



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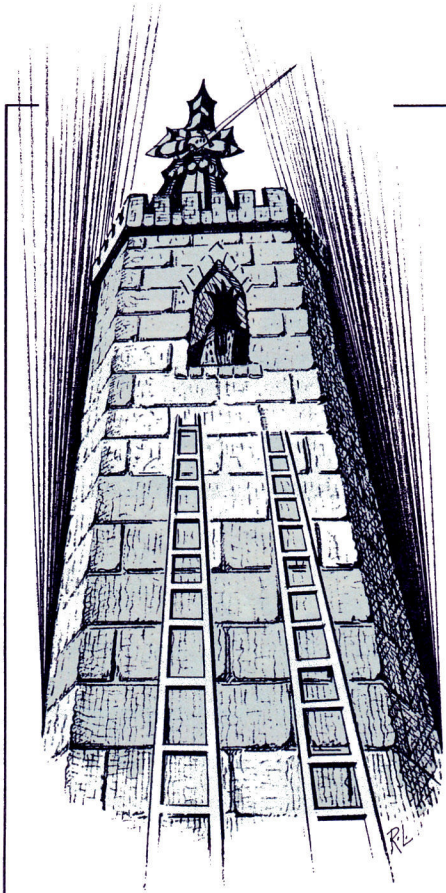

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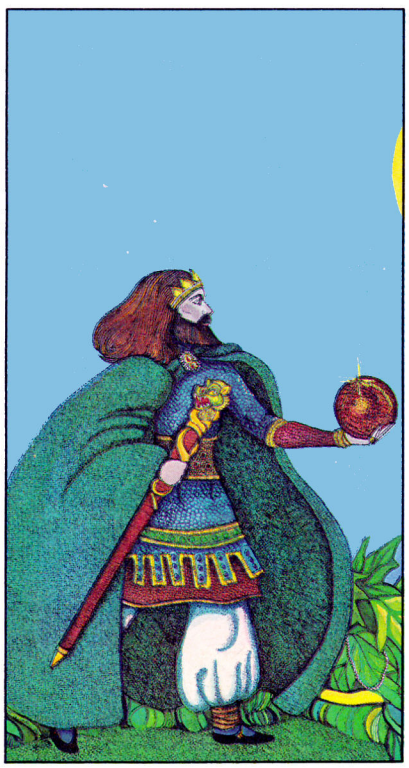

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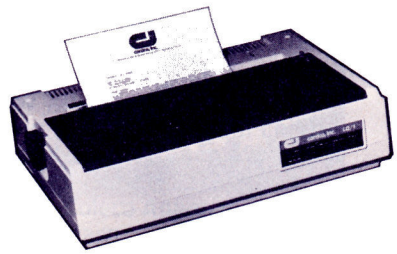

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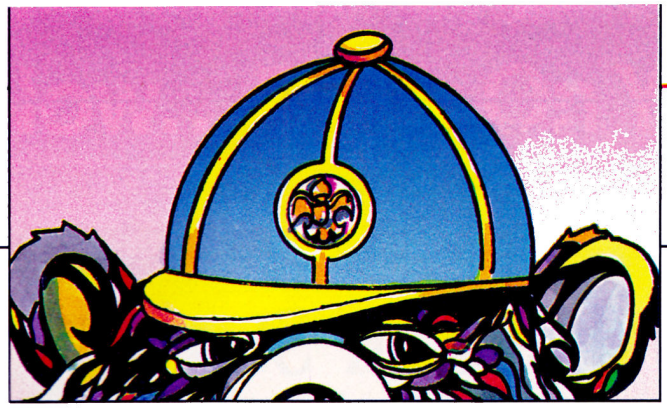

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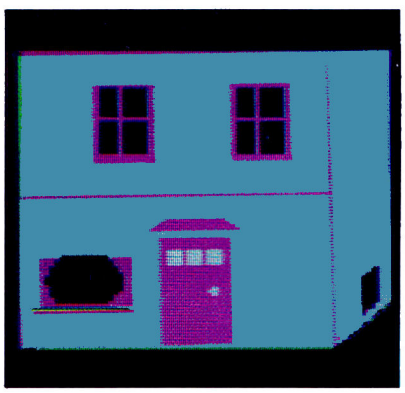

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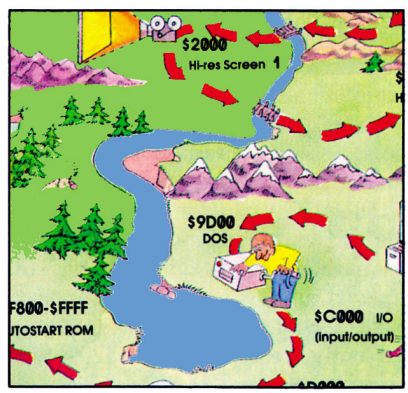

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Fermentations

by Bob Ryan
inCider staff

What's in Store for Software?

If Adam Osborne is right, the way you and I buy software will change radically in the next few years. At this year's West Coast Computer Faire Osborne outlined plans for Paperback Software International, his latest commercial venture. Osborne thinks that microcomputer software is about to become a mass market commodity, and he wants to be in a position to profit from this development.

In Osborne's view, the dilemma facing the software industry is that while the market for software is growing by a factor of ten every few years, the companies selling in that market are having a hard time making a profit. Osborne believes that the current problems in the software industry do not stem from lack of capital but from the way software is sold. "Delivery is the problem," he said, and called the current practice of pricing and distribution "a death wish upon the industry."

Osborne believes that the industry, which he insists is still in its infancy, won't take off until retailers can make a profit selling software. He stated that, as things stand now, a computer store nets very little on a software package that sells for less than $1000. In these cases, the retailer's margin is eaten up by the cost of paying people to demonstrate and support the product. Osborne's solution is to change the software distribution channel.

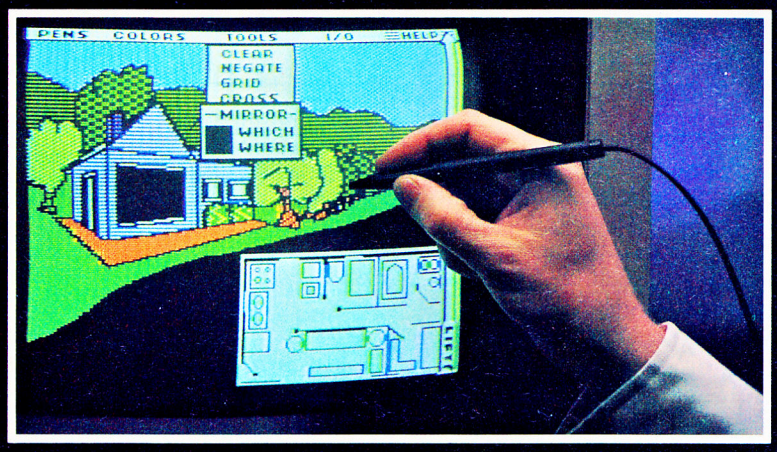
"Non-game software belongs to book shops," Osborne succinctly stated. In this mass market approach, retailers will provide no support for the software; the manufacturer will have that responsibility. With centralized support and the economies of scale, Osborne expects software that currently retails in the $200–$500 range to sell for $30–$80.

Of course, software companies are not structured to distribute and compete on a mass market scale. As Osborne puts it, "an amazing lack of imagination has gone into the development of software companies." In reaction to this, Osborne formed Paperback Software International. PSI will not develop software. Instead, it will provide financial resources, marketing expertise, and a distribution channel to a number of software development companies. PSI has already signed three companies and Osborne expects to have eventually about 30 companies use PSI for marketing and distribution.

Time will tell if Osborne's conception of the software industry is correct, but it is interesting to note that he is not alone in recognizing the potential of the mass market. Sandy Ruby and Bob Shapiro of Micro Software International, the developers of PractiCalc, are also pursuing the mass market. Their product, which incorporates the features of spreadsheets retailing for hundreds of dollars, is being sold in mass market outlets for less than $70. It appears that the future that Osborne envisions is already upon us.

Although the emphasis of his talk at the Faire was oriented toward the future, Osborne did have a few things to say about his recent past. He was not apologetic when discussing Osborne Computer Corporation, and he expressed confidence that Paperback Software International would not suffer the fate of OCC. As he put it, "Nothing like that will ever happen again." Osborne also had another message, namely that "ours is an industry that got to where it is because people take chances. When they fail, they get up and do it [take chances] again." And that's just what he intends to do. ■

Now...Draw On Your Imagination



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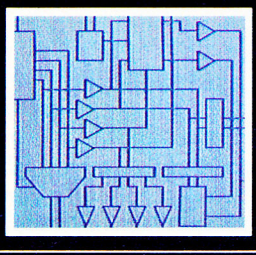



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Letters

Eastern's Covering Itself

Eastern Airlines' prohibition on use of portable computers indicates that they are more familiar with Federal Aviation regulations than you are. I am certain you know of Part 91.19. It states that, except for certain conditions, "No person may operate, nor may the operator or pilot in command of an aircraft allow the operation of, any portable electronic device...." The certain conditions excepted are:

1. portable voice recorders
2. hearing aids
3. heart pacemakers
4. electric shavers
5. any other portable electronic device that the operator of the aircraft has determined *will not* cause interference with the navigation or communication system of the aircraft on which it is to be used.

"Operator" in item number five refers, in this case, to Eastern Airlines. The operator is defined as responsible for determining the device will not cause interference. The operator is therefore charged with proving that under no circumstances whatsoever will the device in question cause interference. Charged with that responsibility, I doubt that I would allow any device to be operated on my aircraft. If anything happened which could be related to the operation of an electronic device, the airline would be found in violation of FAR's. At this time, it's just plain safer, legally and literally, for the airlines to prohibit the use of such devices.

This does not mean it has to stay that way. It would seem appropriate to change the federal regulation to permit operation of "approved" electronic devices in flight. It would seem that it would be possible for the FAA to determine which emissions are a problem and publish those determinations. This would allow manufacturers to test their equipment against a standard and, subject to FAA approval, advertise their products as acceptable for use on commercial aircraft.

Probably this is easier said than done. One fact standing in the way is the increased use of onboard computers used to fly the aircraft and the potential for intentional or unintentional interference by a "kneetop computer" user like yourself.

At any rate, it seems to be a topic of the times, but I don't think it's appropriate to blame Eastern for protecting themselves. I hope you see my point.

Mark L. Hunnibell
PSC 1 Box 4371
APO SF 96286

Tsk, tsk, Mark, I did my homework before writing, so I'm well aware of the regulations. But I have a big problem with the herd instinct—the obeying of rules which are not reasonable—the wearing of designer jeans—Monday night football. So when there's a screw loose somewhere you'll often find me rattling a cage to get it fixed.

My editorial had exactly the effect I aimed for, despite some pot shots from the herd. It made the Washington Post *and that, in turn, sparked the needed official tests. The result was that briefcase computers were given a clean bill of health and Eastern rescinded their ban on them.*

Before writing my editorial I already knew the FAA rules—having been a pilot myself a few years back—and having had to come to grips with them when I got interested in ham repeaters 15 years ago, when I often operated my hand transceiver from commercial airliners with the permission of the caption.

Having checked out the radiation of several briefcase computers before writing, I knew what the results of an official test would be and that it would permit the use of these computers on commercial flights. Remember that I'm also the editor and publisher of a communications magazine, so I'm on home ground with radio frequencies. Been playing with 'em for almost fifty years now.

These briefcase computers are an enormous boon to traveling businessmen, so any gratuitous restrictions on their use should be fought. My NEC goes with me almost everywhere these days, speeding up my writing and making me far more efficient in communicating.

One other thing—part of the New Hampshire constitution calls for its citizens to fight any law they think is wrong. And on our license plates it says, "Live Free Or Die." Many of us take that seriously and refuse the herd mentality of obeying laws whether they are right or not. And that, Mark, is a key to progress.

—Wayne

PeachCalc Correction

On page 144 of the February 1984 *inCider*, PeachCalc, Peachtree's electronic spreadsheet, is priced at $395 for a specific DOS version and is part of "Peachpak 4." This is incorrect. PeachCalc carries a suggested retail price of $150 for both the 8-bit and 16-bit versions. Peachpak 4 is an integrated accounting package, in which PeachCalc plays no part. PeachCalc is a component of PeachText 5000, a series of integrated products for business and personal use, but this has no relation to the Peachpak 4 system.

Genie Ragin
Peachtree Software, Inc.
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Atlanta, GA 30326

We apologize for any confusion this may have caused. We do our best to ensure the accuracy of our product information, but occasionally we slip up. Please correct us if we make mistakes! *—eds.*

Who Needs 16 Bits?

The "Fermentations" column of *inCider*'s January 1984 issue contained a quote (by Alexander Stein of Dataquest Inc.) which suggested that integrated software requires the high clock rate found only in 16-bit machines.

Not true! Apple has just introduced AppleWorks, a powerful integrated software package for the Apple IIe. AppleWorks combines word processing, database management, and spreadsheet analysis in a tightly

Don't let price get in the way of owning a quality printer.

Adding a printer to your computer makes sense. But deciding which printer to add can be tricky. Do you settle for a printer with limited functions and an inexpensive price tag or buy a more versatile printer that costs more than your computer? Neither choice makes sense.

Here's a refreshing option—the new, compact STX-80 printer from Star Micronics. It's the under $200 printer that's whisper-quiet, prints 60 cps and is ready to run with most popular personal computers.

The STX-80 has deluxe features you would expect in higher priced models. It prints a full 80 columns of crisp, attractive characters with true descenders, foreign language characters and special symbols. It offers both finely detailed dot-addressable graphics and block graphics.

And, of course, the STX-80 comes with Star Micronics' 180 day warranty (90 days on the print element).

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integrated design. Moreover, it is written under Apple's new ProDOS operating system for fast, efficient operation. This means that AppleWorks can utilize the ProFile for faster data access and larger files.

The integrated design of AppleWorks features consistent commands and user interface throughout the program, making it easy to learn and use. You can keep up to 12 files in memory at one time and switch among them in seconds. In addition, you can cut and paste using the AppleWorks clipboard to produce your final document.

Finally, please note that other companies have also introduced integrated software for the Apple IIe. It appears that the quality of software for the Apple II family products will continue to improve as developers take full advantage of the computers' powerful features.

Don Field
AppleWorks Product Manager
Apple Computer Inc.

inCider *will publish a review of AppleWorks in its July issue. Watch for it!* —*eds.*

Bar Codes Worth the Price

I support the bar code program listings option as discussed in a letter in the March issue. Several of my friends and I have been toiling to type in the code listing for the Presidential Power game given in the same issue. Even with two people, one reading out the listing and the other typing, the process is extremely time-consuming.

Few people who own Apple computers have the spare time to type in such long programs, yet longer programs are much more useful and effective than shorter ones. In general, someone who has invested $2000–$3000 in a system would be willing to spend another $100 for a monthly subscription to new software.

Hal Hancock
2604 Bois Darc
Duncan, OK 73533

One of *inCider*'s services is providing readers with buying information from the many mail order concerns catering to the Apple market. Often, our readers will go out of their way to write and tell us of the excellent service they received when dealing with a vendor, citing such things as prompt delivery and no-fuss back-up service. That isn't always the case, however, and when problems do arise it's nice to know where you stand legally.

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- The book, magazine or newspaper publisher whose publication carried the original advertisement.
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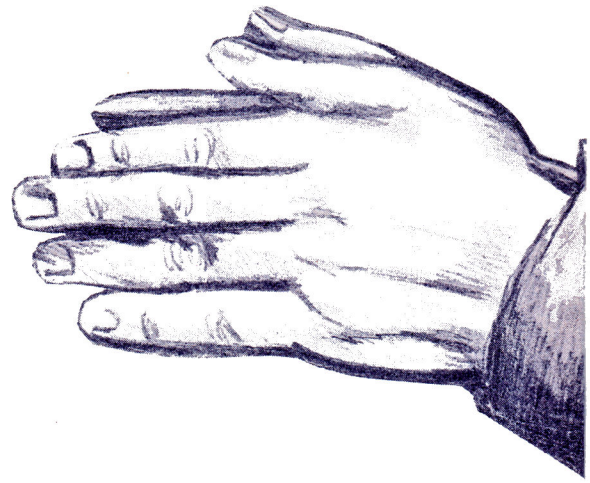

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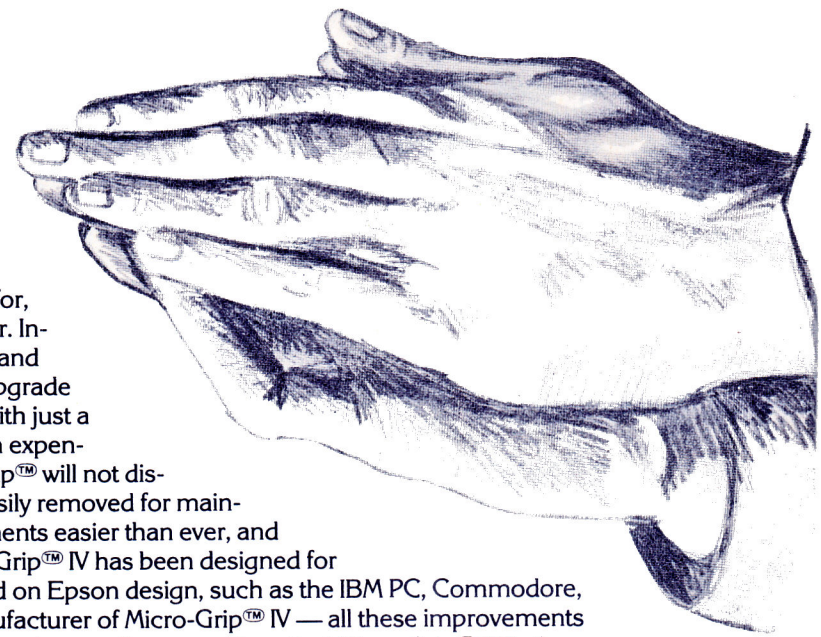

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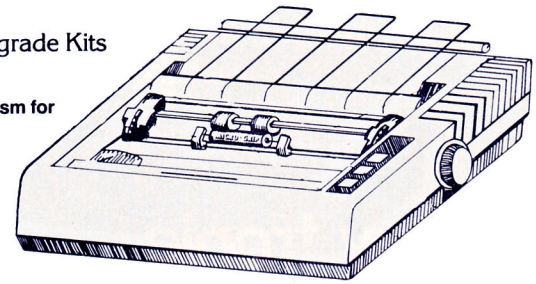

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Fudge It!

by Don Fudge

Mirror, Mirror . . . and Memory Management

This month I present a routine for reversing vector shapes, then a discussion of memory management. I developed the vector reversing algorithm for my new Hi-Res Interior Design and Hi-Res Landscaping systems. I had hundreds of shapes in long vector shape tables and needed a method to create mirror images of them, i.e., for a right-facing chair to face left and vice versa. I could have redrawn all those shapes in reverse, but since I'd just spent a week drawing about 400 shapes, I decided to write a routine that would create the mirror images for me.

I needed a routine that would take a normal vector shape, go through it, and change it so it ended up facing the opposite way. And once I finished using the backwards shape, I needed to be able to run the very same routine and have it return the vector shape to its original orientation.

To do all this, I had to review what I already knew about vector shape move-only and plot-and-move commands. (See Figure 1 and your *Applesoft Manual*, pages 91–100.) It didn't take long to determine that in order to reverse a vector shape, I had to transpose every right arrow into a left arrow and every left arrow into a right arrow. And this would apply to reversing the changes back to normal as well.

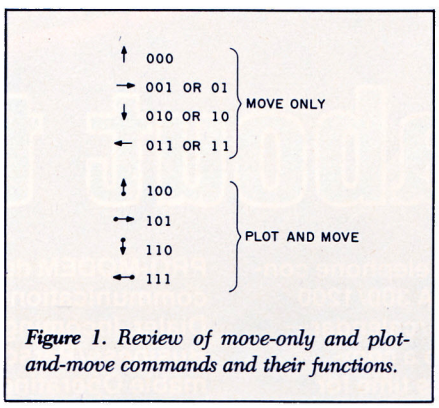


Figure 1. Review of move-only and plot-and-move commands and their functions.

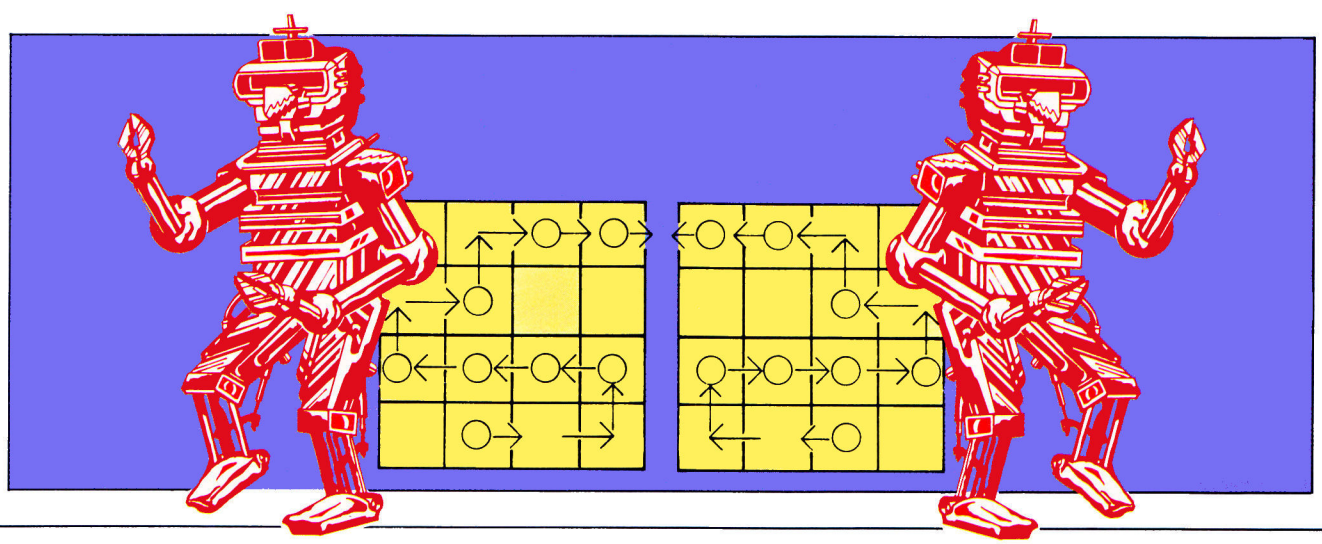
But I had to figure out how to do it. Actually, it turned out to be a rather simple task, but one characterized by some intriguing code.

It's too bad that each of the commands (plot left, move right, move up, plot down, etc.) doesn't get a byte to itself. Then the algorithm would have been a real breeze to code. But in truth it's a good thing vector shape codes *are* so compact—if they weren't they'd take up too much room.

Plotting the Course

The bits in a vector shape byte all have specific functions, and each byte is divided into three parts. Refer to Figure 2. In the byte illustrated there are three plotting vectors: A, B and C. C can only be a mover, not a

Address correspondence to Don Fudge c/o Avant-Garde Creations, PO Box 30160, Eugene, OR 97403.



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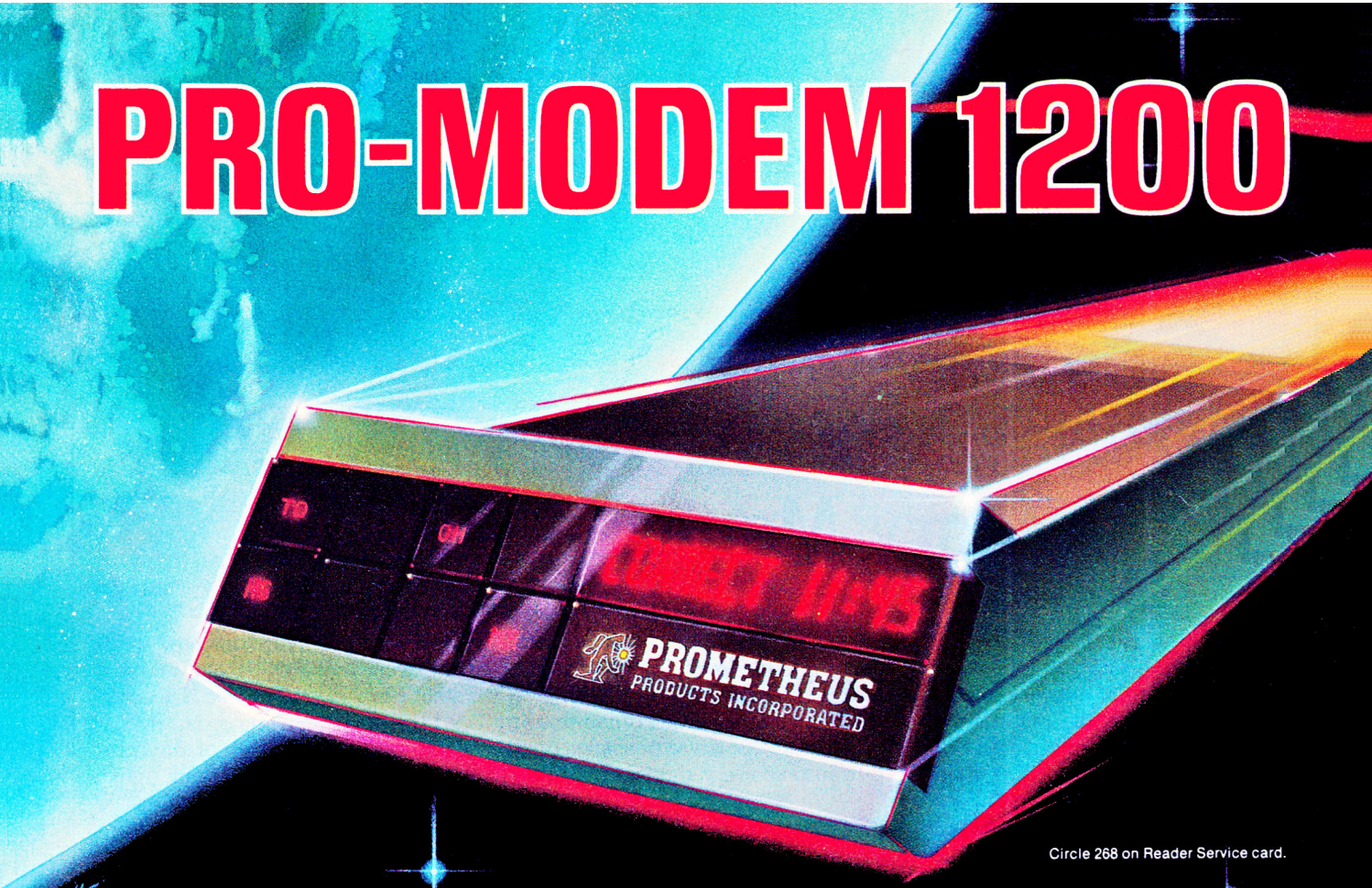

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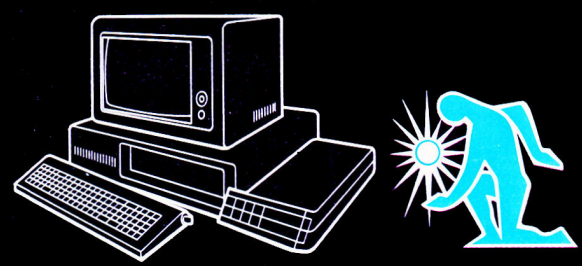

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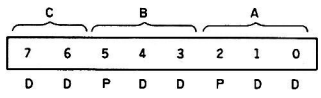

Figure 2. Representation of a vector shape byte—one byte in a shape table.

plotter, but the A and B vectors can plot as well as move. The P's mean *plot bits* and the D's mean *direction bits*. The plot designation takes only one bit per vector because plots either happen or not—on or off. But there are four directions, so in binary this requires two direction bits for every vector.

For my purposes, I wasn't interested in the plot/no-plot bits (2 and 5). I just wanted to make left into right and right into left. Well, right is 01 and left is 11, so basically what I needed to do was make all DD sets of bits (direction bit pairs) that were 01 turn into 11, and all pairs that were 11 turn into 01. It was very important, however, that I in no way change any 00 or 10 direction bit pairs. In other words, I can say that my goal was to change every pair of direction bits ending in 1, but none of them ending in 0. The change would be 1 to 0 or 0 to 1 in the starting bit.

But memory is full of bytes like $FF and $7E. How could I operate on bits within the bytes? The solution was to use ASL and LSR instructions. The first means arithmetic shift left and the second means logical shift right. These assembly language instructions move all bits in a byte one position left or right and dump the extra bit into the *carry* flag. A zero bit is then inserted into the opposite end of the byte. I applied the ASL and LSR instructions frequently in the mirror-imaging routine shown in Listing 1, MIRROR!.

About MIRROR!

The first line contains the name of the routine. Line 2 announces the intention to use the routine later at $300 (which will mean CALL 768 after POKEing 6, shape number). Line 3 allows us to temporarily assemble at $800, since the LISA assembler doesn't want us interfering at $300. Lines 4–9 are where we define labels. Any shape must have a shape number, a starting address low byte, a starting address high byte, and flags to indicate whether we need to change bit 1, bit 4 or bit 7. For each shape byte, we set these flags to 0 and then inspect the bits to determine which of the three needs changing. If no left or right directions are discovered, then no bits are changed. If all commands in the byte are horizontal moving, then all of the flag bits (B1, B4 and B7) are set (incremented from 0 to 1), thus telling the FIXBYTE subalgorithm at lines 56–77 to set bits 1, 4 and 7.

Back at line 10, we have to deal first with the shape number. But what our routine really needs is the shape's starting address. To get the starting address, the routine multiplies the shape number by 2 in line 11. (In binary a left shift multiplies a number by 2, just as in decimal a left shift multiplies a number by 10.) Now, in line 12, we stick the result into the X register, to be used as an index displacement number in line 13.

Read pages 94–95 in your *Apple Manual* if you don't see how all this arrives at a starting address. The fact is, shape tables start with indexes and you must use the 2-byte indexes to get to the shape's starting address.

In line 14 we store the shape's displacement-from-table-starting-address (low byte) in SHAPELO, and then increment our index displacement value in X and load the high displacement byte (lines 14–16). Next we add 8 to the high byte (line 18) because the shape table itself is stored at $800. If you've stored your table elsewhere, you'll need to change the data in addresses $306 (line 13), $30C (line 16) and $30F (line 18). For instance, if your shape table were at $9000, you'd want $90 in place of $8, and you'd need to POKE 774,144 ($90 is 144 and $306 is 774), POKE 780,144 and POKE 783,144.

Line 19 allows us to get the actual

```
 1  ;MIRROR!
 2            ORG $300
 3            OBJ $800
 4  SHAPENUM  EPZ $6
 5  SHAPELO   EPZ $8
 6  SHAPEHI   EPZ $9
 7  B1        EPZ $FD
 8  B4        EPZ $FE
 9  B7        EPZ $FF
10            LDA SHAPENUM
11            ASL
12            TAX
13            LDA $800,X
14            STA SHAPELO
15            INX
16            LDA $800,X
17            CLC
18            ADC #$8
19            STA SHAPEHI
20  START     LDY #$0
21            STY B1
22            STY B4
23            STY B7
24            LDA (SHAPELO),Y
25            BEQ RRTTSS
26            TAX
27            LSR
28            BCS SIDE1
29            LSR
30            BCC TRY34
31            INC B1
32            JMP TRY34
33  SIDE1     LSR
34            BCS TRY34
35  ITSRIGHT  INC B1
36  TRY34     LSR
37            LSR
38            BCS SIDE2
39            LSR
40            BCC TRY67
41            INC B4
42            JMP TRY67
43  SIDE2     LSR
44            BCS TRY67
45  ITSRGHT2  INC B4
46  TRY67     LSR
47            LSR
48            BCS SIDE3
49            LSR
50            BCC FIXBYTE
51            INC B7
52            JMP FIXBYTE
53  SIDE3     LSR
54            BCS FIXBYTE
55  ITSRGHT3  INC B7
56  FIXBYTE   TXA
57            LDX B1
58            BEQ ZEROB1
59            ORA #$2
60            JMP FIX34
61  ZEROB1    AND #$FD
62  FIX34     LDX B4
63            BEQ ZEROB4
64            ORA #!16
65            JMP FIX67
66  ZEROB4    AND #!239
67  FIX67     LDX B7
68            BEQ ZEROB7
69            ORA #!128
70            JMP STOREIT
71  ZEROB7    AND #!127
72  STOREIT   STA (SHAPELO),Y
73            INC SHAPELO
74            BNE CONT
75            INC SHAPEHI
76  CONT      JMP START
77  RRTTSS    RTS
78            BRK
79            BRK
80            END
```

Listing 1. MIRROR!.

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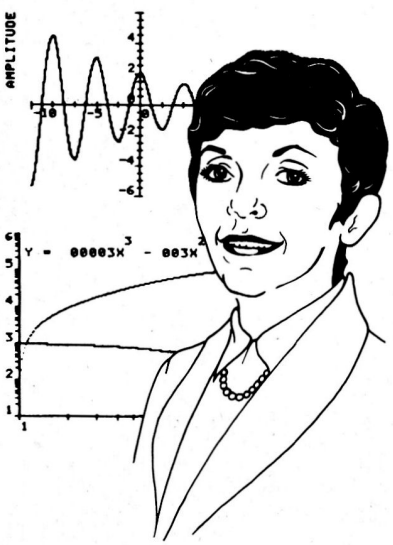

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0300- A5 06 0A AA BD 00 08 85
0308- 08 E8 BD 00 08 18 69 08
0310- 85 09 A0 00 84 FD 84 FE
0318- 84 FF B1 08 F0 60 AA 4A
0320- B0 08 4A 90 0A E6 FD 4C
0328- 2F 03 4A B0 02 E6 FD 4A
0330- 4A B0 08 4A 90 0A E6 FE
0338- 4C 40 03 4A B0 02 E6 FE
0340- 4A 4A B0 08 4A 90 0A E6
0348- FF 4C 51 03 4A B0 02 E6
0350- FF 8A A6 FD F0 05 09 02
0358- 4C 5D 03 29 FD A6 FE F0
0360- 05 09 10 4C 68 03 29 EF
0368- A6 FF F0 05 09 80 4C 73
0370- 03 29 7F 91 08 E6 08 D0
0378- 02 E6 09 4C 12 03 60 00
```

Listing 2. Object code for MIRROR!.

shape address's high byte into SHAPEHI. Then the routine starts and we zero the flags. Next we load the first shape byte in line 24. The signal for the end of a shape is 00, so if line 25 detects a 0 with its BEQ (branch-if-last-result-equals-0), then the routine is all finished, as it will branch to the RTS (return-from-called-subroutine, in this case) in line 77, a line that is labeled RRTTSS, just to be cute.

Transforming the Codes

Now, on to the meat of the routine, transforming vector plot/no-plot codes. In line 25 we temporarily store the shape byte in the X register. Then we shift right in line 27. This puts bit 0 into the carry flag, which we can test in line 28 with a branch-if-carry-set (BCS) instruction.

If the carry is set, it means horizontal moving is occurring, so we must go to the side, according to the instruction. In this case we branch to SIDE1.

In lines 29–30 we branch to TRY34 (try-bits-3-and-4) if the next bit (#1) is 0. If it isn't then a down command has been found, which has a 1 in bit 1 in this case. BCC means branch-if-clear carry (carry equals 0). So, if we want the down command to remain intact with its bit 1 on, we'll need to increment the B1 flag, which is done in line 31. (You see, later—in the FIXBYTE subroutine—1's or 0's will be put into bits 1, 4 and 7 according to the status of bit flags B1, B4 and B7. This is true whether or not the bit fixing represents a change.)

In line 32 we jump down to the TRY34 routine. In 33–34 we shift the byte right again and if the bit that drops into the carry is on, we jump to TRY34. Otherwise, in line 35 we increment the B1 flag (INC B1) because the vector said move right (01). But, we need to reverse it, so we make sure it's changed to left (11) by setting the B1 flag. (The two bits in 01 or 11 are the 1 and 0 bits, and B1 refers to bit 1.)

In 36–45 we do much the same (this time for vector B) as we did in 27–35, except that in 36 we do an extra LSR to shift the plot/no-plot bit of vector A out of the way, as it's not relevant. In 46–55 we do the same for vector C, after first shifting vector B's plot/no-plot bit out of the way.

Lines 56–77 comprise FIXBYTE, where we set or zero bits 1, 4 and/or 7 of the vector shape byte according to the status of flags B1, B4 and B7. Recall that we've saved the original byte in the X register in line 26. We now retrieve that byte into the accumulator with TXA in line 56.

Then we load and test the B1 flag (57–58). If it's off, we branch to 61 to zero bit 1 (ZEROB1). If it's on, we add bit position #1's value to the byte in 59 with ORA #$2. If we have to zero that bit, we do it with AND #$FD.

In 62–66 and 67–71 we do the same, only for bits 4 and 7. In 72 we use the Y register (which was zeroed in line 20) as a no-displacement index as we store (STA) the new vector byte into the current byte address. Then in 73 we increment our byte address's low byte, and if this yields anything but 0 (BNE means branch-if-not-equal-to-0), we jump back to the START after branching to CONT. If the incrementing results in a 0, we have hit a page boundary and must increment the high byte of the current vector byte as well (line 75).

Well, there you have it. See Listing 2 for a binary file object code printout. In using the subroutine, make sure you POKE 774,P : POKE 780,P : POKE 783,P right after BLOADing MIRROR, A$300. P is the decimal value of the memory page number where the shape table starts. P would be 8 if $800 were the starting address, 144 if $9000 were the starting address, 31 if $1F00 were the starting address, and so forth. See Listing 3 for an example of how to use this subroutine.

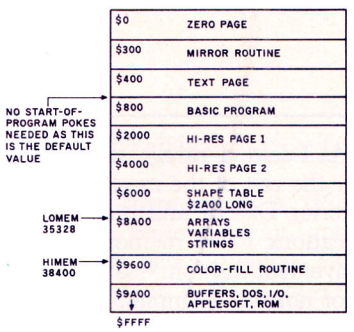


Figure 3. Memory scheme with LOMEM specified. Note that normally variables and arrays from $8A00 to $9600 immediately follow the Basic program (here, at $800–$2000) and LOMEM is automatically set to the end of the Basic program, but I used the LOMEM command to change this.

Refer to Listing 4 for a shape table to experiment with using MIRROR!. It's called ANIMALS,A$8FFF,L$44E.

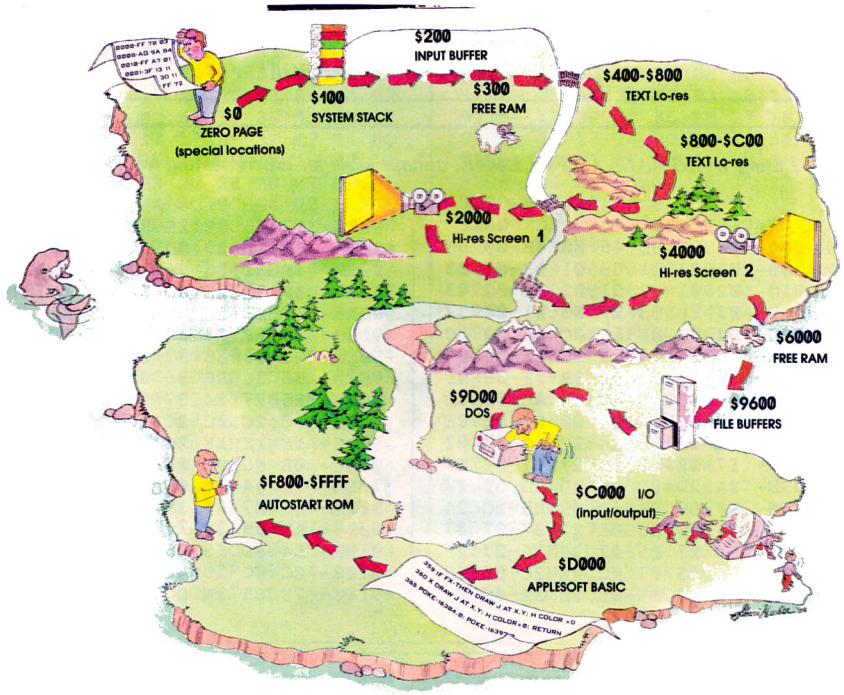
MEMORY MANAGEMENT

Memory management is a big problem with Applesoft Basic. In fact, one out of three letters I get concerns memory management. And this is not surprising, as the *Applesoft Manual* is less than helpful on the subject. When do you use HIMEM? When do you use LOMEM? When do you use start-of-program POKEs?

First, remember that HIMEM is the top address (memory location) available to a Basic program, so strings and string arrays (see the *Applesoft Manual*, page 137) will be stored from HIMEM down towards the end of your Applesoft Basic program. HIMEM automatically defaults to $9600 (38400) unless you change it, or unless you use a MAXFILES command. For most uses, I recommend MAXFILES1 immediately in your HELLO program to automatically reset HIMEM to 39590 ($9AA6).

In most cases LOMEM should be left alone. However, here's a sample case illustrating when it is needed.

In the creation of one of the design modules in Hi-Res Interior Design, I filled the memory to the brim. I ended up with a 6000-byte Basic program, need for both hi-res screens used separately (toggling back and forth), a shape table $2A00 long, the $80-long MIRROR routine, and a $400-long color-fill routine. See Figure 3 for what I did.



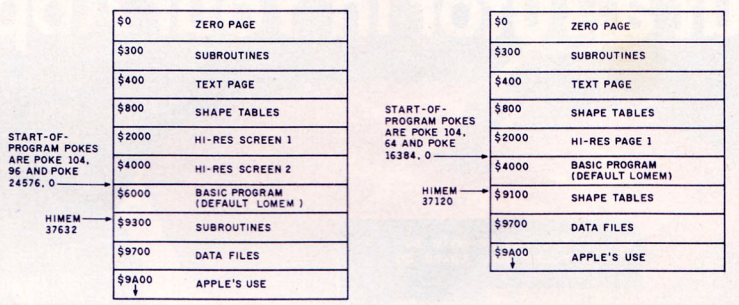


Figure 4. Memory scheme using default LOMEM and start-of-program pokes.

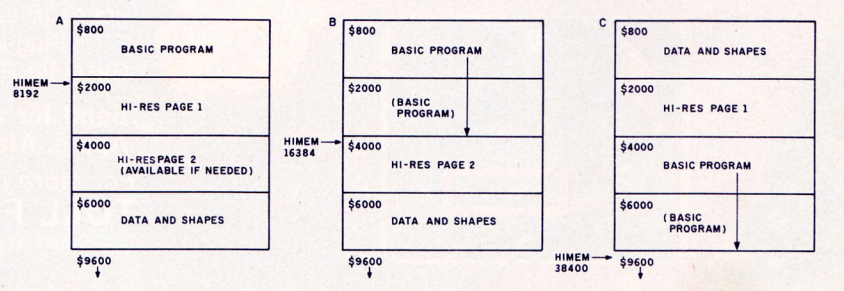


Figure 5. How HIMEM affects memory management.

```
10 HGR: ROT = 64: SCALE = 1: HCOLOR = 3
20 POKE 6,17: CALL 768: XDRAW 17 AT 99,99: REM 6 IS THE
    ADDRESS WHERE YOU GIVE THE SHAPE NUMBER AND 17 IS THE
    SHAPE NUMBER-THE CALL RUNS THE ROUTINE
30 CALL 768 : REM THIS RESTORES THE SHAPE TO ITS ORIGINAL
    ORIENTATION
40 POKE 6,3: CALL 768: DRAW 3 AT 209,79: CALL 768: REM MIRROR
    IT, DRAW IT, RE-MIRROR IT TO RESTORE SHAPE
```

Listing 3. Application of MIRROR!.

Listing 4. ANIMALS,A$8FFF,L$44E, a shape table for experimenting with MIRROR!.

```
8FFF- 16
9000- 00 22 00 46 00 6B 00 BF
9008- 00 2A 01 88 01 D3 01 13
9010- 02 71 02 C1 02 F2 02 43
9018- 03 7B 03 EF 03 21 04 37
9020- 04 3C 3E 1C 0C 25 24 3C
9028- 0C 35 25 15 1E 1F 36 25
9030- 95 15 4D 3A 3F 3F 3F 3F
9038- BF 2D 2D AD AE AE FF 1B
9040- 67 0C 24 04 00 01 2C 2E
9048- 0C 1C 27 24 2C 1C 37 27
9050- 17 0E 15 36 27 97 17 DF
9058- 2A 2D 2D 2D 2D AD 3F 3F
9060- BF BE BE 6D 09 E5 1C 24
9068- 04 00 38 06 27 37 37 37
9070- 3F 27 25 27 25 25 27 25
9078- 27 25 67 0C 2E 2C 2E 28
9080- 05 05 05 05 2E 3E 0E 35
9088- 37 35 2E 2E 3E 1F 3F 3C
9090- 3E 4E 29 0D 35 FF 2E 2D
9098- 4E 31 36 36 DF 64 24 C7
90A0- 3F 3E 2E 0D 1E 36 1F 24
90A8- 17 FE 24 0C 3C C3 33 AE
90B0- 36 1F E4 36 DF E4 6C 24
90B8- 2C 36 36 37 29 00 43 31
90C0- 36 36 36 36 36 36 2E 2D
90C8- 25 27 24 37 36 27 24 2C
90D0- 3C 2C 3C 2C 1C 24 24 3C
90D8- 1F 1E 1E 24 DF 3F 0C 0C
90E0- 0E 0C 0D 2E 24 1F 1F DF
90E8- 3F 64 75 6D 2D 0D 04 3F
90F0- 3F E7 27 38 3F 0C 0C 2D
90F8- AD 35 3F 77 2D 25 0C 1C
9100- E4 8D 15 36 17 2D 25 0C
9108- 0C 0C 2D AD 3F 3F 3E 3E
9110- 2E 65 2E 2C 2E 15 77 9E
```

Listing continued.

As I said, I rarely need LOMEM. For the rest of the modules in Hi-Res Interior Design and many other applications I use memory in a more convenient fashion. See Figures 4 and 5 for normal examples.

Notice in Figure 4 that no LOMEM commands are needed and that start-of-program POKEs are vital. Most of the time, HIMEM's default value ($9600, or 38400) is okay, so I needn't specify HIMEM, but rarely are start-of-program POKEs not needed. Why?

The Importance of POKEs

Well, the computer's start-of-program default value is 2048, or $800, and POKE 103,1 : POKE 104,8 : POKE 2048,0 automatically resets the start-of-program values back to normal/default if you've changed them. But observe, in Figure 5, the limita-

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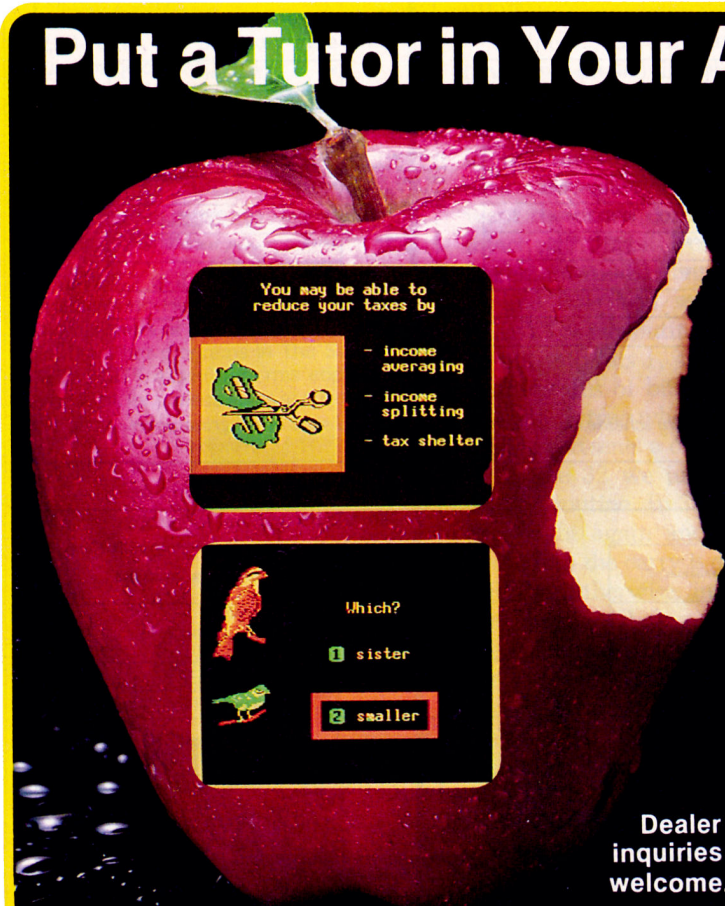

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tions of an $800-based Applesoft program.

In case A there are 6144 ($1800) bytes for the Basic program and its arrays, strings and variables. This is perfect if your program is short, but not many programs are that way anymore.

In case B there are 14336 ($3800) bytes for the Basic program and its arrays, strings and variables. If the Basic program is rather short, without too many variables and arrays, if you need only one hi-res page, and if you have as much as $3600 worth of data or tables to load into memory, this may be adequate. However, look out that you don't run out of memory.

Now let's look at case A with a changed HIMEM. Let's put it at 38400 ($9600). Now there are 6144 bytes (if hi-res page 1 is used) for the

Listing continued.

```
9118- 32 27 1C 1E 20 27 27 3F
9120- 3F 0E 0D 1E 37 36 25 2C
9128- 00 08 38 3F 17 BF 17 3F
9130- 17 0D 0D 3E 1F 37 0D 0D
9138- 0D 3E 1F 3F 96 2D 0D 2D
9140- 38 1F 67 6D 25 25 27 67
9148- 61 0C 65 DC 60 2D B5 D3
9150- 2A 2D FE 37 35 37 35 35
9158- 37 9F 2D 25 55 2D 3C 2C
9160- 1C 27 27 25 67 24 24 07
9168- 28 0C E4 1C 3F 3F 3F 17
9170- 17 17 17 BF 3F E7 24 0C
9178- 2D 36 00 BE 17 1F 0C 1C
9180- 04 28 2E 2E 20 07 00 01
9188- 21 24 0C 0C 04 28 AE 76
9190- 04 28 24 0C 15 BE 35 36
9198- 36 17 36 36 36 36 07 20
91A0- 24 24 24 04 E0 33 AE 37
91A8- 36 36 B7 23 24 0C 04 38
91B0- 3A E0 96 8A 12 3F 24 24
91B8- 3F 3F 3F 37 0D 3E 37 3E
91C0- 3F 24 24 24 24 24 24 64
91C8- 0C 0C 2D 2D 2D 05 05 05
91D0- 05 00 D2 E7 36 36 36 AE
91D8- 3F 27 24 24 24 2C F8 12
91E0- 17 36 F6 AE 3F 24 24 24
91E8- 64 64 0C 1C 3F 24 E5 64
91F0- 0C AD 15 15 15 15 AD AD
91F8- AD AD 15 36 15 AE 36 3E
9200- 67 1C 1C 04 B8 17 36 3E
9208- 3F 0C 24 3C 28 25 FC 13
9210- 37 00 3F 3F 27 24 24 64
9218- 2C 1C BC E7 BE 35 15 36
9220- 36 36 36 F6 1E 36 36 4D
9228- 24 24 04 28 2E 28 2D 2D
9230- F5 0E 36 36 4D 24 24 0D
9238- 24 1C 1C 1C 3F 3F 4E 31
9240- AE 06 00 1C 1C 24 1C 3F
9248- 4C 2D 15 2D 65 2E 06 00
9250- 04 00 00 00 00 00 00 00
9258- 00 00 00 00 00 00 00 00
9260- 04 00 00 00 00 00 00 00
9268- 00 00 00 00 00 00 00 00
9270- 89 AA 2D FE E3 38 17 BF
9278- 17 3F 0E 36 1E 27 1F 6C
9280- 3C 27 24 2C 2C 1C 64 64
9288- 0C 65 0C 2D 65 2D 0C 0C
9290- 2D 2E A8 36 36 3E 20 24
9298- 97 16 1E 04 38 17 3F 1C
92A0- 3E 3C 3E F7 3E 17 17 2D
92A8- 68 49 89 62 0C 0C 04 00
92B0- 00 00 00 00 00 00 00 00
92B8- 00 00 00 00 00 00 01 81
92C0- 43 2C 24 25 24 24 0C 2D
92C8- 2D 3E 3F 07 36 36 D6 D6
92D0- 3E 0E 35 35 37 35 3F 3F
92D8- 3F 17 2D 2D 2D 2D 3E 17
92E0- 2D DE 07 3C 3E 3C 3E 3C
92E8- 3E 24 37 07 20 E5 24 24
92F0- 00 18 24 24 04 18 36 36
92F8- 36 27 24 24 24 37 36 36
9300- 3E 3C 2C 24 24 37 BF BE
9308- AE 37 15 2D F5 37 35 17
9310- BE 17 2E 25 0C 0C 0C 36
9318- BE 2D 64 3C 20 15 2D 0C
9320- 2D 0C 15 9F 15 BE 17 2D
9328- 0C 0C 24 AC 15 15 BE 2D
```

Listing continued.

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"What about dumping DOS and putting HIMEM up at $C000?"

Basic program, and for arrays and variables. But where will you put shapes and data? At $4000 if hi-res page 2 is unused, or at $6000 if hi-res page 2 is used. Actually, in practice I prefer, in a situation like this, to set HIMEM at 36864 ($9000) and have $9000–$9AA6 (with MAXFILES1 in effect) for shapes and data. Next I start the Basic program at $4000 with POKE 104,64 and POKE 16384,0, and have 6144 bytes for data from $800 to $1FFF. This Basic program repositioning precludes strings from overwriting the hi-res pages when they grow down too far. (The symptom is garbage on the hi-res screen.)

Now, since Basic program repositioning is already being pointed out as a cure for most memory management problems, let's move on to case C.

The Best Choice

In case C there are 6144 ($1800) bytes for data and shapes, one hi-res page used, and $5600 (22016) for the Basic program and strings, arrays and variables. (You can put more data in $9600–$9AA6 if MAXFILES1 is in effect.) For an even longer Basic program, with MAXFILES1 in effect you can use $4000–9AA6, which is 23206 ($5AA6) bytes. That must include some room for variables, strings and arrays, of course.

I find that the many versions of case C are more useful than case A or B. Only POKE 104,64 and POKE 16384,0 need be in effect before you LOAD or RUN your Basic program. If both hi-res screens are needed, simply use start-of-program POKEs of POKE 104,96 : POKE 24576,0; and then start your Basic program at $6000, which gives you $3600 (13824) bytes for Basic programs without MAXFILES1 and $3AA6 (15014) bytes with it. Still quite healthy. This is a good arrangement for programs requiring a picture, palette of colors or drawing of some type that occasionally gets toggled to when hi-res page 1 is the main active graphics page.

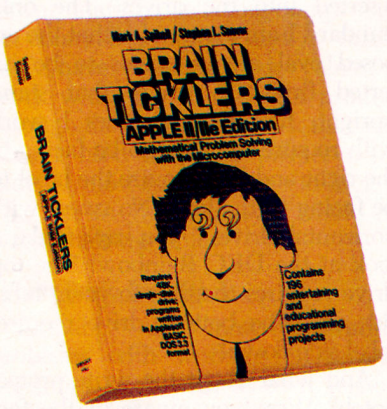
One last consideration: What about dumping DOS and putting HIMEM up at $C000 (49152)? Yes or no? Yes, if your memory will hold everything to preclude the need for further DOS usage (file BLOADing or text file READing). The limit is $C000, since that's where I/O begins. A graphics-using program could be from $4000 to $C000, or $8000 (32768) bytes long, in this situation, including variables, arrays and strings. This may be touchy to work with, so be careful. And as I advise people experimenting with EXECing programs, make two back-ups, not one, and update twice an hour. I normally advise one back-up, but with DOS-dumps and EXECs I've *seen* two entire disks crash simultaneously. An ounce of prevention is worth a pound of reprogramming. ■

Listing continued.

```
9330- 24 24 1C 1C AC 21 FC 6C
9338- E4 F7 3C 3F 3F 3F Ø7 ØØ
9340- ØØ ØØ 3B 3F 77 35 37 37
9348- 6D 3A FF 3F 3C 2C Ø4 2D
9350- 38 3F 68 FC 6C 3C ØC 2D
9358- 2D 2D 2D 2D 2D AC 35 AD
9360- 35 1E E7 Ø7 Ø6 Ø6 2E 2E
9368- 2E 15 3F 1F 3F 3C 2C 2C
9370- 38 37 Ø7 38 3F ØØ ØØ ØØ
9378- ØØ ØØ 11 1E 1E 3F 37 4D
9380- 11 37 1E Ø4 38 1E 1E ØC
9388- 38 3C FE 28 2C 2D 38 3F
9390- ØC 18 Ø8 2D 68 1C 9F 3F
9398- 3C 2C 25 67 2C 2E 2Ø 35
93A0- 2E 6Ø 36 Ø5 2Ø 36 25 AC
93A8- 15 15 1F 6E 31 DF 6E 31
93BØ- DF 6E 31 36 9F 9B 2D ØC
93B8- ØD 15 36 ØD Ø8 24 24 E4
93CØ- 1C 1C 17 Ø6 ØØ 65 ØC 36
93C8- 35 BE ØD Ø8 18 Ø4 38 6C
93DØ- 32 B6 61 3C Ø4 6Ø ØC 96
93D8- 2E 2D 95 Ø9 24 FC ØC 24
93EØ- 24 24 E4 4C 92 ØA 1E 4E
93E8- A8 15 36 36 36 ØØ 48 1E
93FØ- 36 76 2E 2D 1C 1C 24 AC
93F8- 2D 65 65 3C 27 2C 64 DF
9400- 92 1C 1C 96 Ø7 2Ø 17 Ø7
9408- EØ 3F 3F 3F 17 BF 3E 2E
9410- 3E 36 Ø5 A8 76 2E 2D 1C
9418- 1C 44 64 D6 2A 2D 2D ØØ
9420- 4D 1C 1C 1C Ø4 2Ø 37 36
9428- BF ØD 35 FF 6E 36 36 36
9430- 6D E5 E4 1C 24 ØØ DF ØC
9438- ØC ØC Ø4 2Ø 35 36 AD 1F
9440- 37 6D FE 36 36 36 FF 67
9448- 64 ØC 24 ØØ ØØ
```

Prentice-Hall speaks an Apple language other publishers have forgotten.

English.*



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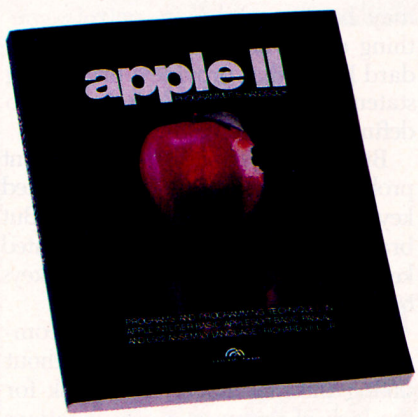

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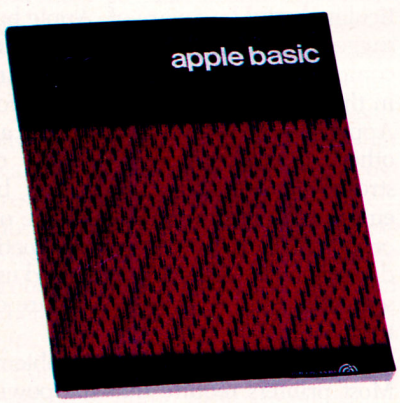

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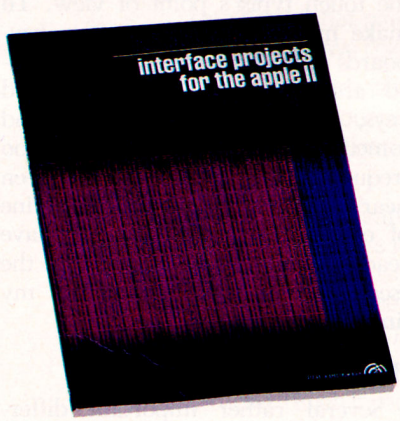

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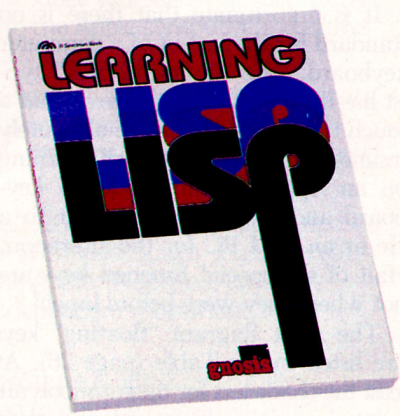

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by Dan Bishop



On Nonstandard Basic and Other Things

One of the interesting aspects of doing custom programming for a variety of businesses is the assortment of microcomputers I find myself working with. This provides a broader perspective on programming and on the microcomputer field than I would get from working exclusively with a single machine. It is also frustrating at times due to the differences in hardware design and in the versions of Basic that these systems use.

I'd like to share some of my experiences along these lines with you. If you yourself deal with different machines, or translate Basic programs from one to another, you may find some of these observations helpful.

Keyboard Layout

It is unfortunate that there is no standard for the layout of a computer keyboard. The "hunt-and-peck" typist has little trouble in this area, but a touch typist like me can go absolutely insane. Imagine working all morning on an Apple II with its small keyboard and then switching over to a IIe or an IBM PC for the afternoon. Half of the special function keys are not where they were before lunch!

The most flagrant "floating" keys are listed in the Table (page 26). At least the characters for these symbols are printed on the keyboard so, even with a totally unfamiliar system, you can eventually find what you are looking for. Unfortunately, many less-used symbols are hidden as control keys. The ^ symbol, for example, is a control-6 on the Radio Shack Model II and doesn't even exist on the Model I. The back-slash is not available on some systems, on others it may be a control-/ or control-something else. Unfortunately, most standard Basics that provide a print-using statement require the back-slash to define alphabetic fields.

Bracketing symbols also present problems. Parentheses are dedicated keys mentioned in the Table. But brackets and braces may be dedicated keys on some keyboards, control keys on others, or not available at all.

Finally, no discussion about computer keyboards is complete without taking the manufacturers to task for the lack of ergonomic considerations in their designs. Typists know where to find the shift key and the carriage return key. To relocate those keys even slightly is to court disaster from the touch typist's point of view. To make matters worse, on many keyboards several other keys are crowded around these slightly displaced keys, making inadvertent (and sometimes disastrous) errors all too frequent. Many's the time I've been near the end of a long, complex line of code on an IBM PC, and have reached out to strike a 1 and hit the escape key instead, wiping out my line of code entirely!

Hardware Differences

Several rather important differences beyond the keyboard exist between machines. I'm not upset about those that distinguish one machine from another—that's the whole idea behind competition. What gripes me are the differences that have no bearing on the machine's quality or functions.

One example is how disks are to be inserted into the drives. The only standard I am aware of is that the exposed oval always seems to be inserted first. On drives that stand upright, half the machines I work with require the label to be facing to the right and half require the label to be facing to the left! "No sweat with horizontal drives," you say? Take a look at the DEC Rainbow! The top drive requires the disk to go in label side up. The bottom drive requires label side down!

And what about the write protect notch? Were you aware of the fact that the notch on 5¼-inch disks should be covered for write protection while for 8-inch disks the notch must be uncovered?

Here's one that Apple users in particular should be aware of. Apple has suggested that it is safe to turn the computer on and off while disks are in the drives. This may be alright for Apple drives. However, almost all other manufacturers I know of strongly suggest that the drives be empty when turning the machine on or off to prevent possible magnetic damage to the disks. If you should use someone else's machine, be aware of this requirement.

Printers are another problem. Most printers require that the power be turned off before scrolling the paper using the platen knob on the side of the machine. This is because

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the stepper motor is engaged whenever the power is on. The paper can be advanced automatically while leaving the printer on by pressing either the line feed or form feed button. On most printers there is a third button, called the "on-line" or "select" switch. Many printers require that this switch be pressed first, thus taking the printer off-line, before the line feed and form feed buttons work. A few printers do not have this requirement.

And while I'm discussing printers, isn't it a shame that common software controllable features such as setting margins, selecting compressed or enlarged printing, and so forth, can't have common code values. I work with enough different printers through the course of a week that any time I need a special printer command I must take the time to look it up. Trusting to memory I would be wrong half the time.

When Basic Isn't Basic

Probably the most frustrating problems with working on several machines, each with its own version of Basic, lie in the differences between the dialects of the language. Some of these problems are unavoidable, because some versions are more sophisticated than others and have command structures that are unrecognizable by less advanced Basics. Other problems could be avoided with a little effort at standardization.

For example, why does Applesoft Basic stand alone (as far as I know) in evaluating relational and logical expressions as 0 (false) or +1 (true)? Most other Basics evaluate a true expression as −1. This presents subtle problems in converting a program when one of the languages is Applesoft.

For an example, try the following short program on your computer:

```
10 A=50
20 PRINT (A=50);" FOR TRUE."
30 PRINT (A=70);" FOR FALSE."
40 END
```

This simple test will reveal which convention your computer's Basic uses. The discrepancy could be a problem in an expression like:

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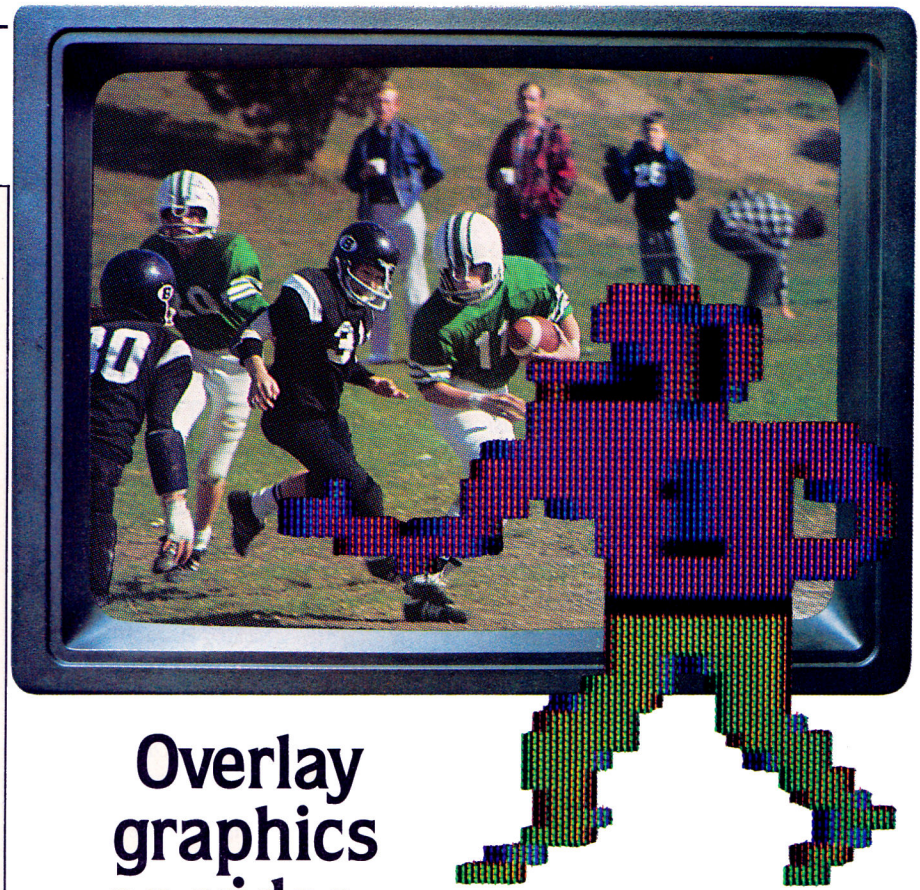

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B = 1*(A$ = "MON") + 2*(A$ = "TUE") + 3*(A$ = "WED") + 4*(A$ = "THU") + 5*(A$ = "FRI") + 6*(A$ = "SAT")

This equation provides B with a value from 1 to 6, depending on the day of the week assigned to A$. That is, B has a value from 1 to 6 if the expression is written in Applesoft using the +1 convention for true expressions. Most other computers would return a value from −1 to −6. (By the way, note how this expression avoids six separate IF commands, yet accomplishes the same result.)

Of course, to convert such a statement to a computer using the opposite convention just surround the expression with parentheses and begin it with a minus sign.

Many of the newer computer systems are using a form of Basic that requires spaces surrounding all Basic keywords. This creates a real hassle in converting an older program for the newer machine. This is one case, in fact, where the hassle is so great that numerous commercial programs have been written to insert spaces for you. If you are ever faced with this type of conversion, buy one of these utility programs. The time and effort you'll save will be well worth the money!

One such space-related problem caught me totally by surprise, and took me awhile to figure out what the difficulty was. Most Basics will allow you to simultaneously end several nested FOR...NEXT loops with one NEXT statement, such as NEXT I,J,K. Simple as that statement may appear, it will not work on an IBM PC! The reason is that, based on the "spaces-surrounding-keywords" rule, the J and K must be preceded by spaces.

This problem isn't universal, however. A simple test to check it out on a new system could be:

```
10 FOR I = 1 TO 10
20     FOR J = 1 TO 5
30 NEXT J,I
40 IF I<>11 THEN PRINT"THIS SYSTEM REQUIRES A SPACE BETWEEN THE COMMA AND THE I.":END
50 PRINT"NO SPACE NEEDED.":END
```

If the program runs at all, the comment will tell you if the additional space is mandatory. However, you might also simply get a SYNTAX ERROR IN 30 or a FOR WITHOUT NEXT message.

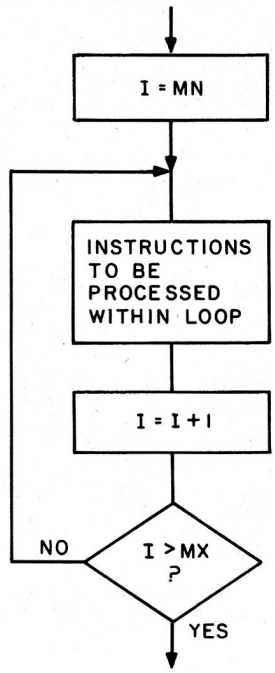

Figure 1. Flow chart of FOR I = MN TO MX .... NEXT I for systems that evaluate the loop counter at the end of the loop. The loop instructions will always be carried out at least once.

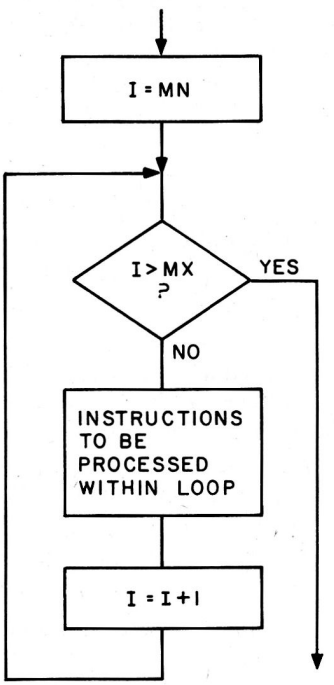

Figure 2. Flow chart of FOR I = MN TO MX .... NEXT I for systems that evaluate the loop counter at the beginning of the loop. If MN is larger than MX at the start, the loop instructions will never be executed.

A well-documented difference among Basics is how a FOR...NEXT loop is handled when the initial value for the loop counter exceeds the maximum value designated. Most early microcomputer Basics would allow the loop to process one time without regard to the loop counter's initial value. Figure 1 is a flow chart that illustrates why this is so. It is due to the fact that the comparison between the value of the loop counter and its maximum allowable value is not made until the loop has processed once all the way through to the NEXT statement.

Advocates of structured programming abhorred this situation (and rightly so, in my opinion). Perhaps due to their anguished cries, most modern microcomputer Basics have set the decision at the start of the loop (Figure 2). This completely bypasses the processing instructions within the loop if the initial value of the loop counter already exceeds the loop limit.

Again, one of the easiest ways to determine how a FOR...NEXT loop is handled by a specific computer is to run a simple program to test it. For example:

```
10  MN = 50:MX = 25
20  FOR I = MN TO MX
30    PRINT"THIS COMPUTER WILL
      ALWAYS PROCESS A LOOP ONCE"
40  NEXT I
50  IF I = 51 THEN 100
60  PRINT"THIS COMPUTER WILL
      BYPASS THE LOOP IF THE
      COUNTER'S INITIAL VALUE
      EXCEEDS THE LIMIT."
100 END
```

As with the previous two situations, most manuals will not specifically state which convention their Basic uses.

Compound Decision Structures

Applesoft Basic does not support the IF...THEN...ELSE structure for decisions. This makes writing structured programs a little awkward and produces a leap-frog effect in jump-

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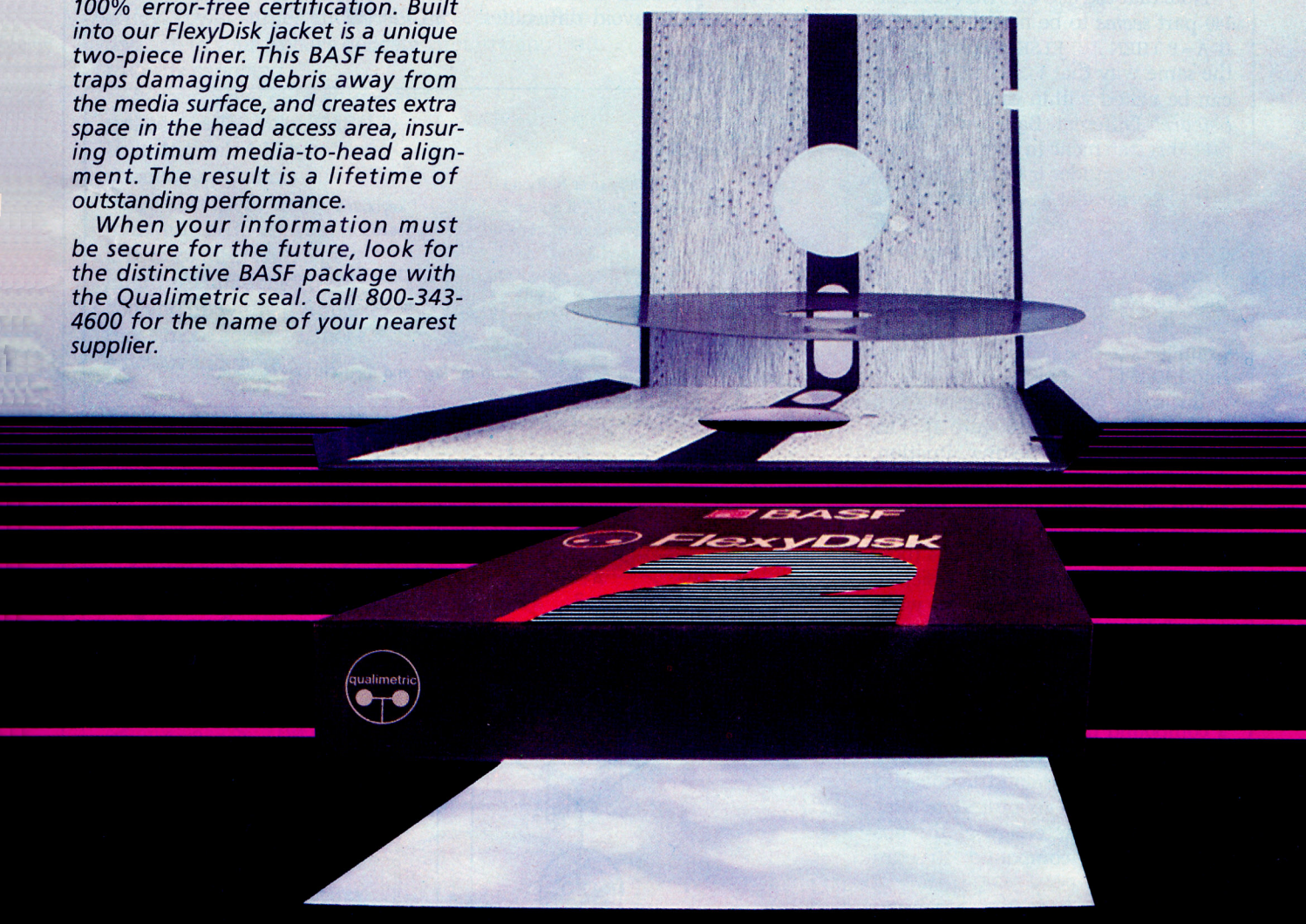

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Circle 327 on Reader Service card.

ing around the processing instructions that handle the false and true segments of the decision. However, it does alleviate any problems with nested IF...THEN...ELSE statements.

For Basics that do support the ELSE structure, it is possible to write a single Basic statement that contains several decisions. This type of statement is referred to as a compound or "nested" decision statement. An example might be:

```
IF A = B THEN IF C = A THEN 120 ELSE 140 ELSE 200
```

Note that the IF C = A THEN 120 ELSE 140 part *seems* to be nested inside the IF A = B THEN .... ELSE 200 part, much the same way that FOR...NEXT loops can be nested within each other, but *beware!* Different Basics will interpret this statement in different ways! Some will consider it nested, with the first ELSE segment associated with the last-occurring IF segment. Figure 3 illustrates the logical flow for these systems. As you can see, if A >< B then the program goes to 200. On the other hand, if A = B then the program goes to line 120 if C = A and to line 140 if C >< A.

But some Basics associate the first ELSE with the first IF (Figure 4). This is definitely *not* a nesting situation. Actually, I don't know what it is. But I ran across the problem using a Radio Shack Model 16 Xenix system and also a Radio Shack Model 4 (both of which use Microsoft Basic). I assume the problem may be widespread. Not all Microsoft Basics work this way, however, making the situation even more confusing.

The only way you can be sure that a compound IF...THEN...ELSE structure will be interpreted consistently is to avoid the nested construction altogether. This may require some alteration in the logic design of the program, but a compound structure such as:

```
IF R = J THEN 140 ELSE IF M = J THEN 150 ELSE 180
```

will always be properly executed. There is *no* nesting in this statement.

Some other features that could easily have been standardized but aren't include the TAB function (some systems count the first print column as column 0, others as column 1), cursor positioning commands (PRINT @ for Radio Shack, LOCATE X,Y for the IBM PC, and HTAB, VTAB for Apple), and clear-screen commands (HOME versus CLS).

Conclusion

I hope these observations will be helpful to those of you who deal with various machines or different versions of Basic. If you are writing a program that you hope may become universally available, you might keep some of these problems in mind and write your code to avoid difficulties on other machines.

"Different Basics will interpret this statement in different ways."

This column marks my eighteenth contribution to *inCider*. The editorial staff has requested that, beginning next month, I redirect the material toward a tutorial development of Basic from the "basics" up. If you are new to the field of computing and anxious to get started at writing your own programs, be sure to tune in to "The Applesoft Adviser" in the July *inCider*! ■

(and)	variously over 8, 9 and 0
" and '	over 2 and 7 if not on right edge of keyboard
+ and =	on top row or on right edge of keyboard
@ and ^	any old place will do
< and >	always over , and . ? Guess again! DEC Rainbows put these next to the left shift key.

Table. The most flagrant "floating" keys and their various locations.

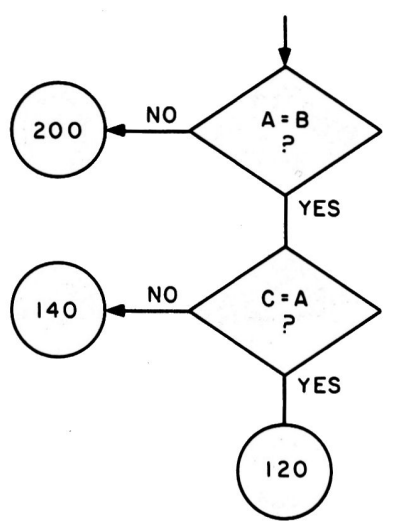

Figure 3. Flow chart of the compound statement IF A = B THEN IF C = A THEN 120 ELSE 140 ELSE 200 for systems that recognize nesting.

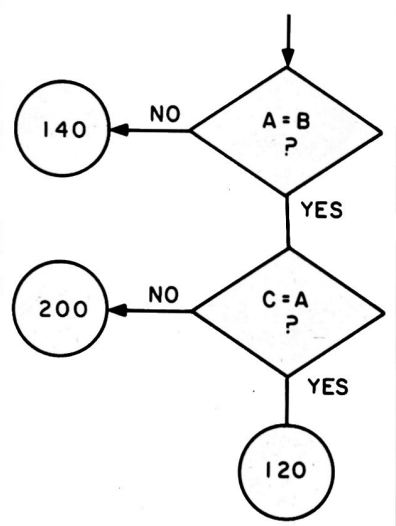

Figure 4. Flow chart of the same compound statement illustrated in Figure 3 for systems that do not recognize nesting. Notice the totally different outcome!

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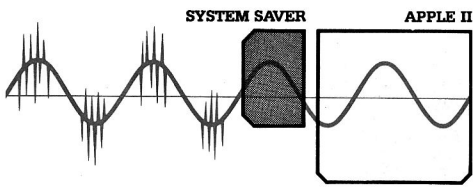

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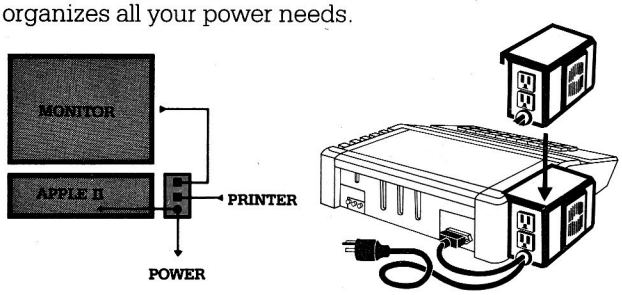

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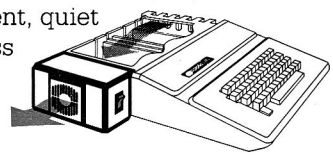

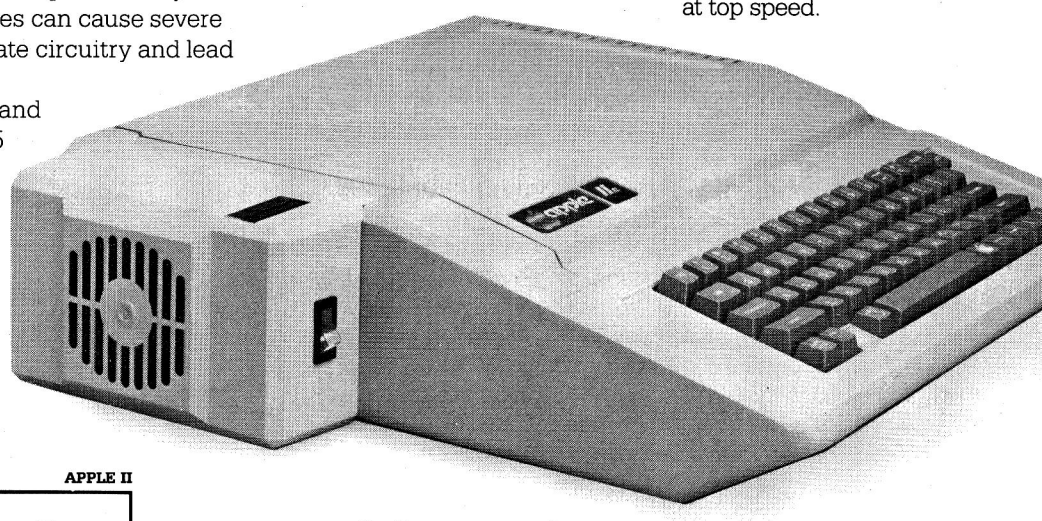

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Stalking the Low-Cost Daisywheel Printer

by Roger Hart

When I bought my Apple system a few years ago, I chose a dot-matrix printer based on a shallow pocketbook. At the time, the least expensive letter-quality printers were in the neighborhood of $2000—too fancy for my limited means. So, like many of us Apple owners, I settled on an inexpensive, yet high quality, dot-matrix printer. My Epson MX-80 was a good compromise between quality and cost and would be good enough for preparing query letters and manuscripts.

I have always been a little bothered by the "computer" look to the print, especially when I send a letter and manuscript to a potential publisher. My concern over print quality got lots of confirmation when I received my *1984 Writer's Market*, a book listing publisher's needs and requirements.

Publishers are who I'm trying to sell, so what they want (and sometimes demand) is important to me. Hundreds of book and magazine publishers have listings that state, "no computer printout submissions," "prefers letter-quality to dot-matrix," or "we process only letter-quality manuscripts."

I knew that this first comment only indicated a lack of understanding about computers. Publishers simply couldn't tell if a manuscript was typed on a typewriter or printed on a letter-quality printer. I also realized that their flat refusal to accept "computer printouts" was based on the lower quality of dot-matrix printers, especially when used with a bare-bones word processing program which generates poorly-shaped characters. These programs, without proper lowercase descenders—those parts of letters like *p* and *y* that extend below the line—are hard to read. I have seen a few myself and, indeed, they are a strain to read. Worse than that, it was obvious that they were creating a prejudice in the minds of editors and publishers. Struggling authors do not need to further prejudice their case. Clearly, I had to do something.



The Smith-Corona Memory Correct III Messenger.

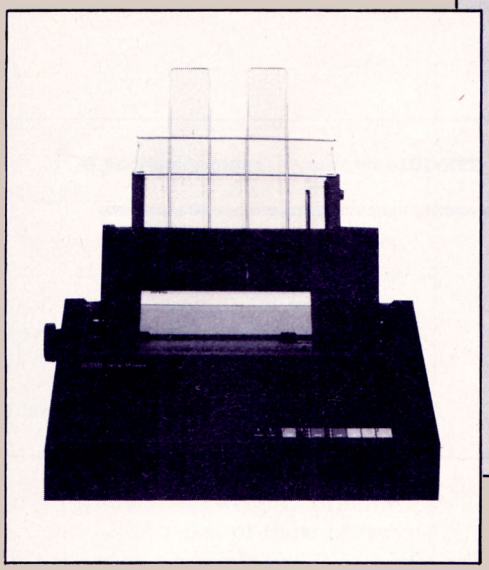
Luckily, a great many daisywheel printers have been recently introduced into the market selling for under $1000. A judicious bargain-hunter will find some of these printers selling for less than $500, even under $400. If, like me, you need a typewriter-quality printer but don't want to spend as much on the printer as the rest of the system cost, these new printers are good news. If you don't own a printer yet, you may want to carefully consider your needs and settle on one of the 24 low-cost daisywheel printers described below.

This recent flood of low-cost letter quality printers is composed of two different products: the lighter, scaled-down versions of the traditional daisywheel computer printers, and the portable or office typewriters that are interfaced to receive the data from your computer and translate it quickly and effortlessly into typed copy.

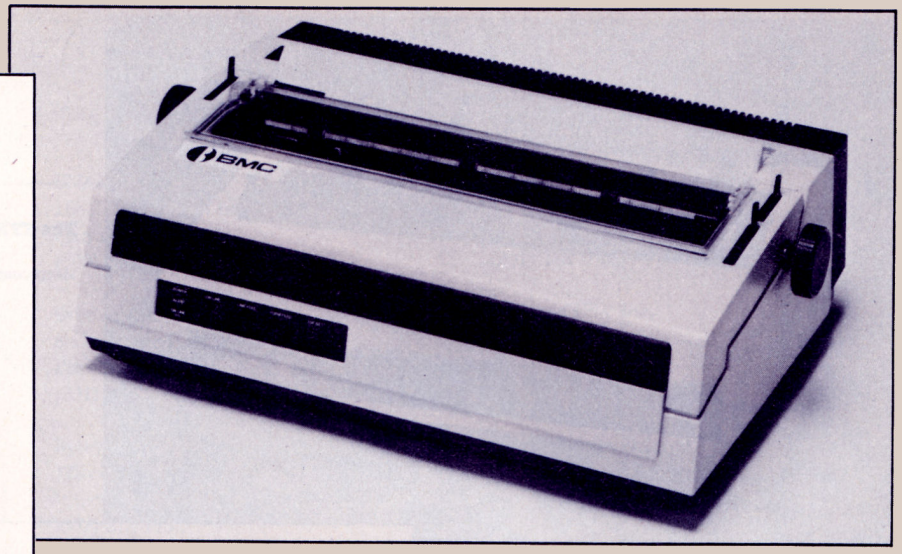
In my quest for a low-cost daisywheel printer, I found almost 30 models on the market. Two years ago, there were none. As in any situation where there are multiple choices, certain trade-offs must be considered.

How important is speed? Do you really need a printer that prints 20 cps (characters per second)? If you have a small to fair-sized business, you may well need one of the faster low-cost printers. Preparing a great many personalized form letters or long reports and manuscripts will take less time if you have invested in one of the higher-speed printers. This article, for instance, is about 15,000 characters in size. It takes 25 minutes to print out at

Roger Hart lives at 437 So. Baboosic Lake Road, Merrimack, NH 03054.



The DTC StyleWriter by Data Terminals & Communications.



The BMC PB 101.

10 cps or 11 minutes using the fastest printer (23 cps) described here. In business, time is money. For home users, however, money usually comes first. It's up to you and your needs. If you use your computer mainly for home use, then one of the less expensive light duty printers or interfaced typewriters will do the job nicely. A letter or two a day with an occasional report will be handled with ease to you and your pocketbook.

Also consider if a buffer will allow you to use a slower printer. Several of these low-cost printers have built-in memory buffers. You print from these buffers while you use your computer for text and data entry. The printer's buffer memory frees your computer's memory from being tied up while you print. You will need to print on continuous-form paper to gain the full advantage of printer buffers. When printing single sheets, most word processing programs must wait for a "page clear" signal and a new "print page" command from the computer's keyboard before the next page begins to print.

You can buy printer buffers separately but it's nice to be able to have one already installed in your printer. One printer, the DTC StyleWriter, has a very generous 32K buffer. This will allow you to store and print about 20 pages off-line from the computer. This printer can be ordered with an optional expanded buffer memory of 67K for an added $49—an excellent value. Separately purchased memory buffers of similar size can easily cost you over $200.

Do you need to address envelopes? This is an important factor to consider when shopping for a printer. If you already have a good typewriter with a common typeface, then your envelope addressing problem is solved. Use your typewriter. You will find it bothersome to use a standard printer for this simple task. Each address must be created as a separate file, formatted to print correctly on the envelope, saved, printed, and finally deleted from your disk. Envelopes are a dreaded nuisance.

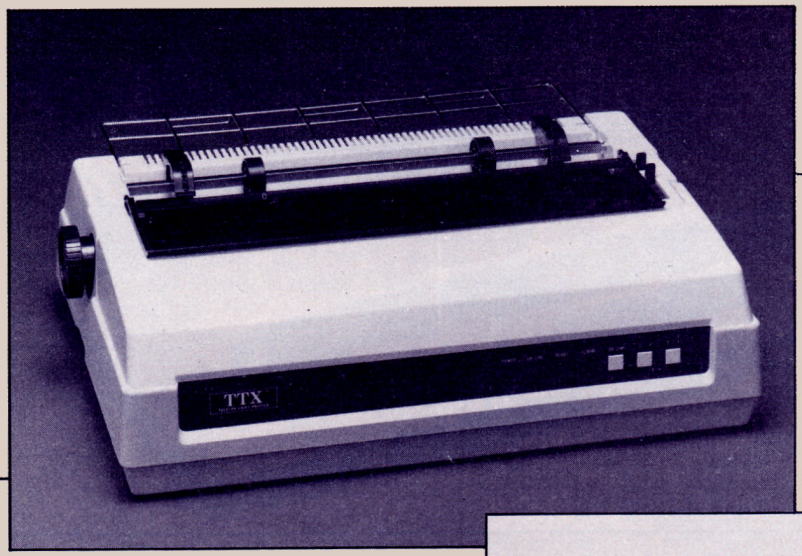
One other way to solve the envelope problem is to use an interfaced electronic typewriter, such as the Bytewriter, or Smith-Corona's Messenger III with its optional interface. Put your old typewriter in a garage sale and invest in one of these new daisywheel electronic models. They print at about 10 to 12 characters per second—slow by dot-matrix standards, but still 140 words per minute.

Another option is to buy one of the printers that has an optional keyboard, such as the Comriter CR-II, Brother HR-15 or the Dynax DX-15. These three printers are essentially similar. The keyboard looks like a typewriter keyboard with about 46 keys. Printer input is readily switchable from keyboard output (for those pesky envelopes) to printing from your Apple and vice versa. This typewriter input keyboard is detached and can be used some distance from the printer. The keyboard weighs slightly over two pounds and can be held in the lap for comfort and convenience. Now, all we Apple owners could hope for is for some genius out there to make the keyboard switchable to the computer. A detached keyboard for the computer and for the printer—Apple owners want everything, don't we?

Even without this dreamed-about ability to use the optional printer keyboard for computer data entry, this printer-keyboard combination might be a very good choice if yours is a small business and has the need for both a printer and typewriter. Both functions are available for about $800 list.

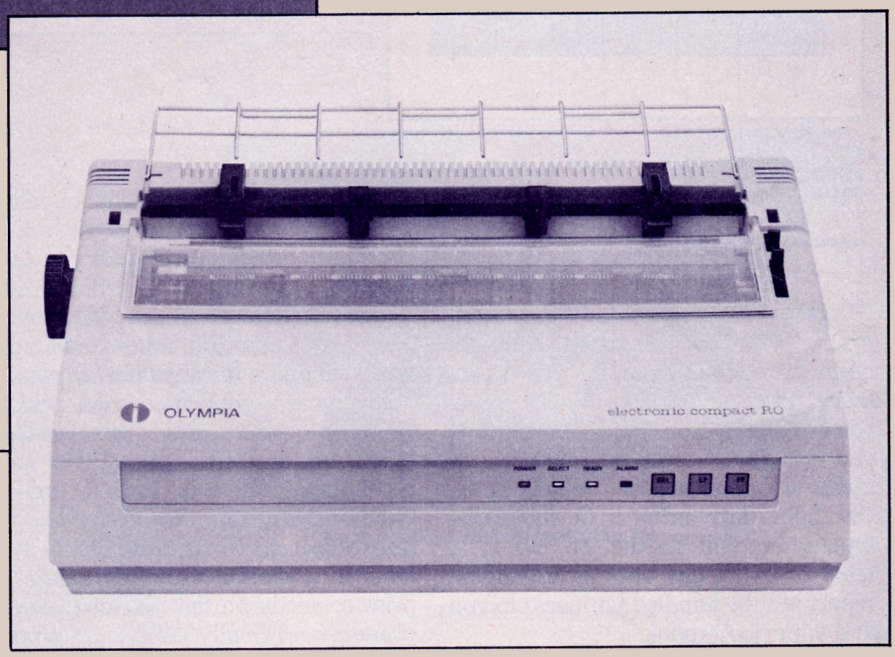
Pitch is another factor. Pitch is the width of the letter: Pica type is 10 characters per inch, elite is 12 characters per inch. Can you be happy with a single pitch? The visual effect can be quite dramatic to change pitch when printing a document. It will help give a professional "typeset" appearance. A few of the printers listed have only a single pitch or must be purchased in a single fixed pitch option. It may mean nothing to you to be able to change type width or pitch from one document to the next or even within the same document, but it's a factor that must be determined before you buy.

Proportional spacing is another feature available on quite a few of the letter-quality printers that can be purchased for under $1000. Proportional spacing uses special printwheels that give a wider spacing to certain letters like *m* and *w*. These letters are naturally wider than *i* or *l*, for instance, yet



The TTX-1014 by Teletex Communications Corp.

The Olympia Electronic Compact RO.





The Dynax DX-15.

are reserved the same amount of space unless proportional spacing is used. Proportional spacing will put the same amount of space between letters regardless of the actual letter width. Be sure, though, that your word processing software can support this feature. Many of the programs which run on an unmodified Apple do not include proportional spacing control.

What does proportional spacing do for you? Well, it allows you to print out letters, price sheets, data bulletins, and similar documents with a "typeset" look. Using your printer's proportional spacing will give a professionally printed appearance to your work. If you're going to have 5000 copies of your new catalog or brochure printed at your local printshop, simply print it out in proportional spacing, take this "camera ready" copy to your local printing shop, and have it run off. Your computer's printer will have done your typesetting for you.

Interfacing is another problem. Many of the low-cost printers come with a Centronics parallel interface as standard. An RS-232C serial interface is often extra. If you plan on changing computers in the future, you might want to purchase one of the printers having both types of interface included as standard original equipment. The Teletex TTX-1014, Olympia Electronic Compact RO and the Smith-Corona models have both types of interface as standard equipment.

Another important factor in choosing a letter-quality printer is the paper feed mechanism that you will be using. Often, a letter-quality printer is used with letterhead and other forms of single sheet stationery. Will you be using single sheet paper or tractor-feed paper? If you plan to use both or if there is any chance that you may change your mind later, then opt for one of the models that have optional paper feed equipment available that will fill your future needs. This will be particularly important if you have a small to medium sized business. At first, you may get along with feeding single sheets of letterhead into your printer. Later, when volume increases, you may wish to switch to pre-printed tractor-fed letterhead or add an automatic sheet feeder to handle the feeding operation all by itself. In the day-to-day operation of your printer, you may be better off having tractor-fed continuous-form paper on a slower speed printer rather than a higher speed sheet-fed printer. Speed is speed, whether it is in the printer speed or in the paper manipulation.

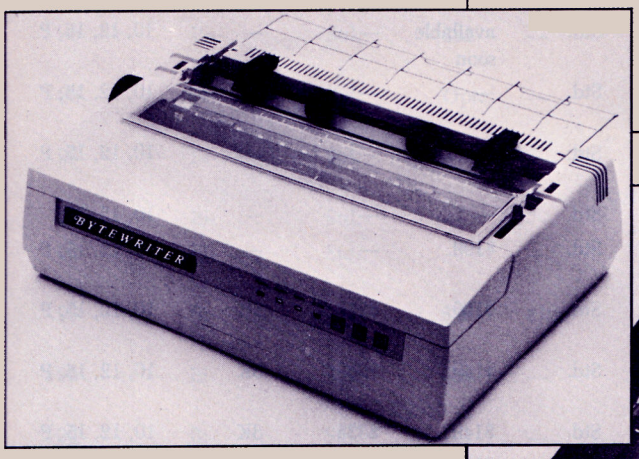
You may not want to purchase these options now but, if they will ever be important in the future, it's best to buy a printer that has these options. Many do have them, but some don't. Think ahead here because it will influence the future usefulness of the printer you now purchase.

Two printers, the TTX-1014 and the Olympia, give you both feed mechanisms—friction and tractor. It makes the decision process a little easier and simplifies the change-over

from sheet to continuous form paper and back.

The weight of the printer is another factor that could be important. The overall weight of the printer is a general indicator of the ruggedness of the mechanism. It certainly isn't a foolproof guide, but you will see that the more costly printers are the heavier ones. There are two categories of low-cost daisywheel printers that are easily distinguished by weight, printing speed and price. Each of these factors is related.

The lower cost range of printers sell for about $500 to $650, weigh about 20 pounds and print at around 12 characters per second. Many of these do not have optional tractor feed mechanisms available. The higher cost range printers sell for $700 to $1,000, weigh 30–35 pounds, and print at around 18 characters per second. Both ranges of printers have generally good reliability. Printers are partly mechanical, so reliability and ruggedness is important. These printers have an MTBF (mean time before failure) of over 2000 hours of printing at a 25% duty or usage rate.



The Bytewriter 900.



The Bytewriter 40.

Manufacturers

BMC
16830 So. Avalon Blvd.
Carson, CA 90746
(800) 752-5002

Brother International Corp.
8 Corporate Place
Piscataway, NJ 08854
(201) 981-0300

Bytewriter
125 Northview Road
Ithaca, NY 14850
(607) 272-1132

Cardco Inc.
313 Mathewson
Wichita, KS 67214
(316) 267-6525

Comrex International Inc.
3701 Skypark Drive
Suite 120
Torrance, CA 90505
(213) 373-0280

Data Terminals & Communications
590 Division St.
Campbell, CA 95008
(800) 962-8185 (outside California)
(800) 538-9294 (California)

Dynax Inc.
15698 Bandini Blvd.
Bell, CA 90201
(213) 260-7121

Juki Industries of America Inc.
229 Market St.
Saddle Brook, NJ 07662
(201) 368-3666

Olympia USA Inc.
Box 22
Somerville, NJ 08876
(201) 722-7000

Sanyo Business Systems Corp.
51 Joseph St.
Moonachie, NJ 07074
(201) 440-9300

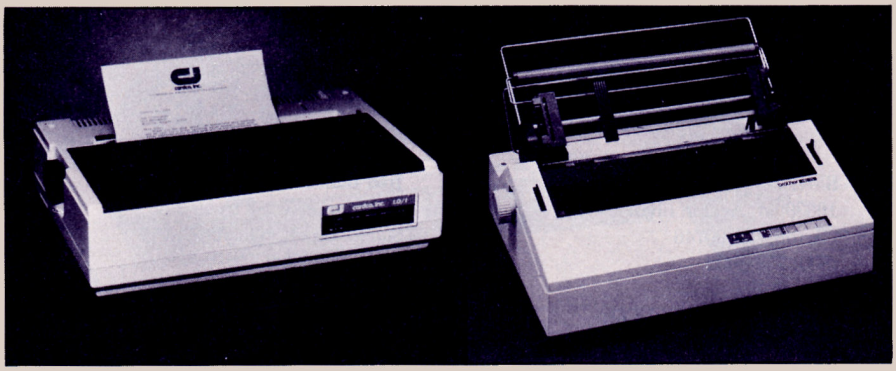
Silver-Reed America Inc.
19600 So. Vermont Ave.
Torrance, CA 90502
(800) 421-4191 (outside California)
(213) 837-6104 (California)

Smith-Corona Consumer Products
65 Locust St.
New Canaan, CT 06840
(203) 972-1471

Star Micronics Inc.
Box 612186
Dallas/Fort Worth Airport, TX 75261
(214) 456-0052

Teletex Communications Corp.
3420 East Third Ave.
Foster City, CA 94404
(415) 341-1330

Transtar Computer Products Inc.
Box C-96975
Bellevue, WA 98009
(206) 454-9250



The Cardco LQ/1 (left).

The Brother HR-25 (right).

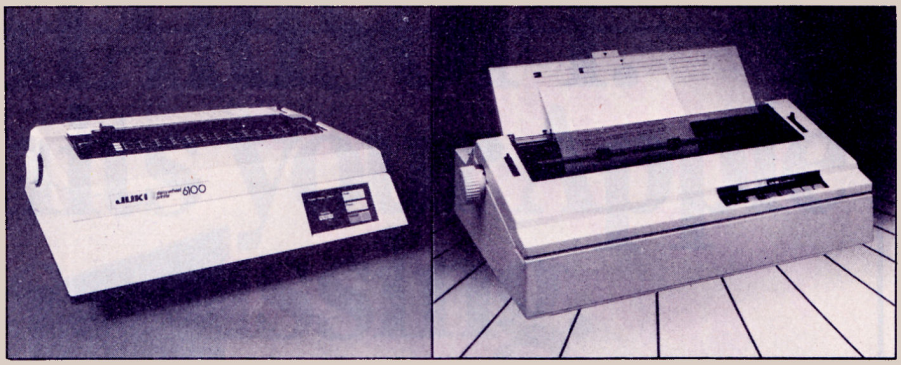
Even though your printer will be a reliable piece of equipment, you may wish to purchase from a local dealer and forgo the extra 10 to 20 percent savings you could have by purchasing through the mail. Mail order houses, especially for novice computer owners, are often short on advice and less than totally responsive to after-the-sale problems. There are, however, a lot of satisfied mail-order buyers, including me. The savings were more important and I had looked into most of the potential interfacing problems already. The mail-order dealer I purchased from was in the same state, so there

PRINTER	List Price, dollars	Speed, cps	Paper Width, inches	PAPER FEED MECHANISM			Memory Buffer, K	Type Spacing, per inch
				Friction	Tractor	Sheet		
Bytewriter 35	545	10–12	13	Std.	—	—	—	10, 12, 15
Bytewriter 40	645	10–12	13	Std.	—	—	—	10, 12, 15
Bytewriter 900	649	12–14	13.2	Std.	Std.	—	—	10, 12, 15
Smith-Corona Memory Correct III Messenger with Interface Module	769	12	12	Std.	—	—	—	10, 12, 15
Smith-Corona TP-II	595	12	13	Std.	$149	—	—	10 or 12
Silver-Reed EXP-500	599	12	13	Std.	$149	—	—	10, 12, 15
Silver-Reed EXP-550	699	17	13.2	Std.	$160	—	—	10, 12, 15, P
Transtar 120	550	14	12	Std.	$149	—	2K*	10, 12, 15
Transtar 130	699	18	17	Std.	$149	—	2K*	10, 12, 15, P
Star Powertype	499	18	8.5	Std.	available soon	—	—	10, 12, 15, P
BMC PB 101	699	17	14	Std.	—	—	—	10, 12, 15, P
BMC PB 401	849	17	14	Std.	—	—	—	10, 12, 15, P
Sanyo PR 5000	595	14	13	Std.	—	—	—	10, 12, 15,
Sanyo 5500	995	16	17	Std.	$199	—	—	10, 12, 15, P
Comrex ComRiter CR-II	599	12	13.5	Std.	$120	$259	5K	10, 12, 15, P
Comrex ComRiter CR-III	995	23	14.9	Std.	$149	$269	5K	10, 12, 15, P
DTC StyleWriter Special	639	12	13.5	Std.	$149	$335	3K	10, 12, 15, P
DTC StyleWriter	899	12	13.5	Std.	$149	$335	35K	10, 12, 15, P
Dynax DX-15	599	13	13.5	Std.	$120	$250	3K	10, 12, 15, P
Teletex TTX-1014	649	12	14.5	Std.	Std.	—	—	10, 12, 15
Olympia Electronic Compact RO	649	14	14.4	Std.	Std.	—	—	10, 12, 15
Juki 6100	599	18	13	Std.	$149	available soon	2K	10, 12, 15, P
Brother HR-25	995	23	16.5	Std.	$150	$270	3K	10, 12, 15, P
Cardco LQ/1	650	14	13	Std.	available	available	—	10, 12, 15

*on serial model only

The Juki 6100 (left).

The ComRiter CR-111 by Comrex (right).



wasn't complete isolation.

You're probably wondering which printer I bought. I invested in the ComRiter CR-II/Brother HR-15/Dynax DX-15 (I said they were similar. They are.) daisywheel printer and keyboard. This printer suits my current needs and should be suitable for the future, too.

Your printer needs will probably be different from mine. With so many fine low-cost letter-quality printers available, you have a wide range to choose from no matter what your pocketbook dictates. Happy shopping. ■

Characters per Printwheel	Directional	INTERFACE Centronics Parallel	INTERFACE RS-232C Serial	Keyboard	Size, inches W H D	Weight, pounds	Comments
100	Uni-	Std.	—	Incl.	16.5 × 4.3 × 13.7	21†	Doubles as an electronic typewriter (Olivetti Praxis).
100	Uni-	Std.	—	Incl.	18.7 × 5.3 × 15	19.4	Doubles as an electronic typewriter (Olivetti Praxis).
100	Bi-	Std.	Std.	—	18.2 × 5.2 × 12.2	20	
88	Uni-	Std.	Std.	Incl.	18.5 × 5.5 × 15	21.6	Doubles as an electronic typewriter.
93	Uni-	Std.	Std.	—	19.5 × 6.4 × 12.4	18.5	
96	Bi-	Std.	$50	—	17.5 × 4.8 × 11.9	18.7	Uses Olivetti ribbon and Silver-Reed printwheels.
96	Bi-	Std.	$100	—	21 × 7 × 15	30.9	Uses Olivetti ribbon and Silver-Reed printwheels.
96	Bi-	Std.	Opt.	—	17.5 × 4.8 × 11.9	18.6	Uses Olivetti ribbon and Silver-Reed printwheels.
96	Bi-	Std.	Opt.	—	23 × 7.5 × 14	31	Uses Olivetti ribbon and Silver-Reed printwheels.
96	Bi-	Std.	Std.	—	19.6 × 5.5 × 14.3	22	Uses Qume printwheels.
96	Bi-	Std.	Opt.	—	22.4 × 6.7 × 14.1	35	Uses IBM Selectric ribbon and Brother printwheels.
96	Bi-	Std.	—	—	22.9 × 7.8 × 14.9	30.9	Uses Olivetti ribbon and Silver-Reed printwheels.
96	Bi-	Std.	—	—	17.5 × 4.8 × 12.4	18.7	
96	Bi-	Std.	—	—	22.9 × 7.8 × 14.9	30.9	Uses Olivetti ribbon and Silver-Reed printwheels.
96	Bi-	Std.	$50	$199	18.3 × 6.5 × 13.3	20	2-color printing. Uses IBM Selectric ribbon and Brother printwheels.
96	Bi-	Std.	$50	—	20.5 × 7.6 × 15	30	2-color printing. Uses IBM Selectric ribbon and Brother printwheels.
96	Bi-	Std.	—	—	13.1 × 4.7 × 9.6	25	
96	Bi-	Std.	—	—	13.1 × 4.7 × 9.6	25	2-color printing.
96	Bi-	Std.	$50	$195	18.3 × 6.5 × 13	19.6	2-color printing. Uses IBM Selectric ribbon and Brother printwheels.
100	Bi-	Std.	Std.	—	18.3 × 5.3 × 12.3	22	
100	Bi-	Std.	Std.	—	19.5 × 6.3 × 12.6	17	
100	Bi-	Std.	$80	—	20.5 × 5.9 × 17.9	31	Uses IBM Selectric ribbon and Triumph-Adler printwheels.
96	Bi-	Std.	$50	—	21 × 7.4 × 15	30.2	2-color printing.
96	Bi-	Std.	Opt.	—	17.5 × 4.8 × 12.4	18.7	

†Includes carrying case

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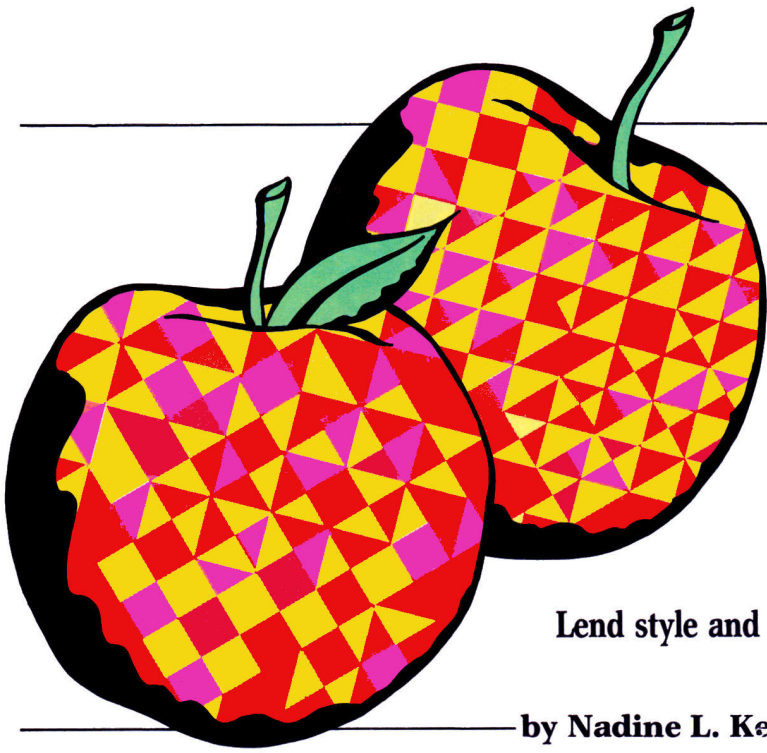

Apple Writer Patchwork

Lend style and panache to your Okidata printouts.

by Nadine L. Keilholz

I suspect that I'm not the only Apple owner who uses the computer as a word processor the great majority of the time. I use the Apple Writer II program in my work as a free-lance writer, in volunteer work I do for local civic organizations, and for all my personal and business correspondence. Having grown accustomed to this particular word processing program, I would, in the words of an old commercial, "rather fight than switch."

Until recently I used an Okidata Microline 80 printer. It was a little workhorse, turning out page after page of copy—reliably, but without imagination. It printed in "data processing quality," which meant that everything I wrote was obviously a computer printout. It lacked such features as the ability to print in correspondence quality or boldface, the capacity for superscripting, subscripting and underlining—in other words, all the features necessary for me to produce camera-ready copy.

When I was ready to replace it with a more sophisticated model, I decided, on the basis of the Microline 80's performance and reliability, to stay with an Okidata printer. On examining their literature I found that the Microline 92 was not only within my budget, but also contained all the features I needed and more.

I bought the printer and carried it home in a state of euphoria. The salesman had assured me that it was compatible with my Apple II Plus, my Tymac printer interface and my Videx Videoterm 80-column board. All I had to do was plug it in and I'd be producing perfect copy in any of several sizes and styles of print—right?

Wrong!

Oh, the salesman had been right about the printer's compatibility with my computer and interface, and it worked perfectly from within an Applesoft program, producing all those beautiful effects for which I'd bought it. But using it with the Apple Writer II was a different story.

The printer, you see, requires control characters to make it produce all those neat little effects, and the Apple Writer II has no provision to type in certain of the needed control characters directly from the keyboard. So there I was with a word processor I liked and was comfortable with and a printer that would do everything I wanted a printer to do—and no way to make the two of them work together!

I don't know what other people do in this situation, but I did what I always do when I run into a computer-related problem I can't handle. I called my son, who is a programmer, and hollered "Help!"

As usual, he came up with the perfect solution.

One of the nicest features of the Apple Writer II is the glossary. The glossary is something you can make up yourself—a sort of dictionary of words or characters you use frequently—and load into the computer. It can be made up of words, names or phrases. From then on every time you want to use one of those words, names or phrases all you have to do is type control-G and an identifying character, and the word processor takes over from there, inserting the sequence of characters you have selected.

It is usually used to store hard-to-type character sequences. The Apple Writer II manual uses as an example the name Phineas Q. Phlagel, Inc. If you had to type that several dozen times a day, you, too, would appreciate being able to store it in a glossary so you could simply type control-GP to have it magically appear, complete and properly spelled, in your copy.

But with a little help from the Applesoft program my son designed for me, I can also store in the glossary the control characters needed to make my Microline 92 do all the beautiful things it was designed to do. Now when I want correspondence quality print, all I do is preface my writing with a control-G and a C. To begin underlining I simply follow the control-G with the

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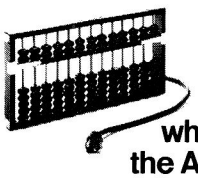

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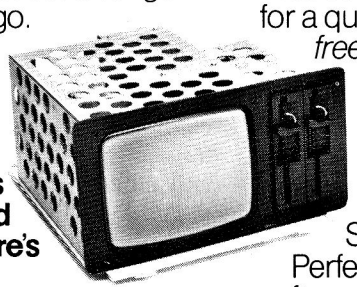

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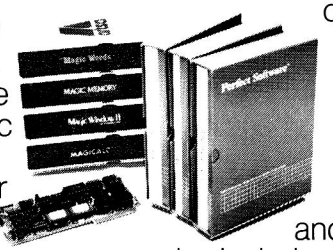

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```
1 REM ****************************************
2 REM * PRINTER CONTROL CODE GLOSSARY CREATOR *
3 REM * FOR USE WITH APPLE WRITER II          *
4 REM * BY STEPHEN G. KEILHOLZ                *
5 REM * 229 LORAINE DRIVE, APT. 103           *
6 REM * ALTAMONTE SPRINGS, FL 32714           *
7 REM ****************************************
10  DIM A$(40),C(13): REM NO MORE THAN 40 GLOSSARY ENTRIES OF NO MORE THAN 13 CHARACTER
CODES EACH
20 D$ =  CHR$ (4)
30  TEXT : HOME : PRINT "   APPLEWRITER ][ GLOSSARY GENERATOR"
40  VTAB 5: INPUT "FILENAME FOR GLOSSARY? ";F$
50  VTAB 5: HTAB 1: PRINT "CREATE A NEW GLOSSARY OR APPEND ENTRIES TO AN OLD ONE <N,O>? ";:
GET G$: IF G$ <  > "N" AND G$ <  > "O" THEN 50
60  REM NO CHECKING FOR VALIDITY ON FILENAME
70 I = 0
200  VTAB 4: HTAB 1: PRINT "NO. OF NEW ENTRIES: ";I: VTAB 5: HTAB 1: CALL 64578: REM CLEAR
TO END OF SCREEN
210  VTAB 6: PRINT "<RETURN> TO END GLOSSARY ENTRIES."
220  VTAB 5: PRINT "GLOSSARY ACCESS CHARACTER:";: GET A$: PRINT A$: CALL 64578
230  IF A$ =  CHR$ (13) THEN 1410: REM END ENTRIES
240  PRINT : IF A$ < "A" OR A$ > "Z" THEN B$ = "U": GOTO 400
250  PRINT "TYPE 'U' FOR UPPER CASE OR": PRINT "     'L' FOR LOWER CASE"
260  VTAB 6: HTAB 22: PRINT "CASE:";: GET B$: IF B$ <  > "U" AND B$ <  > "L" THEN 260
270  PRINT B$;: CALL 64578
280  IF B$ = "L" THEN  PRINT "OWER"
290  IF B$ = "U" THEN  PRINT "PPER"
400  PRINT ":"
410  PRINT "TYPE THE DECIMAL NUMBERS FOR THE CODES  THAT YOU WANT TO ENTER IN THE
GLOSSARY."
420  PRINT "SEPARATE NUMBERS WITH SPACES.": PRINT "FOR EXAMPLE  :27 70 54 54"
430  VTAB 7: PRINT ":";: CALL 64666: INPUT "";C$
440  IF C$ = "" THEN 430
600  FOR J = 1 TO  LEN (C$)
610 A =  ASC ( MID$ (C$,J,1)): IF A = 32 OR (A > 47 AND A < 58) THEN  NEXT J: GOTO 800
620  GOTO 430: REM BAD CHARACTER IN STRING
800  CALL 64578
810  VTAB 15: HTAB 3: PRINT "IS THE ABOVE ENTRY CORRECT <Y,N>? ";: GET E$: IF E$ <  > "Y"
AND E$ <  > "N" THEN 810
820  IF E$ = "N" THEN 200
1000 SP = 1:K = 0: REM STARTING POSITION FOR FIRST NUMBER AND NUMBER OF NUMBERS
1010 C$ = C$ + " ": REM ADD SPACE FOR SCANNING ROUTINE
1020  FOR J = 1 TO  LEN (C$)
1030  IF  MID$ (C$,J,1) <  > " " THEN 1070
1040 V =  VAL ( MID$ (C$,SP,J - SP)): REM VALUE COMES FROM THE CHARACTERS STARTING AT THE
STARTING POSITION AND GOING TO THE CURRENT CHARACTER (WHICH IS A SPACE.)
1050 K = K + 1:C(K) = V: REM STORE CHARACTER
1060 SP = J: REM NEW STARTING POSITION
1070  NEXT J
1200 I = I + 1: REM BEGIN CONSTRUCTION OF NEXT GLOSSARY STRING
1210 A$(I) =  CHR$ ( ASC (A$) + (32 * (B$ = "L")))
1220  REM IF B$ IS EQUAL TO "L" THEN THE EXPRESSION (32 * (B$ = "L")) WILL EVALUATE TO 32,
OTHERWISE (IF B$="U") THE EXPRESSION EVALUATES TO 0 (ZERO.)
```

Program listing.
Program for creation of printer control code glossary.
(Written by Stephen G. Keilholz)

letter U and to stop underlining I insert the control-G again, followed by S.

I have stored in a single glossary similar commands for all the other things I might want my printer to do—horizontal and vertical emphasis, boldface print (a combination of the two), superscript, subscript, double-wide print, 6 or 8 lines per inch, and the three basic print sizes available—and switching from one to another is simply a matter of pressing a couple of keys.

The program is user-friendly—around here we call it "so simple even Mom can use it!"—with written directions for each procedure appearing on the screen. The most important thing to remember is that you must use the decimal equivalents of the control characters (not the hexadecimal) in compiling the file. The decimal equivalents can be found in a chart in the back of the user's manual for Okidata printers, and I imagine manuals for other brands contain the same information. (I might note here that there are some errors in the control character chart in the manual for the Okidata 92, and you must be sure to check the addendum for corrections.)

Once you have made up your file of control characters, it needs only to be called up each time you use the Apple Writer, using the usual Control-Q and selection number 5 from the menu.

Since only one glossary may be resident in the Apple Writer at a time, you may, if you normally use a glossary, simply append your usual glossary definitions to the end of your printer glossary to make one file of them. This can be done easily by entering the printer command glossary into the text editor (using the control-L rather than control-Q). Add your other glossary listings, then re-save the file using the same name. Although the program limits the number of glossary entries to 40, each with no more than 13 characters, this limit does not apply when adding glossary entries using the text editor. You must, of course, be sure that your added glossary entries use different identifying characters, and that the total glossary does not exceed the allowed 2048 characters.

The fact that the printer control

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Program	Our Price
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The Wall Street Plotter	94.00
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The Market Analyzer	275.00
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FOX & GELLER Quickcode	189.00
HAYDEN Pie Writer 2.2	99.00
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Real Estate Analyzer II	160.00
HOWARD W. SAMS	
Financial Facts	47.00
Instant Recall	47.00
KENSINGTON	
Format II Enhanced	105.00
KNOWARE Knoware	72.00
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MegaFinder	108.00
MegaSpell	45.00
MegaWriter	47.00
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Spellstar	162.00
Wordstar	320.00
Wordstar W/Z Card	Call
Word/Spell/Mail	540.00
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Write Away	126.00
MUSE Supertext-Pro	70.00
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D B Master Ver. 4	230.00
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Visicalc 3.3	164.00
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Program	Our Price
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BPI Speed Read	140.00
CBS Software	Call
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Mach II	31.00
Mach III	38.95
Apple IIe:	
Mach II	35.00
Mach III	42.95
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Micromodem IIe/w Smart Com I	250.00
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Listing continued.

```
1230  FOR J = 1 TO K
1240 A$(I) = A$(I) +  CHR$ (C(J))
1250  NEXT
1260  GOTO 200
1400  REM ALL ENTRIES MADE, NOW SAVE FILE
1410  VTAB 4: HTAB 1: CALL 64578: PRINT : HTAB 14: FLASH : PRINT "WRITING FILE": NORMAL
1420  IF G$ = "O" THEN  PRINT D$"APPEND ";F$: GOTO 1460: REM SKIP DELETION OF OLD FILE AND
OPEN TO APPEND
1430  PRINT : PRINT D$"OPEN ";F$
1440  PRINT D$"DELETE ";F$: REM REMOVE OLD FILE WITH SAME NAME
1450  PRINT D$"OPEN ";F$
1460  PRINT D$"WRITE ";F$
1470  FOR J = 1 TO I: PRINT A$(J)
1480  NEXT J
1490  PRINT D$"CLOSE"
1500  VTAB 5: CALL 64578: PRINT "ALL ENTRIES SAVED TO DISK.  NOW ENTER   APPLEWRITER AND
TEST THE NEW GLOSSARY!"
1510  END
```

characters show up on the screen as funny looking symbols and characters is hard to get used to at first. It makes formatting more difficult since, although they are not printed in the final copy, they add to the line length on the screen, and often look more like typographical errors than something that should be there. It's a small price to pay, though, for the printing versatility it allows.

I find the program is the perfect answer to my problem. For all you other Apple Writer II users who may have problems controlling printers from within the word processor, the accompanying program may be your perfect solution, too. ■

Ed. note—Ms. Keilholz was inspired to share her solution with us when she read a query from a reader in the July inCider. *This kind of interaction enriches everyone—and we thank both contributors.*

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TOM SNYDER: INTERVIEW

by Brian Murphy



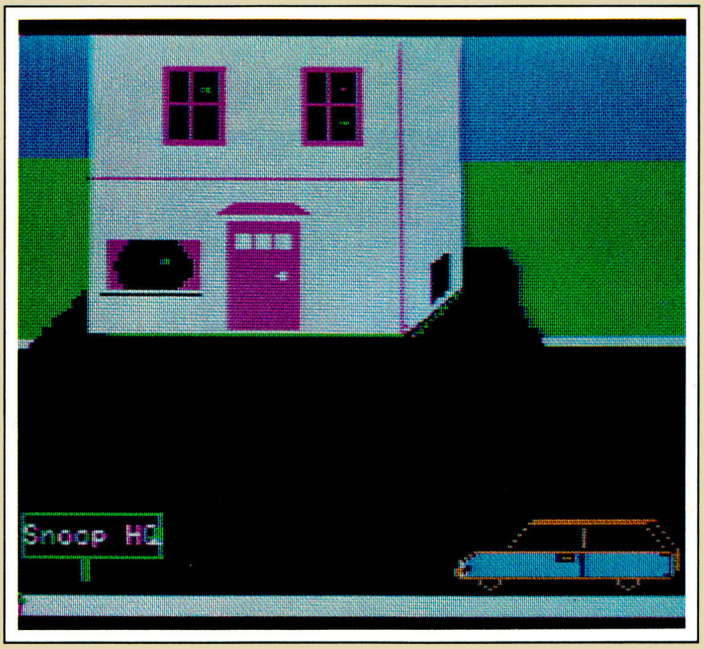
Tom Snyder is a schoolteacher turned software programmer. A budding computer whiz kid in his early teens, he attracted the attention of IBM with his design for a computer. The prestigious computer firm was so impressed that they sent him more than $2000 worth of parts to build a prototype—a project he successfully completed.

Surprisingly, Snyder's interest in computers waned during his late teens. He had little involvement with computers or software until he became a teacher. The TRS-80 computer led him to discover that the computer can be a powerful tool in the classroom.

Snyder's games, developed for his own classroom, drew favorable comments from colleagues and friends. Their confidence led him to the door of Spinnaker Software. His educational games—the "Search" series, Snooper Troops, and In Search of The Most Amazing Thing—won praise from software critics, teachers, and home users.

In a recent conversation with *inCider*, Snyder expounded on his computing background and the philosophy behind his games. He also gave us a sneak pre-

The controversial programming entrepreneur blasts theory and voices his opinions on classroom computing.



view of future productions.

inCider: What first interested you in computers, and how did you become a software author?

Snyder: It was back in junior high school. I became a "computer nerd" for seven years. Now this was back in the '60s before there was any integrated circuitry. I designed a little computer and my parents talked me into sending it to IBM, which was the big giant back then. They actually sent me a couple thousand dollars' worth of parts and said, "Go ahead; build one."

So, I built this enormous digital computer in my basement. Then I put it in a couple of science shows at MIT. I literally forgot it all and got into music and social stuff and never touched computers) again until 1979, when I walked into Radio Shack and bought a TRS-80 Model I, just out of curiosity.

inCider: How did you use it?

Snyder: I had been a teacher for eight years at the time, and I really did not intend—people don't believe this—to write educational software. I used it in the classroom to play games with the kids and to organize my grading system. The next thing I knew, I was writing simulations that were run by the computer for the whole group, and I was coming up with some pretty bizarre stuff.

People talked me into finding out if it was any good. I hired a consultant from New York City, and paid him to come up for the day and tell me, unbiased, if there was anything there. He let me know two things. One was that the quality was a lot higher than anything out, and the other thing was that it was a completely different approach. That's when I started a company and started the whole bandwagon.

inCider: Describe how you first approached writing software.

Snyder: I was using simulations. But teachers have been using simulations for a long time without computers, and they are very paper-pencil-3-by-5-card-and-dice intensive. It was an enormous management problem for me.

So, at first I just had the computer helping me manage them, but slowly I realized the computer could be used to

---

Brian Murphy, a frequent contributor to inCider, *resides at 133 Post Road, Fairfield, CT 06430.*

pace the simulation. In order to do that, I had to turn around and let the kids push the buttons. Then I discovered some really bizarre ways to use the computer. One was to have the computer call up each group, so at any given time one group was using the computer while the others were sitting around discussing what had happened to them.

There was a constant kind of energy going around the room because the computer was servicing 25 kids, and it was still way ahead of the group. So, they'd be back at their desks, figuring out what had just happened to them and making plans for what to do on their next turn, making maps and exchanging information.

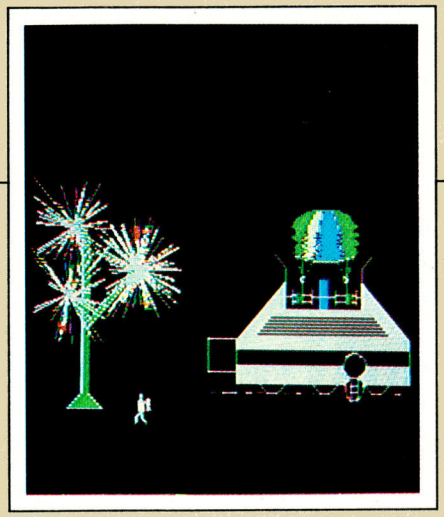
What was happening, however, was that a couple of bright kids in every group were taking over the groups. What I did was put all the information up on the screen in an interesting, graphic way and made it so that the screen was up there only a couple of seconds.

It forced the kids to divide up the responsibilities: "Okay you get the latitude and I'll get the ocean's depth." What happened was that even the quiet, shy kids or kids who weren't really dominant were sucked into the activity. Then they'd all sit down and talk to each other. They'd ask, "What's the ocean's depth?" and whoever had that job would announce it. And just what you would like to see in a class would happen. Some shy kid would say what the ocean's depth was and the other kids would say, "You're kidding! That's not what it was the last time. It's getting shallower. Maybe we're nearer land."

inCider: These materials you used in your classroom, are they available now in a commercial version?

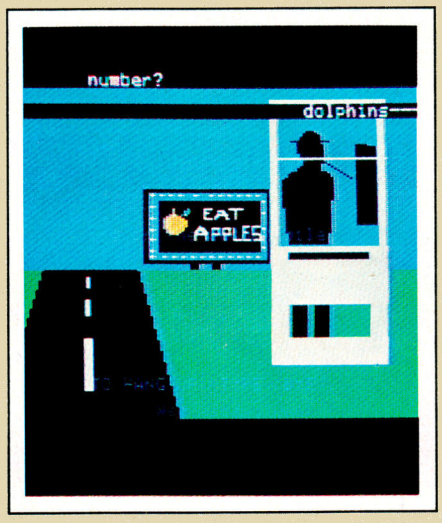
Snyder: Oh, yes. But they're very expensive—a hundred eighty bucks. McGraw-Hill decided to approach this market differently and to put together a big series of notebooks, workbooks, and packages that are sold to the classroom.

inCider: What title are these games published under?



Snyder: "The Search Series." They cover geography—each one is called a "Search"—Geology Search, Community Search, Archaeology Search, and Energy Search. I'm really happy to say that they have been critically acclaimed. They've gotten very high marks.

inCider: Name some other products you're proud about.



Snyder: In Search of the Most Amazing Thing, Fraction Fever, and a lot of the products coming out that you might not have heard about, yet. Agent U.S.A. is one. That is where you travel around the country on trains, going from train station to train station, learning all about the United States while trying to stop the Fuzzbodies. The only way you can stop them is with these crystals. You have to rush around to a hundred different cities, get the train schedules right, and try to cut off the Fuzzbodies.

inCider: Any other titles coming out?

Snyder: Spelldiver. In this game, you're a deep sea diver and you've discovered a word under the water that's hundreds of feet high and hundreds of feet long. You can only see part of a letter at any given time. You have to figure what the word is. It gives kids a new kind of kinesthetic approach to recognizing letters, because they only see a little bit at a time. We have a dictionary of hundreds of commonly misspelled words that you will find underwater.

inCider: Any other titles?

Snyder: Yes, we have Banner Catch, which is a first. It's a simulation of "capture the flag," but it's the only one in which—here's that social element coming back in—you can't play it alone and you can't play it against another person. You have to have another person, and the two of you collaborate against the computer. When kids play it, they're constantly stopping it and talking to each other to figure out strategy.

We also have a game called Run For The Money coming out that's about to have a huge amount of public relations done by Scarborough Systems. It's a business simulation for kids.

inCider: That's fascinating. What age group is it for?

Snyder: It's for eight to adult, but we have kids in college playing it. What we decided to do was make a business simulation for two kids at a time—you can't play it alone. It's a device where the kids can try out strategies. We have a book of strategies we think are used in the real world, adapted for kids. There are two factories that compete against each other on another planet, and if the factory makes enough money it can blast off and leave the planet!

inCider: Outer space economics that offer a real economic experience. . .

Snyder: Right. And the kids can try an approach with very high pricing and very high advertising, or they can do very low quality units and very low pricing with very high advertising. We have all the strategies described, and

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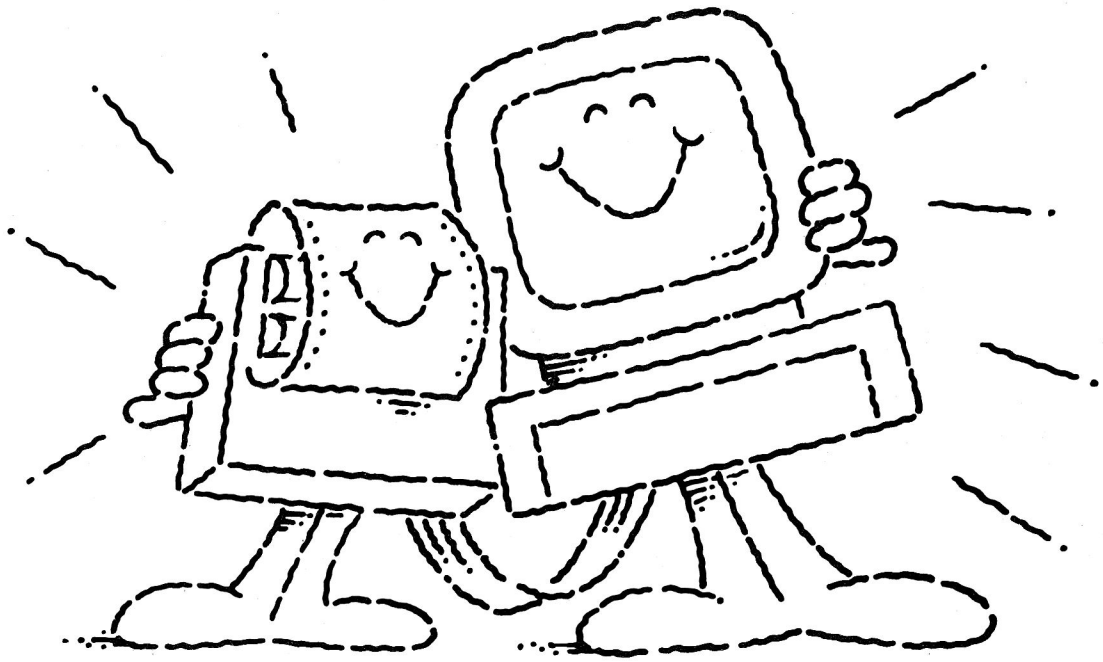

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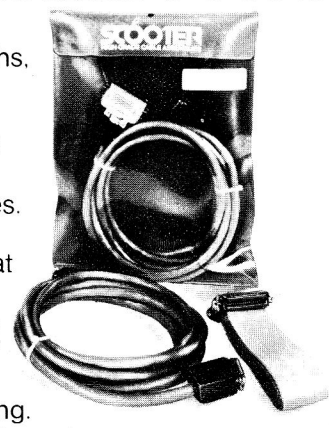

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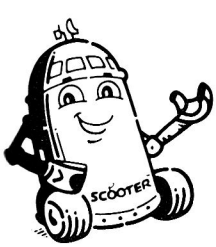

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cessing. They can simulate physical events and they can do data base stuff—and they can play games.

There's something in our computers. They're digital and they're numbers-oriented; they carry an implicit promise that their effects will be quantifiable.

inCider: So you can make an exact measurement of how much the child has learned?

Snyder: Right. But good software, once you're through with it...the effect is going to be as hard to measure as that of a good book.

One of the concepts I love to hate is the idea of teacher-proof or student-proof software—that the software is so good and so complete you can't possibly screw up on it. My point isn't that it's impossible to do; it's probably possible to do. But at the point it's anybody-proof, it's probably not that good. The more it needs intervention from people, the more likely you are to get some real learning taking place.

That's why I'm so excited about the collaborative model taking place in educational software, because when one kid turns to another and tells him what he just did, they're verbalizing; they're theorizing.

inCider: So you feel the interaction between children is more important than the interaction between one kid and the computer?

Snyder: Oh, yes! By all means! I really like the idea of slowing things down and opening them up. I think that In Search of the Most Amazing Thing is a bit flawed because it's so lethargic, but the initial goal was to make it a little more like a book. I have kids call me up at night and say they've almost found the Most Amazing Thing.

They're playing the game while they're calling. They have the space to get up and go to the bathroom, make a sandwich, call a friend, call someone in, talk, theorize, read a little of the [game] book while they're flying around...I'm trying to create more space in between the code so that they can do other stuff; so that it becomes part of their lives.

People talk about the concern that...learning is "context-frozen." What you learn is only in terms of what happens on the screen, and once you walk away it's not with you any more. If you're living with it—talking, reading, writing, getting up, moving around or theorizing—it makes it more a part of your life.

inCider: If you were going to give advice to school administrators and teachers who want to buy educational software with limited resources, what would you say?

Snyder: It's a question of allocation. No school on that level is going to have a million dollars (for computers), so we're going to have limited computers and, therefore, limited computer time.

The most important thing you can do is to get the kids programming. And the best way is with Logo. The second best language is Basic. Now every time you steal those computers to do either drill or practice or individual games... you're probably not allocating your hardware as well as you could. Computer literacy is the most dramatic teaching that's going to go on with the computer.

I would argue that if you want to buy software and not just languages, [get] the kinds of group simulations that really electrify. If your kids are studying colonial America and they play Geography Search, they all get to pretend they're looking for the New World. Then you're using the computer not as a primary teaching tool... [but as] an incentive builder so you can do skits around it; the kids can do creative writing based on it; you can apply books you've read about explorers to what happened in the simulation. Remind the administrators that the computer should not substitute a good, effective (non-computer) curriculum.

I disappoint administrators all the time. They've gone out and raised a couple thousand, ten thousand or fifty thousand bucks and say, "What do we buy?" I say, "Don't buy that much!" People go out and buy truck loads of computers and software, but it's very hard to know how to fit it into the school environment.

One of the oddest things that happens is that the best the school can do is to simulate what happens at home. They have to find a quiet place; let kids be by themselves. And all we're doing is taking home gaming and home exploration and doing it at school! That, to me, isn't the primary value of school. School is a social, cultural experience. To force the school into trying to emulate the home, in order to use computers properly, seems like throwing money in the wrong direction.

inCider: Let's turn to the home scene for a moment. What advice do you have for parents in selecting educational software?

Snyder: Here's a great rule of thumb...Parents should buy what they, themselves, like. And then, what the parents should do is go home and play it. Don't even invite the kid in the room! Don't tell him he can't come in, but play it, get into it, and learn all about it. Then the kid is going to come in, wanting to do stuff with the parents and then the parents can show the kids how to do it.

The parents can't fake it with a stupid program. And therefore, they're not going to communicate with their kids. If the parents go out and buy Zork, and are playing this intense adventure game when the kids come in, the parents have to make just a little effort to include the kids, and they'll play.

inCider: What are they learning?

Snyder: It's giving the kids experience and helping them. All that problem-solving stuff is about all you can say. It's just a neat experience. What good is something like scuba diving? It's a good experience.

inCider: Is there one thought you would like parents and teachers to keep in mind about educational software?

Snyder: That for the next couple of years, at the very best, education by computer is going to be an experimental and expensive notion, and don't believe that there's a definitive set of software or an approach. That is going to be an experiment that may or may not work, in any case. If people know that, they're less likely to get burned. ■

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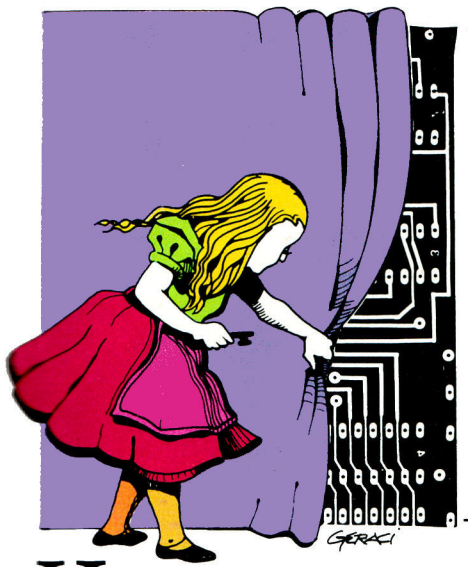

inCider's inSidious inSolubles

by Art Ude

How gratifying to find that you, *inCider*'s readers, are enjoying the inSolubles. Your inSidious puzzles have been arriving at our offices and, starting in July, we will present two each month. If your entry is printed you will receive a free 12-month subscription to *inCider*, or your present subscription will be extended and your name proudly displayed with your inSoluble.

If you haven't submitted an entry, why not? The rules are simple enough and you'll find it's more fun than work. Send your entries to me at *inCider*, 80 Pine St., Peterborough, NH 03458. A magazine like *inCider* has a lead time of several months, so if you would like a response to your submission before it appears on the magazine's pages, please enclose a self-addressed stamped envelope.

Rules for inSidious inSolubles

1. An inSoluble must be a straightforward Applesoft program. Any poked machine language subroutines and calls to that subroutine must be correct.
2. The program must accomplish something. In other words, you should get some kind of a result when it's run.
3. The program shouldn't crash. An error message must mean a typing error.
4. There must be a short explanation of what the program is supposed to do. It may contain clues to the problem.
5. The program may make use of common peripherals such as disk, printer, and modem.
6. There may be more than one error in the program.

In submitting your inSolubles keep in mind the shorter the better—but we like programs that do something useful. *Remember to provide the solution.*

The first programs I have received show some inGenious inSights into the peculiar ways of Applesoft and, although not problems as such, some letters have provided interesting questions concerning the Apple and its Basic language. A few readers have sent improvements for the programs that have already appeared, or chastised me for poor programming techniques.

In future columns I will attempt to respond to all your questions and comments, but in the meantime, transfer all those strange happenings your Apple has been experiencing from your computer to ours and cash in on the 12 free issues of *inCider*. By printing two inSolubles each month, your chance of being published has improved by 100%. ■

Text File

The program in Listing 1 demonstrates how to create and read back a sequential text file. Make sure you have a disk in your drive with some space available, and that no current file is called NAMES.TXT. See if you can figure out how to delete the unwanted file—after you figure out what's wrong.

```
10  TEXT : HOME :D$ =  CHR$ (4)
20  PRINT "I WILL NOW CREATE A SE
    QUENTIAL TEXT FILE"
30 N$ = "NAMES.TXT"
40  PRINT D$;"OPEN ";N$: PRINT D$
    ;"WRITE ";N$
50  FOR N = 1 TO 10: READ A$: PRINT
    A$: NEXT
60  PRINT D$;"CLOSE"
70  PRINT : PRINT : PRINT "I WILL
     NOW READ A SEQUENTIAL TEXT
    FILE": PRINT
80  PRINT "TYPE <SPACE BAR> TO CO
    NTINUE...";
90  GET A$
100  PRINT D$;"OPEN ";N$;: PRINT
    D$;"READ ";N$
110  PRINT : ONERR  GOTO 130
120  INPUT B$: PRINT B$: GOTO 120

130  POKE 216,0: PRINT D$;"CLOSE"

140  END
200  DATA  JACK,JILL,MARY,ALICE,T
    OM,DICK,JANE,HARRY,SUE,SAM
```

Listing 1. Text File.

Hi-Res Viewer

It is sometimes nice to take a quick look at one or both of the high-resolution pages. Unless you have an excellent memory, you'll probably want to check page 13 of the *Apple II Reference Manual*, or page 28 of the IIe manual, to solve the mystery of Listing 2.

Solutions on page 117.

```
10  TEXT : HOME
20  PRINT "        * HI-RES PAGE
    VIEWER *"
30  PRINT : PRINT "**************
    ****************************"
40  VTAB 10
50  PRINT "        1 - VIEW HIRES
    PAGE ONE"
60  PRINT "        2 - VIEW HIRES
    PAGE TWO"
70  PRINT "        ESC - VIEW THIS
     PAGE"
80  PRINT "        E - END PROGRAM
    "
90 KEY =  PEEK ( - 16384): POKE  -
    16368,0
100  IF KEY = 155 THEN  POKE  - 1
    6300,0: POKE  - 16303,0: GOTO
    90
110  IF KEY = 177 OR KEY = 178 THEN
    140
120  IF KEY = 197 THEN  TEXT : HOME
    : END
130  GOTO 90
140  POKE  - 16297,0: POKE  - 163
    02,0
150  IF KEY = 177 THEN  POKE  - 1
    6300,0: GOTO 90
160  POKE  - 16299,0: GOTO 90
```

Listing 2. Hi-Res Viewer.

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Variance Analysis Revealed

Who knows if your business is spending too much—or too little? You will, with this handy VisiCalc technique.

by Trish McClelland

One of the more practical applications of VisiCalc is tracking actual operating expenses against the budget. This procedure provides you with a variance, an indication of how much more was spent than was budgeted. Going one step further you arrive at a percent variance that shows exactly what percentage of the monthly budget was spent. Add to that an annual budget figure and a percentage of the annual budget spent and you have a complete year-to-date variance analysis.

Let's start at the beginning. Figure 1 shows the variance analysis model. For each of the five categories there is an actual figure and a budgeted figure, expressed in thousands, with all figures totalled on line 17.

At E11 a variance is required. The calculation should be the actual amount spent minus the budgeted amount, or +C11-D11. A negative result means we're under budget, while a positive figure is the amount we're over budget. This command is then replicated for E12 to E15, with both coordinates relative.

Variance Percentage

Now we come to the percentage of the variance. To obtain this figure we divide the difference (or variance) by the original (budget). Therefore, the command at F11 should read +E11/D11.

The answer appears as a six-digit decimal. Since percentages are normally shown as decimals in VisiCalc, we should limit the number of decimal places to two to avoid confusion. This is best done with the command /F$.

Not only does this command reduce the number of decimal places, it also aligns the decimal points, resulting in a spreadsheet that is easier to read. Now the command and calculation located at F11 can be replicated from F12 through F15, again with both coordinates relative.

Budget Percentage

The figures for the 1983 budget are entered manually. Next we have the percentage of the budget spent. Unlike the percent variance, which yields the percentage over or under budget, the percentage of the budget spent is exactly that—the percentage of the annual budget actually spent during a month.

To obtain this figure we divide the actual amount spent by the total budget. The calculation at H11, then, is +C11/G11. Again the /F$ is necessary, and the command and calculation is replicated through the remaining categories, from H12 through H15. The coordinates here are also relative.

Along the subtotal line we have the @SUM command at C17, D17 and G17. But in the variance column at E17 we have the calculation +C17 -D17. And, at F17 the percent variance total should be +E17/D17.

Had we summed the percent variances in column F, we would have received the answer .59, which is incorrect. The correct percentage is -.04. Again it is necessary to enter the command /F$ to reduce the number of decimal places.

And at coordinate H17 the calculation should be +C17/G17 and the /F$ added. Once more, had we summed this column we would have received a wrong answer.

Let's take a better look at this. Listed in column H is the percentage of the budget spent for each category. Summed up, the response is .4966667, or .50 rounded off. But have we really spent 50 percent of our annual budget in one month?

Looking at the total amount spent, 20.7, we see it cannot be equal to one half of the annual budget, 234. But if we say the total amount spent divided by the total budget, we arrive at the correct figure of .09, which means 20.7 is 9 percent of 234.

Write to Trish McClelland at 205 Yoakum Parkway, Apt. 702, Alexandria, VA 22304.

	A	B	C	D	E	F	G	H	I
1									
2									
3									
4									
5				YEAR-TO-DATE VARIANCE ANALYSIS					
6									
8	OPERATING EXPENSE		ACTUAL	BUDGET	VARIANCE	% VAR	1983 BUDGET	PERCENTAGE OF BUDGET SPENT	
9									
10									
11	SALARIES		12	14	-2	-Ø.14	15Ø	Ø.Ø8	
12	OFFICE SUPPLIES		1	1	Ø	Ø.ØØ	12	Ø.Ø8	
13	EQUIPMENT RENTAL		4	3	1	Ø.33	3Ø	Ø.13	
14	OFFICE LEASE		3	3	Ø	Ø.ØØ	36	Ø.Ø8	
15	UTILITIES		.7	.5	.2	Ø.4Ø	6	Ø.12	
16									
17	SUBTOTAL		2Ø.7	21.5	-.8	-Ø.Ø4	234	Ø.Ø9	

Figure 1. Variance analysis model.

Unforeseen Expenses

Now, this matrix has worked well up to this point. But what happens when one of the items is an unforeseen expense? Chances are that it has not been budgeted, either for this month or for the year. It is possible to have an annual budget for the item without having a budget for it during a particular month.

Changing the budget figure at D11 to 0, we get an error message at F11. And if the 1983 budget is changed to 0, an error message appears as the annual percentage. The reason for this is simple. You cannot divide a whole number by zero, which is what the present calculation essentially involves.

Simple, but frustrating. Now that the matrix is all set up, how do we convert the percent variance from an error message to a value? We establish a set of @IF tables.

Our matrix, at this point, has encompassed the columns A through I. Now let's go to J11. (See Figure 2.) We begin by entering the same calculation as in coordinate F11, +E11/D11, and by formatting it with the /F$ command to reduce the number of decimal places to two. This gives the same answer as F11, or ERROR if the budget figure is zero.

Now we move to K11 and type in @ISERROR(J11). This asks if an error message has appeared at coordinate J11. If so, the answer will be TRUE; if not, the answer is FALSE.

Next we enter the value 0 in coordinate L11. At M11 we type @IF(K11,L11,J11). This says, in essence, that if the response at K11 is TRUE, take the value located at L11; if it is FALSE, take the value located at J11.

Let's ignore the coordinates for the moment and take a closer look at the concept itself. We cannot tell the system to divide the variance by the budget figure if the budget is zero. Therefore, we use a section of the spreadsheet as a work space and enter the command to divide the variance by the budget. We will receive a legitimate value if we have a value other than zero in our budget; but if the budget is zero, we get an error message.

We don't want to submit a report that is filled with error messages. If there's no budget figure, it's much better that the variance percentage be shown as a zero. A percent of the budget is needed—without a budget there can be no percentage.

In order to achieve this we must first ask if the value received from the variance-divided-by-budget calculation is legitimate. We do this by asking if there is an error message in the cell where the answer should be. The response is TRUE or FALSE.

In order to enter an @IF function in VisiCalc, we must give the system an alternative between two coordinates. The preference is, of course, to use the real answer to the calculation, if that answer is a legitimate value. If it's not, we want to choose the value 0 instead of having the error message appear on the report.

That is why we entered a zero in the @IF table. Then, when we entered the @IF command we could instruct the system to choose the value if other than ERROR, and the zero if the

	J	K	L	M	N
1					
2					
3					
4					
5					
6					
7					
8			IF TABLES		
9					
10					
11	-Ø.14	FALSE	Ø	-Ø.14	
	¦	¦	¦	¦	
	¦	¦	¦	¦	
	¦	¦	¦	¦	
	¦	¦	¦	¦	
	¦	¦	¦	@IF(K11,L11,J11)	
	¦	¦	Ø		
	¦	@ISERROR(J1Ø)			
	+E1Ø/D1Ø				

Figure 2. @IF table.

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"And in the process we've explored the mystical qualities of @IF tables."

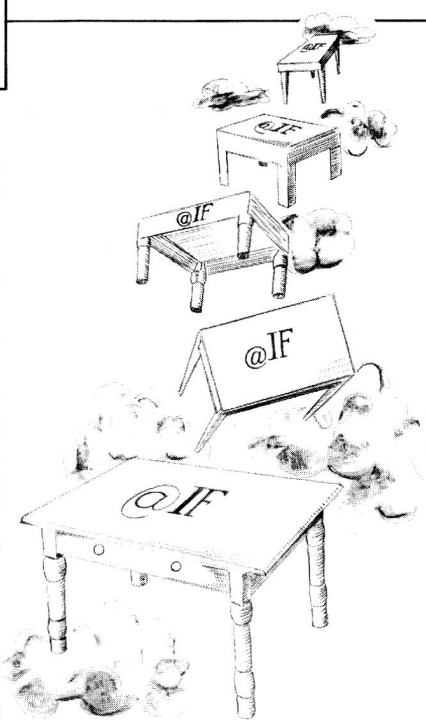
response was an error.

Going back to the matrix, now that the worksheet for this line is complete (as far as the monthly variance goes), we can replicate it to all the other lines. All the coordinates involved would be relative.

We still have one step left to complete this function. In Figure 1, we still have the command +E11/D11 at coordinate F11. To complete this process this command should be replaced with +M11, which simply ensures that whatever the outcome of our @IF table, it will be reflected in the place where it counts—under % Variance.

Percentage of Budget Spent

Now that we have completed the table for the monthly variance percentage, we do the same thing for the



percentage of budget spent. We can begin this table at N11, where the calculation will be +C11/G11. At O11, we'll have @ISERROR(N11); at P11, 0; and at Q11, @IF(O11,P11,N11). At J11 and Q11 the /F$ command is typed in, and last, at H11, +Q11 is entered.

Of course we won't print out the entire worksheet—just that portion that others should see (and that they'll understand). The matrix as shown in Figure 1 will be the report as presented.

Now we have a completed matrix. We can enter the various operating expenses, the actual amount spent and the monthly and annual budgets, and arrive at an error-free variance, variance percentage and percentage of the total budget spent. And in the process we've explored the mystical qualities of @IF tables. Hopefully you've learned that it's not too difficult after all. ■

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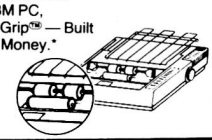

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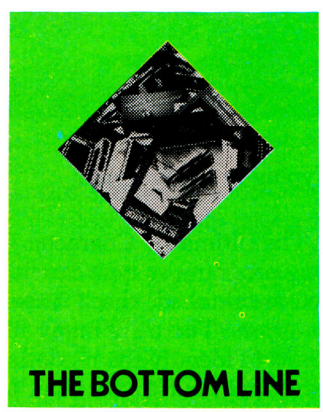

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The Exodus: Ultima III Character Editor



Exodus: Ultima III, a stunning fantasy adventure and the third scenario in the popular Ultima series, is rated by most fantasy adventure players as the best of the series. This offering from Origin Systems Inc. has been at the top of the charts for months.

In spite of its popularity, however, the game is tough to master. New characters are hard put to survive their first battles, and experienced characters, after months of development, can be abruptly slain and reduced to ashes. Most players would like a little help, once in a while—a faithful character restored to life, a character's class changed to a more versatile one, or just a little extra gold. The Ultima III Character Editor offers just such an opportunity. It enables you to examine the data on each member of your party, get a full printout if you like, then change any of the values as much as you want.

This editor was written in Applesoft on an Apple II Plus with 48K memory. It should work on any of the Apple II family, as long as you have at least 48K and are running DOS 3.3. The RWTS routine of DOS 3.3 is needed to read from and write to the disk.

Typing in the Program

The Ultima III Character Editor is a long program, so type carefully. When you are finished, check it several times for errors. There are many REM statements to identify the modules; you can leave them out if you want to save on typing.

The crucial line is 6065—the one that puts the characters back on the disk. If there are bugs in the rest of the program, then the characters line 6065 stores may be monsters instead of heroes. *Until you're sure the program works correctly, leave line 6065 out.*

The program lines are short for ease in typing and in following the logic. You can double-up many of them, if you want, to save on memory space. Space is not really critical in this program, however, as there are no graphics, and Applesoft is able to handle the strings with no trouble.

How It Works

Ultima III uses 64 bytes to store each character's data—name, food, arms and weapons, marks and cards, wisdom, and so forth. Characters are stored, four per sector, in one place on the "player" disk. When a character is chosen to be one of the four in the adventuring party, the data on that character is copied to another sector. As the game is played, this "party" sector is frequently updated. Only when the party is dispersed is the new data read back to the original storage area.

To modify any character you must first form a party and make sure that character is included. The Character Editor then uses the RWTS routine of DOS 3.3 to read the party sector into the Apple's RAM memory. With that sector in place you can change the four characters any way you want. When

Disaster threatens and there's nothing you can do. Or is there? Check out this utility for reviving and regirding characters in this popular adventure game.

by Kerry Lanz

you're done, read the sector back onto the disk and the changes become permanent.

The first screen the program generates is a title page prompting you to insert the player disk into the disk drive. This is not the disk that arrives in the Ultima III package. The instructions Origin supplies tell you how to make a duplicate to use for playing the game. That is the disk used by my Character Editor.

After you insert the disk, your Apple reads the party sector and stores those 256 bytes starting at location 38000, as defined in line 7025. The next screen is a roster of your four characters. Now you have three choices: to examine and modify a character; to send the characters back to the disk, making any changes permanent; and to exit the program. Changed characters are not sent to the disk until you specifically command it, in case you might have second thoughts.

Change Possibilities

When you choose a character for a closer look, a screen appears that displays the name of the character and four options. One option is a printout of the character's data. Even if you never modify anything, this capability makes the program worth typing in.

Another choice lets you give a character "marks" and "cards." I can't say much about these without giving away some of the solution to Exodus. In general, marks give you special abilities and protection; good things happen to characters with marks. Cards are needed in the final stages of play when you actually confront "Exodus." Much of the game is spent in locating marks and cards, and discovering how to use them correctly. Now you can give your characters any that you want.

A very powerful option lets you view the equipment your character is holding—both type and number of each, as well as which item is currently set for use. You can give your character any kind of item, right up to the "ex-

Lines 100–525 are the subroutines frequently called by the rest of the program. When Applesoft looks for a subroutine, it starts at the beginning of the program and searches the lines sequentially, so if the subroutines are at the beginning the search is fast. During initialization I defined two functions that are used in these routines to translate between decimal and hexadecimal.

Lines 200–265 control cursor movement and sort keyboard input.

Lines 1000–1100 read the character's data from memory. Ultima III stores values in hex, but Applesoft uses decimal numbers. So, proper subroutines are called to read the byte, translate it into hex, and store it as a variable.

Lines 2000–4085 create the three data displays on your character. The character's name, printed across the top of the screen, is used as a top line for them all. Then the routines print basic character values, armor and weapons, or marks and cards.

Lines 5000–5075 make up the main menu for changing a character, then call the proper routine.

Lines 5200–5855 are the routines that actually alter the character. They list the data, control the cursor, change the value as you specify, and poke the new information into the memory.

Lines 5900–5940 control the printout function of the program, so you can get a hard-copy record. If your printer needs any special codes, this is the place to put them.

Lines 6000–6090 control the roster page and the basic options: examine individual characters, leave the program, and store the modified characters back to the disk. Line 6065, as mentioned, is the one that tells RWTS to do the storing. Keep this line out of the program until you are sure everything works fine.

Lines 7000–7075 initialize the program. HIMEM is lowered just a little to make room for the 256 bytes of your four characters. The pokes set up the RWTS routine of DOS 3.3.

Lines 7100–7190 print the title page and ask you to insert the Ultima III player disk.

Lines 7205–7245 read the sector containing your party of four characters from the disk into RAM, then into the N$ array.

Table 1. Line-by-line program analysis.

Address your correspondence to Kerry Lanz, c/o inCider, *Pine St., Peterborough, NH 03458.*

otics," and from one to 99 of each. (Keep in mind, though, you really don't need many of any item.)

The final choice is the one you'll use most often—the one to change basic values of your character. If the character is in poor health (D for dead or A for ashes), you can restore it to soundness. You can alter race, class and sex. You can set the four basic qualities (strength, dexterity, IQ and wisdom) anywhere from 0 to 99. You can bestow keys, gems, torches and powders, and restore gold, food and hit points. Hit points and experience points can be increased to a maximum of 9999, although you'd better be careful. If experience is set that high, you may find it has plummeted to 0000 when the character earns another point.

For each screen the cursor controls are the same: You move it through the list with the two arrow keys. Hitting return brings you back to the main menu. Pressing the space bar lets you change the value next to the cursor. If the value is a letter, you see the choices offered by the game; if the value is a number, you see the range accepted by the game. For cards and marks, the space bar is a simple on/off switch for changing the card or mark next to the cursor. ■

A$	Array of values for armor.
B	Temporary decimal value of a byte.
B$	Temporary hex value of a byte.
BASE	Starting location of the four characters.
BB$	Temporary hex value of a second byte.
C$	Class of character.
CC$	String of initials for class.
D$	Dexterity.
DEC	Function for changing from hex to decimal.
E$	Experience.
E1	Armor equipped.
E2	Weapon equipped.
F$	Food.
G$	Gold.
GM$	Gems.
H	Horizontal cursor position.
H$	Health.
HEX	Function for changing from decimal to hex.
HH$	String of initials for health.
HN$	Hit points now.
HT$	Hit point total.
K	Miscellaneous variable.
K$	Keyboard input.
KB	Keyboard strobe.
KY$	Keys.
L	Miscellaneous.
LOC	Location of one character.
M$	Magic points.
MC	Array of marks and cards values.
N$(N)	Array of four names.
P$	Powders.
Q$	I. Q.
R$	Race.
RR$	String of initials for race.
S$	Sex.
SG$	Strength.
SS$	String of initials for sex.
T$	Torches.
V	Vertical cursor position.
V1	Length of first column.
V2	Length of second column.
V3	Lines from top of screen.
W$	Array of values for weapons.
WM$	Wisdom.
X	Miscellaneous variable.

Table 2. Variable list for Ultima III Character Editor.

```
ULTIMA III: EXODUS  CHARACTERS

     1. PRIEST
     2. STRIDER
     3. CONAN
     4. >NO CHARACTER<

YOUR CHOICES:

  1-4   CHOOSE A CHARACTER TO MODIFY
<RETURN> MAKE CHANGES PERMANENT
<ESCAPE> EXIT PROGRAM
```

***Figure 1.** The roster screen shows the four characters in your party. From here you can change them, make the changes permanent, or leave the program.*

```
EXODUS CHARACTER: PRIEST

YOUR CHOICES ARE:

  1. CHARACTER VALUES
  2. ARMOR & WEAPONS
  3. MARKS & CARDS
  4. PRINT OUT CHARACTER
<RET> RETURN TO ROSTER
```

***Figure 2.** The character menu lets you change your character's basic values, add weapons and armor, give marks and cards, or get a printout of the character's data. Commands are given by pressing only one key.*

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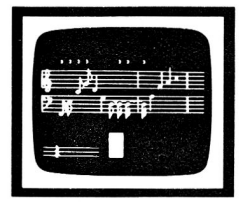

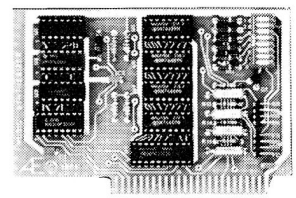

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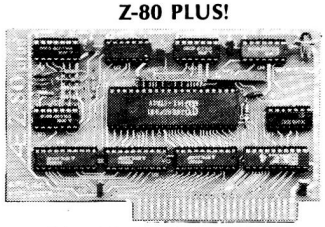

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SUP'RTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

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Program listing. Ultima III Character Editor.

```
10  REM
*********************************
  ULTIMA III CHARACTER EDITOR
*********************************

15  REM            BY
16  REM
17  REM
18  REM      KERRY J. LANZ
19  REM
20  REM
50  GOTO 7000
97  REM
98  REM READ 1 BYTE
99  REM
100 B$ =  STR$ ( FN HEX(X)): IF  LEN (B$) < 2 THEN B$ = "0" + B$
105  RETURN
147  REM
148  REM READ 2 BYTES
149  REM
150  GOSUB 100:BB$ = B$
155 X = X + 1: GOSUB 100
160 B$ = BB$ + B$: RETURN
197  REM
198  REM CURSOR MOVEMENT
199  REM
200  IF V < 1 AND H = 11 THEN V = V2:H = 31: GOTO 220
205  IF V < 1 AND H = 31 THEN V = V1:H = 11: GOTO 220
210  IF V > V1 AND H = 11 THEN V = 1:H = 31: GOTO 220
215  IF V > V2 THEN V = 1:H = 11
220  VTAB V + V3: HTAB H
225  INVERSE : PRINT ">": NORMAL
230  VTAB 23: HTAB 20: POKE KB,0
235  GET K$:K =  ASC (K$)
240  IF K = 13 THEN  POP : RETURN
245  IF K = 32 THEN  RETURN
250  VTAB V + V3: HTAB H: PRINT " "
255  IF K = 8 THEN V = V - 1: GOTO 200
260  IF K = 21 THEN V = V + 1: GOTO 200
265  GOTO 220
297  REM
298  REM CHANGE 1 BYTE
299  REM
300  VTAB 22: HTAB 1: CALL  - 868
305  HTAB 5: INPUT "NEW VALUE (0-99): ";K$
310 K =  VAL (K$): IF K < 0 OR K > 99 THEN 300
315  POKE X, FN DEC(K)
320  VTAB 22: HTAB 1: CALL  - 868
325  GOSUB 100
330  VTAB V + V3: HTAB H + 1
335  PRINT B$: RETURN
347  REM
348  REM CHANGE 2 BYTES
349  REM
350  VTAB 22: HTAB 1: CALL  - 868
355  HTAB 5: INPUT "NEW VALUE (0-9999): ";K$
360  IF  VAL (K$) < 0 OR  VAL (K$) > 9999 THEN 350
365  IF  LEN (K$) < 4 THEN K$ = "0" + K$: GOTO 365
370  POKE X, FN DEC( VAL ( LEFT$ (K$,2)))
375  POKE X + 1, FN DEC( VAL ( RIGHT$ (K$,2)))
380  VTAB 22: HTAB 1: CALL  - 868
385  GOSUB 150: VTAB V + V3
390  HTAB H + 1: PRINT B$: RETURN
397  REM
398  REM CHANGE LETTER
399  REM
400  VTAB 22: HTAB 1: CALL  - 868
405  HTAB 4: PRINT "NEW VALUE (";B$;"): ";
410  GET K$: PRINT K$
415  FOR K = 1 TO  LEN (B$)
420  IF K$ =  MID$ (B$,K,1) THEN  POKE X, ASC (K$):K =  LEN (B$)
425  NEXT
430 K$ =  CHR$ ( PEEK (X))
435  VTAB 22: HTAB 1: CALL  - 868
440  VTAB V + V3: HTAB H + 1
445  PRINT K$: RETURN
497  REM
498  REM CHOICES
499  REM
500  VTAB 21: PRINT "CHOICES:";
505  PRINT  SPC( 3);: INVERSE : PRINT "<-";: NORMAL
510  PRINT  SPC( 3);: INVERSE : PRINT "->";: NORMAL
515  PRINT  SPC( 3);: INVERSE : PRINT "<SPACE>";: NORMAL
520  PRINT  SPC( 3);: INVERSE : PRINT "<RETURN>": NORMAL
525  RETURN
995  REM
996  REM **********************
997  REM * ANALYZE CHARACTER *
998  REM **********************
999  REM
1000  HOME
1010 X = LOC + 15: GOSUB 100:T$ = B$
1015 H$ =  CHR$ ( PEEK (LOC + 17))
1020 X = LOC + 18: GOSUB 100:SG$ = B$
1025 X = LOC + 19: GOSUB 100:D$ = B$
1030 X = LOC + 20: GOSUB 100:Q$ = B$
1035 X = LOC + 21: GOSUB 100:WM$ = B$
```

Listing continued.

```
EXODUS CHARACTER: STRIDER

   RACE: E          EXPERIENCE: 0000
  CLASS: F                FOOD: 0100
    SEX: O                GOLD: 0100
 HEALTH: G           HITS NOW: 0100
                    TOTAL HITS: 0100
STRENGTH: 15        MAGIC PTS: 00
DEXTERITY: 10         TORCHES: 00
  I  Q  : 13            GEMS: 00
 WISDOM: 12             KEYS: 00
                      POWDERS: 00

     ARMOR              WEAPONS
EQUIPPED #0         EQUIPPED #0
   CLOTH: 01          DAGGER: 01
 LEATHER: 00            MACE: 00
   CHAIN: 00           SLING: 00
   PLATE: 00             AXE: 00
+2 CHAIN: 00             BOW: 00
+2 PLATE: 00           SWORD: 00
  EXOTICS: 00      2-HND SWORD: 00
                       +2 AXE: 00
                       +2 BOW: 00
                     +2 SWORD: 00
                      GLOVES: 00
                       +4 AXE: 00
                       +4 BOW: 00
                     +4 SWORD: 00
                      EXOTICS: 00

   MARKS                CARDS

 FORCE   0             LOVE   0
  FIRE   0              SOL   0
 SNAKE   0            MOONS   0
 KINGS   0            DEATH   0
```

Figure 3. Printout of a newly created character. It (sex is "other") is an elf fighter, with no arms or weapons, experience, nor marks or cards. Gold, food, and hit points are low. The four basic attributes are low.

```
EXODUS CHARACTER: STRIDER

   RACE: H          EXPERIENCE: 8000
  CLASS: R                FOOD: 9500
    SEX: M                GOLD: 5000
 HEALTH: G           HITS NOW: 9000
                    TOTAL HITS: 9000
STRENGTH: 75        MAGIC PTS: 50
DEXTERITY: 75         TORCHES: 99
  I  Q  : 75            GEMS: 99
 WISDOM: 75             KEYS: 99
                      POWDERS: 99

     ARMOR              WEAPONS
EQUIPPED #0         EQUIPPED #0
   CLOTH: 01          DAGGER: 01
 LEATHER: 01            MACE: 01
   CHAIN: 01           SLING: 01
   PLATE: 01             AXE: 01
+2 CHAIN: 01             BOW: 01
+2 PLATE: 01           SWORD: 01
  EXOTICS: 05      2-HND SWORD: 01
                       +2 AXE: 01
                       +2 BOW: 01
                     +2 SWORD: 01
                      GLOVES: 01
                       +4 AXE: 01
                       +4 BOW: 01
                     +4 SWORD: 01
                      EXOTICS: 05

   MARKS                CARDS

 FORCE   1             LOVE   1
  FIRE   1              SOL   1
 SNAKE   1            MOONS   1
 KINGS   1            DEATH   1
```

Figure 4. The same character as in Figure 3, just a few minutes later. Strider has become a hero. "He" is now a human ranger with great attributes. All values are high; he has lots of gold, keys, gems, etc.; all armor and weaponry are available; and he has all four marks and all four cards.

Listing continued.

```
1040 R$ =  CHR$ ( PEEK (LOC + 22))
1045 C$ =  CHR$ ( PEEK (LOC + 23))
1050 S$ =  CHR$ ( PEEK (LOC + 24))
1055 X = LOC + 25: GOSUB 100:M$ = B$
1060 X = LOC + 26: GOSUB 150:HN$ = B$
1065 X = LOC + 28: GOSUB 150:HT$ = B$
1070 X = LOC + 30: GOSUB 150:E$ = B$
1075 X = LOC + 32: GOSUB 150:F$ = B$
1080 X = LOC + 35: GOSUB 150:G$ = B$
1085 X = LOC + 37: GOSUB 100:GM$ = B$
1090 X = LOC + 38: GOSUB 100:KY$ = B$
1095 X = LOC + 39: GOSUB 100:P$ = B$
1100  RETURN
1995  REM
1996  REM ********************
1997  REM * CHARACTER SCREEN *
1998  REM ********************
1999  REM
2000  TEXT : HOME : INVERSE
2005  PRINT "  EXODUS CHARACTER: ";
2010  PRINT N$(N); SPC( 6): NORMAL
2015  PRINT : PRINT : POKE 34,2: RETURN
2100  GOSUB 1000: HOME
2105  PRINT  SPC( 5);"RACE: ";R$; SPC( 7);
2110  PRINT "EXPERIENCE: ";E$
2115  PRINT  SPC( 4);"CLASS: ";C$; SPC( 11);
2120  PRINT  SPC( 2);"FOOD: ";F$
2125  PRINT  SPC( 6);"SEX: ";S$; SPC( 7);
2130  PRINT  SPC( 6);"GOLD: ";G$
2135  PRINT  SPC( 3);"HEALTH: ";H$; SPC( 7);
2140  PRINT  SPC( 2);"HITS NOW: ";HN$
2145  PRINT  SPC( 19);"TOTAL HITS: ";HT$
2150  PRINT " STRENGTH: ";SG$; SPC( 7);
2155  PRINT "MAGIC PTS: ";M$
2160  PRINT "DEXTERITY: ";D$; SPC( 9);
2165  PRINT "TORCHES: ";T$
2170  PRINT  SPC( 3);"I  Q  : ";Q$; SPC( 12);
2175  PRINT "GEMS: ";GM$
2180  PRINT  SPC( 3)"WISDOM: ";WM$; SPC( 9);
2185  PRINT "   KEYS: ";KY$
2190  PRINT  SPC( 22);"POWDERS: ";P$
2195  RETURN
2995  REM
2996  REM ********************
2997  REM * ARMOR & WEAPONS *
2998  REM ********************
2999  REM
3000  PRINT  SPC( 5);
3005  INVERSE : PRINT "  ARMOR  ";
3010  NORMAL : PRINT  SPC( 9);
3015  INVERSE : PRINT "  WEAPONS  ": NORMAL
3020 E1 =  PEEK (LOC + 40):E2 =  PEEK (LOC + 48)
3025  FOR K = 1 TO 7:X = LOC + 40 + K
3030  GOSUB 100:A$(K) = B$: NEXT
3035  FOR K = 1 TO 15:X = LOC + 48 + K
3040  GOSUB 100:W$(K) = B$: NEXT
3045  PRINT "  EQUIPPED #";E1; SPC( 9);
3050  PRINT "EQUIPPED #";E2
3055  PRINT  SPC( 4);"CLOTH: ";A$(1);
3060  PRINT  SPC( 10);"DAGGER: ";W$(1)
3065  PRINT  SPC( 2);"LEATHER: ";A$(2);
3070  PRINT  SPC( 12);"MACE: ";W$(2)
3075  PRINT  SPC( 4);"CHAIN: ";A$(3);
3080  PRINT  SPC( 11);"SLING: ";W$(3)
3085  PRINT  SPC( 4);"PLATE: ";A$(4);
3090  PRINT  SPC( 13);"AXE: ";W$(4)
3095  PRINT " +2 CHAIN: ";A$(5);
3100  PRINT  SPC( 13);"BOW: ";W$(5)
3105  PRINT " +2 PLATE: ";A$(6);
3110  PRINT  SPC( 11);"SWORD: ";W$(6)
3115  PRINT  SPC( 2);"EXOTICS: ";A$(7);
3120  PRINT  SPC( 5);"2-HND SWORD: ";W$(7)
3125  PRINT  SPC( 23);"+2 AXE: ";W$(8)
3130  PRINT  SPC( 23);"+2 BOW: ";W$(9)
3135  PRINT  SPC( 21);"+2 SWORD: ";W$(10)
3140  PRINT  SPC( 23);"GLOVES: ";W$(11)
3145  PRINT  SPC( 23);"+4 AXE: ";W$(12)
3150  PRINT  SPC( 23);"+4 BOW: ";W$(13)
3155  PRINT  SPC( 21);"+4 SWORD: ";W$(14)
3160  PRINT  SPC( 22);"EXOTICS: ";W$(15)
3165  RETURN
3995  REM
3996  REM *****************
3997  REM * MARKS & CARDS *
3998  REM *****************
3999  REM
4000  PRINT  SPC( 3);
4005  INVERSE : PRINT "  MARKS  ";
4010  NORMAL : PRINT  SPC( 12);
4015  INVERSE : PRINT "  CARDS  "
4020  NORMAL : PRINT
4025 B =  PEEK (LOC + 14)
4030  FOR K = 7 TO 0 STEP  - 1
4035 MC(K + 1) =  INT (B / (2 ^ K))
4040 B = B - MC(K + 1) * 2 ^ K: NEXT
4045  PRINT  SPC( 3);"FORCE"; SPC( 3);MC(5);
4050  PRINT  SPC( 12);"LOVE"; SPC( 3);MC(1)
4055  PRINT  SPC( 4);"FIRE"; SPC( 3);MC(6);
```

Listing continued.

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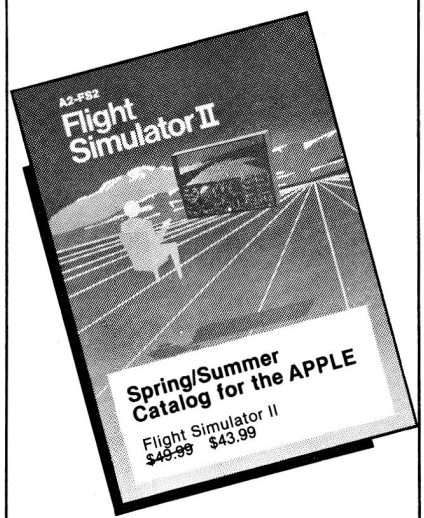

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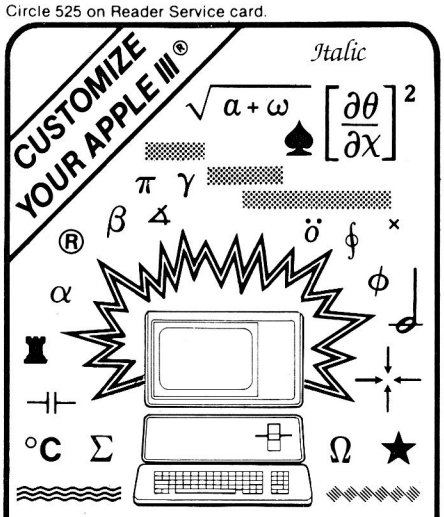

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```
4060  PRINT  SPC( 13);"SOL"; SPC( 3);MC(2)
4065  PRINT  SPC( 3);"SNAKE"; SPC( 3);MC(7);
4070  PRINT  SPC( 11);"MOONS"; SPC( 3);MC(3)
4075  PRINT  SPC( 3);"KINGS"; SPC( 3);MC(8);
4080  PRINT  SPC( 11);"DEATH"; SPC( 3);MC(4)
4085  RETURN
4995  REM
4996  REM *************
4997  REM * MAIN MENU *
4998  REM *************
4999  REM
5000  GOSUB 2000
5005 LOC = BASE + ((N - 1) * 64)
5010  HOME
5015  PRINT : PRINT "YOUR CHOICES ARE:": PRINT
5020  PRINT "  1. CHARACTER VALUES"
5025  PRINT "  2. ARMOR & WEAPONS"
5030  PRINT "  3. MARKS & CARDS"
5035  PRINT "  4. PRINT OUT CHARACTER"
5040  PRINT "<RET> RETURN TO ROSTER"
5045  VTAB 22: HTAB 20
5050  POKE KB,0: GET K$
5055 K =  ASC (K$): IF K = 13 THEN 6000
5060  IF K < 49 OR K > 52 THEN 5045
5065 K = K - 48
5070  ON K GOSUB 5200,5500,5800,5900
5075  GOTO 5010
5195  REM
5196  REM ********************
5197  REM * CHANGE CHARACTER *
5198  REM ********************
5199  REM
5200  HOME : GOSUB 2100: GOSUB 500
5205 V1 = 9:V2 = 10:V3 = 2:V = 1:H = 11
5210  GOSUB 220: IF H = 31 THEN 5265
5215  ON V GOSUB 5225,5230,5235,5240,5220,5245,5250,5255,5260
5220  GOTO 5210
5225 X = LOC + 22:B$ = RR$: GOTO 400
5230 X = LOC + 23:B$ = CC$: GOTO 400
5235 X = LOC + 24:B$ = SS$: GOTO 400
5240 X = LOC + 17:B$ = HH$: GOTO 400
5245 X = LOC + 18: GOTO 300
5250 X = LOC + 19: GOTO 300
5255 X = LOC + 20: GOTO 300
5260 X = LOC + 21: GOTO 300
5265  ON V GOSUB 5275,5280,5285,5290,5295,5300,5305,5310,5315,5320
5270  GOTO 5210
5275 X = LOC + 30: GOTO 350
5280 X = LOC + 32: GOTO 350
5285 X = LOC + 35: GOTO 350
5290 X = LOC + 26: GOTO 350
5295 X = LOC + 28: GOTO 350
5300 X = LOC + 25: GOTO 300
5305 X = LOC + 15: GOTO 300
5310 X = LOC + 37: GOTO 300
5315 X = LOC + 38: GOTO 300
5320 X = LOC + 39: GOTO 300
5495  REM
5496  REM ***************
5497  REM * CHANGE ARMS *
5498  REM ***************
5499  REM
5500  HOME : GOSUB 3000: GOSUB 500
5505 V1 = 7:V2 = 15:V3 = 4:V = 1:H = 11
5510  GOSUB 220: IF H = 31 THEN 5520
5515 X = LOC + 40 + V: GOSUB 300: GOTO 5510
5520 X = LOC + 48 + V: GOSUB 300: GOTO 5510
5795  REM
5796  REM ***********************
5797  REM * CHANGE MARKS/CARDS *
5798  REM ***********************
5799  REM
5800  HOME : GOSUB 4000: GOSUB 500
5805 V1 = 4:V2 = 4:V3 = 4:V = 1:H = 11
5810  GOSUB 220: IF H = 31 THEN 5820
5815 MC(V + 4) =  NOT MC(V + 4): GOTO 5825
5820 MC(V) =  NOT MC(V)
5825 B = 0
5830  FOR K = 1 TO 8
5835 B = B + MC(K) * 2 ^ (K - 1)
5840  NEXT : POKE (LOC + 14),B
5845  VTAB V + 4: HTAB H + 1
5850  IF H = 11 THEN  PRINT MC(V + 4): GOTO 5810
5855  PRINT MC(V): GOTO 5810
5895  REM
5896  REM *************
5897  REM * PRINT OUT *
5898  REM *************
5899  REM
5900  VTAB 22: HTAB 1
5905  PRINT "->START PRINTER AND PRESS ANY KEY<-";
5910  POKE KB,0: GET K$
5915  PR# 1
5920  GOSUB 2000: GOSUB 2100
5925  PRINT : GOSUB 3000
5930  PRINT : GOSUB 4000
5935  PR# 0
```

Listing continued.

Listing continued.

```
5940  GOSUB 2000: RETURN
5995  REM
5996  REM **********
5997  REM * ROSTER *
5998  REM **********
5999  REM
6000  TEXT : HOME
6005  INVERSE : PRINT  SPC( 5);"ULTIMA III: EXODUS  CHARACTERS"; SPC( 5)
6010  NORMAL : PRINT : PRINT
6015  FOR K = 1 TO 4
6020  HTAB 10: PRINT K;". ";N$(K)
6025  NEXT
6030  IF N$(1) = ">NO CHARACTER<" THEN  PRINT : PRINT "PLEASE FORM A PARTY
   AND TRY AGAIN.": END
6035  PRINT : PRINT "YOUR CHOICES:": PRINT
6040  PRINT "   1-4   CHOOSE A CHARACTER TO MODIFY"
6045  PRINT "<RETURN> MAKE CHANGES PERMANENT"
6050  PRINT "<ESCAPE> EXIT PROGRAM"
6055  VTAB 22: HTAB 20: POKE KB,0
6060  GET K$:K =  ASC (K$)
6065  IF K = 13 THEN  POKE 47092,2: CALL 768: POKE 47092,1: GOTO 6055
6070  IF K = 27 THEN  HOME : END
6075  IF K < 49 OR K > 52 THEN 6055
6080 N = K - 48
6085  IF N$(N) = ">NO CHARACTER<" THEN 6055
6090  GOTO 5000
6995  REM
6996  REM ******************
6997  REM * INITIALIZATION *
6998  REM ******************
6999  REM
7000  HIMEM: 38000
7005  DIM W$(15)
7010  POKE 768,32: POKE 769,227: POKE 770,3
7015  POKE 771,76: POKE 772,217: POKE 773,3
7020  POKE 47083,0: POKE 47091,0: POKE 47092,1
7025 BASE = 38000: REM RAM CHARACTER LOCATION
7030  POKE 47088,BASE -  INT (BASE / 256) * 256
7035  POKE 47089, INT (BASE / 256)
7040  POKE 47084,3: POKE 47085,6: REM DISK CHARACTER LOCATION
7045  DEF  FN HEX(X) =  INT ( PEEK (X) / 16) * 10 + ( PEEK (X) -  INT (
   PEEK (X) / 16) * 16)
7050  DEF  FN DEC(X) = ( INT (X / 10) * 16) + (X -  INT (X / 10) * 10)
7055 HH$ = "GPDA"
7060 RR$ = "HEDBF"
7065 CC$ = "FCWTPBLIDAR"
7070 SS$ = "MFO"
7075 KB =  - 16384
7095  REM
7096  REM **************
7097  REM * TITLE PAGE *
7098  REM **************
7099  REM
7100  TEXT : HOME
7105  FOR K = 1 TO 5: HTAB 10
7110  INVERSE : PRINT  SPC( 20): NORMAL
7115  PRINT : NEXT
7120  VTAB 2: HTAB 15
7125 K$ = "ULTIMA III": GOSUB 7170
7130  VTAB 4: HTAB 12
7135 K$ = "CHARACTER EDITOR": GOSUB 7170
7140  VTAB 10:K$ = "THIS PROGRAM LETS YOU MODIFY YOUR PARTY OF 4 EXODUS
   CHARACTERS.  MAKE SURE YOU": GOSUB 7175
7145 K$ = "HAVE AT LEAST 1 CHARACTER IN THE PARTY.": GOSUB 7175
7150  FOR K = 1 TO 1500: NEXT : PRINT : PRINT
7155 K$ = "INSERT SCENARIO/DUPLICATE PLAYER MASTER AND PRESS ANY KEY.":
   GOSUB 7175
7160  VTAB 20: HTAB 20
7165  POKE KB,0: GET K$: GOTO 7200
7170  INVERSE
7175  FOR K = 1 TO  LEN (K$)
7180  PRINT  MID$ (K$,K,1);
7185 X =  PEEK ( - 16336) +  PEEK ( - 16336)
7190  NEXT : NORMAL : PRINT : RETURN
7197  REM
7198  REM  READ DISK
7199  REM
7200  CALL 768
7205  FOR K = 1 TO 4
7210 LOC = BASE + ((K - 1) * 64)
7215 N$(K) = "": REM NULL STRING
7220  FOR L = 0 TO 13
7225 N$(K) = N$(K) +  CHR$ ( PEEK (LOC + L))
7230  NEXT
7235  IF  LEFT$ (N$(K),1) =  CHR$ (0) THEN N$(K) = ">NO CHARACTER<"
7240  NEXT
7245  GOTO 6000
```


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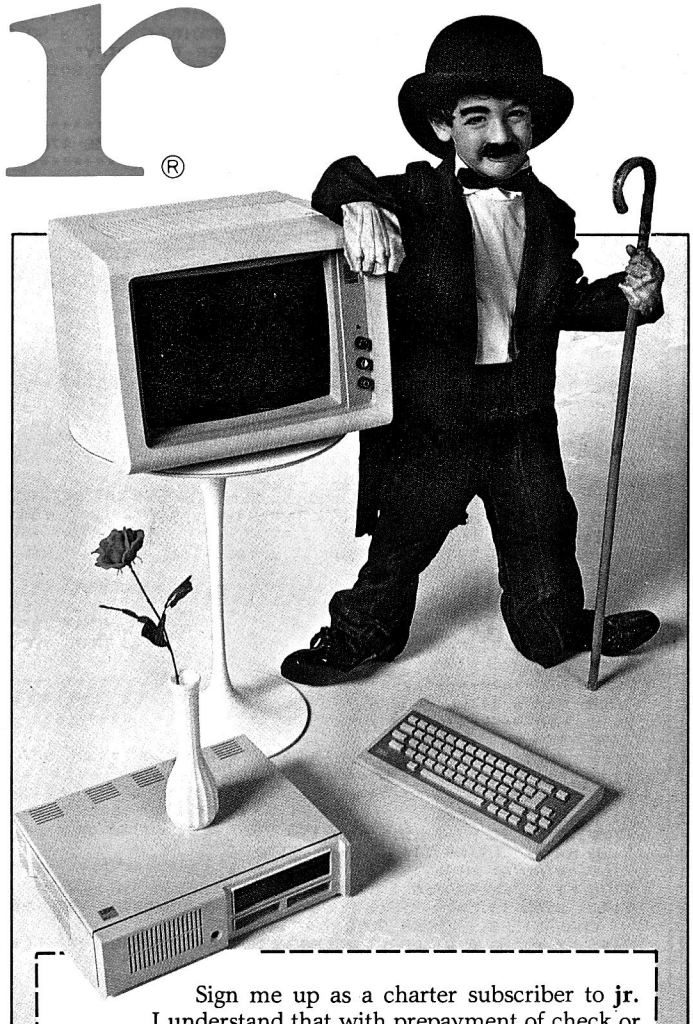

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Scout Search



by John Romero

Scout Search is a lo-res maze game and the object is for you, the Scoutmaster, to gather all of your Cub Scouts before the killer grizzly attacks them. If the grizzly grabs a Scout, he screams. If the grizzly gets you, you lose one life. (You have three lives to start with.) After you gather your Scouts, you go to the next maze. After the tenth screen, the mazes become more difficult.

I wrote Scout Search in Applesoft with a machine-language move routine for the speed of smooth animation. I used lo-res graphics because when I wrote this game I didn't know how to make a bit-mapped shape creator utility. Bit-map animation is the animation used in the professional games on the market.

To save both programs (Applesoft and machine language), first type in the Applesoft as shown. Then, type SAVE SCOUT SEARCH. Enter the monitor by typing CALL -151 and start typing with:

```
8000: 4C 19 00 80 1C 1B 0D 0C 1E
<- RETURN key
```

Note: Make sure you type a colon after the location number and not a hyphen as in the listing. When you're done, type BSAVE SCOUT SEARCH, A$8000,L$31F. For details on entering hex listings, see page 92 of the *Apple IIe Reference Manual* or page 42 of the *Apple II Reference Manual*. ■

Address correspondence to John Romero at PO Box 1079, APO New York, NY 09238.

```
0  IF  PEEK (32768) <  > 76 THEN  PRINT
     CHR$ (4)"BLOADSCOUT SEARCH.O
     BJ"
1 MEN = 3
2 MZ = 0
5 ST = 3
6  POKE 235,0
7  CALL 32768
8  POKE 236,0
9  TEXT : HOME : GOTO 1000
10  GR : GOTO 53
11  COLOR=  RND (1) * 15: POKE 8,1

12  FOR I = 0 TO 20: VLIN 0,39 AT
     I: VLIN 0,39 AT 39 - I: POKE
     6,I + 10: POKE 7,20: CALL 333
     68: NEXT
14  FOR I = 20 TO 0 STEP  - 1: COLOR=
     0: VLIN 0,39 AT I: VLIN 0,39 AT
     39 - I: POKE 6,I + 20: POKE 7
     ,15: CALL 33368: NEXT
19 MAX = 38
20  COLOR=  INT ( RND (1) * 13 + 1
    ): HLIN 0,39 AT 0: HLIN 0,39 AT
     39: VLIN 0,39 AT 0: VLIN 0,39
     AT 39
30  FOR I = 0 TO MAX STEP ST: FOR
     J = 0 TO MAX STEP ST
32 C =  INT ( RND (1) * 3.5 + 1)
34  IF C = 1 THEN  HLIN I,I + (ST -
     1) AT J
36  IF C = 2 THEN  VLIN J,J + (ST -
     1) AT I
38  NEXT : NEXT
39  COLOR= 15
40  FOR I = 1 TO 10 -  PEEK (235)
41 K =  INT ( RND (1) * 37 + 1):L =
     INT ( RND (1) * 37 + 1): IF
     SCRN( K,L) <  > 0 THEN 41
42  PLOT K,L
44  POKE 32770 + I,K: POKE 32781 +
     I,L
50  NEXT : CALL 32822
52  IF  PEEK (236) THEN MEN = MEN -
     1: POKE 236,0: IF MEN = 0 THEN
     POKE  - 16368,0: GOTO 70
53  VTAB 21: PRINT "MEN: "MEN
54  VTAB 22: PRINT "SCOUTS LEFT: "
     10 -  PEEK (235)" "
55  IF  PEEK (235) = 10 THEN 80
60  POKE 227,10 -  PEEK (235)
61  POKE 249, RND (1) * 37 + 1: POKE
     250, RND (1) * 37 + 1: POKE 2
    5, RND (1) * 37 + 1: POKE 26,
     RND (1) * 37 + 1
62 PT = PT + 10 * (10 -  PEEK (235
    )): VTAB 23: PRINT "POINTS: "
     PT
63 MZ = MZ + 1: IF MZ -  INT (MZ /
    10) * 10 = 0 THEN ST = ST - 1
    :MAX = 39
64  VTAB 21: HTAB 20: PRINT "MAZE:
     "MZ
69  GOTO 11
70  VTAB 21: PRINT "YOU DIED. WANN
    A PLAY AGAIN?";: GET A$: IF A
    $ = "Y" THEN  RUN
71  IF A$ <  > "N" THEN 70
72  TEXT : HOME : END
80  HOME : VTAB 21: PRINT "ALL YOU
    R SCOUTS GOT EATEN UP!!": PRINT
     "YOUR SCORE: "PT" MAZE: "MZ
90  PRINT "WANNA PLAY AGAIN?";: GET
     A$: IF A$ = "Y" THEN  RUN
92  IF A$ <  > "N" THEN 90
93  TEXT : HOME : END
1000  INVERSE : PRINT ":
      :": PRINT "  SCOUT SEARCH
     ": PRINT ":                :"
    : NORMAL : VTAB 1: HTAB 18
1002  PRINT "BY JOHN ROMERO": HTAB
    18: PRINT "COPYRIGHT (C) 1983
    ": PRINT
1004  FOR I = 1 TO 40: PRINT "-";:
     NEXT
1006  PRINT : PRINT " WELCOME TO T
    HE SCOUT SEARCH! ARE YOU  RE
    ADY TO GRAB YOUR SCOUTS BEFOR
    E THE  KILLER GRIZZLY DOES?
     I SURE HOPE SO!": PRINT
1008  PRINT " YOU ARE THE SCOUTMAS
    TER.  YOUR JOB IS  TO ROUND U
    P ALL OF YOUR LOST CUB SCOUTS
     BEFORE THE KILLER GRIZZLY GR
    ABS THEM.  IF THE GRIZZLY GR
    ABS A SCOUT, YOU WILL  HEAR A
     BLOOD-CURDLING SCREAM EMIT F
    ROM  THE POOR SCOUT."
1010  PRINT : PRINT " ANOTHER THIN
    G, DON'T LET THE GRIZZLY  CA
    TCH YOU EITHER OR YOU WILL SU
    FFER THE SAME FATE AS YOUR SC
    OUTS!  THE CONTROLS FOR THE G
    AME ARE:"
1012  HTAB 20: PRINT "A": HTAB 17:
     PRINT "< -+- >": HTAB 20: PRINT
    "Z"
1014  PRINT "HIT ANY KEY TO START
    GAME:";: GET A$: HOME : GOTO
    10
```

Listing 1. Scout Search.

```
8000- 4C 19 80 1C 1B 0D 0C 1E
8008- 08 0B 15 64 22 64 0F 0B
8010- 01 1A 20 25 0E 0D 64 14
8018- 64 20 1D 80 60 A9 01 85
8020- 1D 85 1E 85 19 85 1A A9
8028- 28 85 1F A9 26 85 FA 85
8030- F9 A9 0A 85 E3 60 20 51
8038- 80 20 F8 80 20 C4 81 20
8040- 2C 81 20 FE 81 20 66 82
8048- 20 AD 82 20 C5 82 4C 36
8050- 80 A5 19 85 1B A5 1A 85
8058- 1C A5 1D D0 21 A5 1A 38
8060- E9 01 85 1A A5 1A A4 19
8068- 20 71 F8 F0 0E A5 1A 18
8070- 69 01 85 1A A9 01 85 1D
8078- 20 03 81 4C 9C 80 A5 1A
8080- 18 69 01 85 1A A5 1A A4
8088- 19 20 71 F8 F0 0E A5 1A
8090- 38 E9 01 85 1A A9 00 85
8098- 1D 20 03 81 A5 1E D0 21
80A0- A5 19 38 E9 01 85 19 A5
80A8- 1A A4 19 20 71 F8 F0 0E
80B0- A5 19 18 69 01 85 19 A9
80B8- 01 85 1E 20 03 81 4C DF
80C0- 80 A5 19 18 69 01 85 19
80C8- A5 1A A4 19 20 71 F8 F0
80D0- 0E A5 19 38 E9 01 85 19
80D8- A9 00 85 1E 20 03 81 A9
80E0- 00 20 64 F8 A5 1C A4 1B
80E8- 20 00 F8 A9 0D 20 64 F8
80F0- A5 1A A4 19 20 00 F8 60
80F8- A4 1F A2 FF CA D0 FD 88
8100- D0 F8 60 A9 01 85 09 85
8108- 08 A9 32 85 07 A9 32 85
8110- 06 20 15 81 60 A4 07 A5
8118- 08 20 A8 FC A6 06 CA D0
8120- FD 2C 30 C0 88 D0 F0 C6
8128- 09 D0 EA 60 A5 F9 85 FB
8130- A5 FA 85 FC A5 FD C9 C1
8138- D0 1A A5 FA 38 E9 01 85
8140- FA A5 FA A4 F9 20 71 F8
8148- F0 07 A5 FA 18 69 01 85
8150- FA 4C AB 81 C9 DA D0 1A
8158- A5 FA 18 69 01 85 FA A5
8160- FA A4 F9 20 71 F8 F0 07
8168- A5 FA 38 E9 01 85 FA 4C
8170- AB 81 C9 88 D0 1A A5 F9
8178- 38 E9 01 85 F9 A5 FA A4
8180- F9 20 71 F8 F0 07 A5 F9
8188- 18 69 01 85 F9 4C AB 81
8190- C9 95 D0 17 A5 F9 18 69
8198- 01 85 F9 A5 FA A4 F9 20
81A0- 71 F8 F0 07 A5 F9 38 E9
81A8- 01 85 F9 A9 00 20 64 F8
81B0- A5 FC A4 FB 20 00 F8 A9
81B8- 0E 20 64 F8 A5 FA A4 F9
81C0- 20 00 F8 60 AD 00 C0 C9
81C8- C1 D0 03 85 FD 60 C9 DA
81D0- D0 03 85 FD 60 C9 88 D0
81D8- 03 85 FD 60 C9 95 D0 03
81E0- 85 FD 60 C9 A0 D0 03 85
81E8- FD 60 C9 9B D0 0F 2C 10
81F0- C0 AD 00 C0 10 FB C9 9B
81F8- F0 03 2C 10 C0 60 A9 0A
8200- 85 FE A6 FE BD 03 80 38
8208- E5 19 C9 02 90 04 C9 FF
8210- 90 3D BD 0E 80 38 E5 1A
8218- C9 02 90 04 C9 FF 90 2F
8220- A9 1E 85 FF A5 FF 85 06
8228- 85 07 20 58 82 C6 FF D0
8230- F3 A9 00 20 64 F8 A6 FE
8238- BD 0E 80 BC 03 80 20 00
8240- F8 A6 FE A9 64 9D 0E 80
8248- 9D 03 80 C6 E3 E6 EB C6
8250- FE A5 FE C9 FF D0 AB 60
8258- A4 07 A6 06 CA D0 FD 2C
8260- 30 C0 88 D0 F5 60 A9 0A
8268- 85 FE A6 FE BD 0E 80 38
8270- E5 FA C9 02 90 04 C9 FF
8278- 90 2A BD 03 80 38 E5 F9
8280- C9 02 90 04 C9 FF 90 1C
8288- A9 00 20 64 F8 A6 FE BD
8290- 0E 80 BC 03 80 20 00 F8
8298- A6 FE A9 64 9D 0E 80 9D
82A0- 03 80 C6 E3 C6 FE A5 FE
82A8- C9 FF D0 BE 60 A5 E3 D0
82B0- 13 A9 64 85 FF A5 FF 85
82B8- 06 85 07 20 58 82 C6 FF
82C0- D0 F3 68 68 60 A5 F9 38
82C8- E5 19 C9 02 90 04 C9 FF
82D0- 90 3E A5 FA 38 E5 1A C9
82D8- 02 90 04 C9 FF 90 31 A9
82E0- 0F 85 FF A9 64 85 FE A5
82E8- FF 20 64 F8 A5 FA A4 F9
82F0- 20 00 F8 A5 FF 85 06 A5
82F8- FE 85 07 20 58 82 C6 FF
8300- D0 E5 A9 0F 85 FF C6 FE
8308- D0 DD A9 01 85 EC 68 68
8310- 60 28 00 00 A0 28 00 00
```

Listing 2. Scout Search machine language routine.



Apple Mechanic's hi-res type routines and fonts are usable in your programs WITHOUT LICENSING FEE. Just give Beagle Bros credit on your disk and documentation.

APPLE MECHANIC

HI-RES SHAPE EDITOR / TYPE FONT DISK
by BERT KERSEY

$29.50: Includes Peeks/Pokes Chart & Tip Book #5.

SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Access & create **proportionally-spaced hi-res Typefaces** with each character re-definable as you want. Six fonts are included on the disk. Excellent LISTable Applesoft demos show you how to animate graphics and create professional-looking Charts and Graphs.

BYTE-ZAP: Rewrite any byte on a disk for repair or alteration. Load entire sectors on the screen for inspection. **Hex/Dec/Ascii displays** and input. Educational experiments included for making trick file names, restoring deleted files, changing DOS, etc.

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

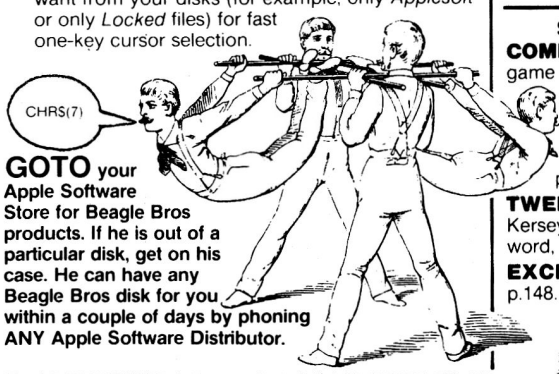
APPLE MECHANIC TYPEFACES

by BERT KERSEY

$20.00: Includes Peeks & Pokes Chart.

26 NEW FONTS for use with Apple Mechanic programs. Many different sizes and typestyles, both ordinary and *Artistic*. Every character—from A to Z to "★" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All typefaces are **proportionally spaced** for a more professional appearance. People *do* notice the difference!

BEAGLE MENU: Display only the file names you want from your disks (for example, only *Applesoft* or only *Locked* files) for fast one-key cursor selection.



GOTO your Apple Software Store for Beagle Bros products. If he is out of a particular disk, get on his case. He can have any Beagle Bros disk for you within a couple of days by phoning ANY Apple Software Distributor.

DOS BOSS

DISK COMMAND EDITOR
by BERT KERSEY and JACK CASSIDY

$24.00: Includes Peeks/Pokes Chart & Tip Book #2.

RENAME DOS COMMANDS & Error Messages—"Catalog" can be "Cat"; "Syntax Error" can be "Oops" or almost *anything* you want it to be.

PROTECT YOUR PROGRAMS. An unauthorized Save-attempt can produce a "Not Copyable" message, or *any* message you want. Also easy List-Prevention and other useful Apple tips and tricks. Plus one-key program-execution from catalog.

CUSTOMIZE DOS. Change the catalog Disk Volume heading to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips and educational Apple experiments.

ANYONE USING YOUR DISKS (booted or not) will be using DOS the way YOU designed it.



```
10 LIST: LIST: LIST: FOR ZZ=PEEK(175)+PEEK
(176)*256+36 TO 3072: POKE ZZ,216: NEXT
20 FOR XXX=1 TO 2: POKE-16299,0: POKE
-16300,0: XXX=1: NEXT: REM Experiment
with different length variable names.
```

BEAGLE BAG

12 APPLE GAMES ON ONE DISK
by BERT KERSEY

$29.50: Includes Peeks & Pokes Chart

COMPARE BEAGLE BAG with any single-game Locked-Up disk on the market today. All 12 games are a blast, the price is a bargain, the instructions are crystal clear, *and* the disk is COPYABLE. You can even *change* the programs or list them to learn programming tricks by seeing how they work.

TWELVE GAMES from the Applesoft Ace, Bert Kersey— TextTrain, Wowzo, Magic Pack, Buzzword, Slippery Digits, and many many more...

EXCELLENT REVIEWS—See Jan-83 *Softalk*, p.148. Beagle Menu too: see Typefaces description.



Beagle Bros
Micro Software Inc.

4315 SIERRA VISTA / SAN DIEGO, CA 92103
619-296-6400

ALL BEAGLE DISKS ARE UNLOCKED, COPYABLE AND COMPATIBLE WITH APPLE II, II+ AND IIe.* (Don't Settle for Less!)

*DISKQUIK requires Apple IIe.
"APPLE" is a Registered Trade Mark of You-Know-Who.

SILICON SALAD

NEW!

INCLUDING TIP DISK #2
by BERT KERSEY and MARK SIMONSEN

$24.95: Includes Peeks/Pokes AND Commands Charts

MANY MINI-UTILITIES: Disk Scanner finds bad disk sectors, **Key-Clicker** adds subtle sound as you type, **DOS-Killer** adds two tracks of space to your disks, **2-Track Cat** allows up to 210 file names per disk, **Program Splitter** makes room for hi-res pix with large Applesoft programs, **Text Imprinter** transfers text to the hi-res screen, **Onerr Tell Me** prints the appropriate error message but continues program execution, **Text Screen Formatter** converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Including fantastic programming tricks from Beagle Bros Tip Books 5, 6 and 7, plus programs from Tips/Tricks Chart #1.

TWO-LINERS TOO: From our customers around the world—and elsewhere. Little mind-blowers that will teach your old Apple some new tricks!

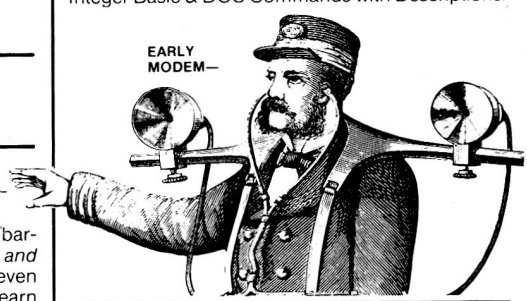
TIP DISK #1

100 TIP BOOK TIPS ON DISK
by BERT KERSEY

$20.00: Includes Peeks & Pokes Chart.

100 LISTABLE PROGRAMS from Beagle Bros Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are LISTable and changeable for Apple experimentation.

COMMAND CHART INCLUDED: Free with each Tip Disk; an 11 x 17 poster of all Applesoft, Integer Basic & DOS Commands with Descriptions!



FLEX TYPE

(FORMERLY "FLEX TEXT")
VARIABLE-WIDTH HI-RES TEXT UTILITY
by MARK SIMONSEN

$29.50: Includes Peeks & Pokes Chart

PRINT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires a monochrome monitor, not a tv).

ADD GRAPHICS TO TEXT or add Text to hi-res graphics. Run your existing Applesoft programs under Flex Type control. Fast, easy to use, and Compatible with GPLE and Double-Take.

DOS TOOL KIT® font compatibility, or use the supplied Flex Type typefaces. Select up to 9 fonts with control-key commands. A text character editor lets you redesign any Apple text character.

FRAME-UP

FAST APPLE DISPLAY UTILITY
by TOM WEISHAAR

$29.50: Includes Peeks & Pokes Chart

PROFESSIONAL PRESENTATIONS: Turn your existing Hi-Res, Lo-Res and Text frames into attractive Apple "slide shows". *FAST* hi-res loads in 2½-seconds! Paddle or Keyboard-advance frames.

UNATTENDED SHOWS are optional, with each picture arranged and pre-programmed to display on the screen from 1 to 99 seconds. Custom **Text Screen Editor** lets you create black-and-white text "slides" and add type "live" from the keyboard during shows. Mail copies of presentations on disk to your friends and associates (or home to Mom!).

RUSH the following disks by First Class Mail—

☐ Alpha Plot	$39.50	☐ Frame-Up	$29.50
☐ Apple Mechanic	29.50	☐ GPLE	49.95
☐ A.M.Typefaces	20.00	☐ ProntoDOS	29.50
☐ Beagle Bag	29.50	☐ Silicon Salad	24.95
☐ Beagle BASIC	34.95	☐ Tip Disk #1	20.00
☐ DiskQuik	29.50	☐ Utility City	29.50
☐ DOS Boss	24.00	☐	
☐ Double-Take	34.95	☐ ADD ME to mailing list.	
☐ Flex Type	29.50	☐ ALREADY ON mail list.	

AT YOUR APPLE DEALER NOW!
Or order directly from Beagle Bros—

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Visa/MasterCard or COD, call **TOLL-FREE**

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1-800-227-3800 ext. 1607

OR mail U.S.Check, Money-Order or Visa/MC# to **BEAGLE BROS**, 8th Floor 4315 SIERRA VISTA, SAN DIEGO, CA 92103

Add $1.50 First Class Shipping. Any-Size Order.
Overseas add $4.00. COD add $3.00. California add 6%
ALL ORDERS SHIPPED IMMEDIATELY.

AD#8A Circle 179 on Reader Service card.

NEW! GPLE
GLOBAL PROGRAM LINE EDITOR
by NEIL KONZEN

$49.95: Includes Peeks/Pokes Chart & Tip Book #7.

A CLASSIC APPLE PROGRAM EDITOR GPLE lets you edit Applesoft program lines *FAST* without awkward cursor-tracing and "escape editing".

INSERT & DELETE: GPLE works like a word processor for Applesoft program lines. You make changes instantly by jumping the cursor to the change point and inserting or deleting text. No need to trace to the end of a line before hitting Return.

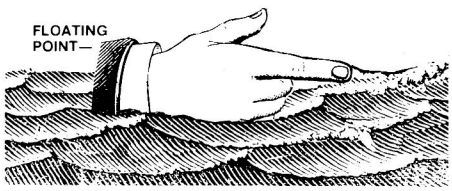
GLOBAL SEARCH & REPLACE: Find any word or variable in your programs, *FAST*. For example, find all lines containing a GOSUB, or edit or delete all lines with REM statements, or all occurrences of any variable. **Replace any variable**, word or character with any other. For example, change all X's to ABC's, or all "Horse" strings to "Cow".

80-COLUMN COMPATIBILITY: All edit & global features support **Apple IIe 80-column cards** and most 80-column cards on *any* Apple IIe, II+ or II.

DEFINABLE ESC FUNCTIONS: Define ESC plus any key to perform any task. For example, **ESC-1** can catalog drive 1, **ESC-L** can do a "HOME: LIST", **ESC-N** could type an entire subroutine... *Anything* you want, *whenever* you want.

GPLE DOS MOVER: Move DOS and GPLE to Language Card (or IIe upper 16K) for an EXTRA **10,000 Bytes** (10K) of programmable memory.

Plus APPLE TIP BOOK #7: Learn more about your Apple! Includes all new GPLE tips and tricks.



UTILITY CITY
21 PROGRAMMING UTILITIES
by BERT KERSEY

$29.50: Includes Peeks/Pokes Chart & Tip Book #3

LIST FORMATTER prints each program statement on a new line. Loops indented with printer Page Breaks. A great Applesoft program de-bugger.

MULTI-COLUMN CATALOGS, with or without sector and file codes. Organize your disk library.

INVISIBLE and trick catalog file names. Invisible functioning commands in Applesoft programs too.

MUCH MORE: 21 utilities, including auto-post Run-number & Date in programs, alphabetize/store info on disk, convert dec to hex or Int to FP, protect and append programs, dump text to printer...

LEARN PROGRAMMING: List-able programs and informative documentation. Includes Tip Book #3. Hours of good reading & Applesoft experiments.

ALPHA PLOT
HI-RES GRAPHICS/TEXT UTILITY
by BERT KERSEY and JACK CASSIDY

$39.50: Includes Peeks/Pokes Chart & Tip Book #4.

DRAW IN HI-RES on both Apple "pages" using easy keyboard commands OR paddles/joystick. Pre-view lines before plotting. Solid or mixed colors & Reverse (background-opposite) drawing. FAST one-keystroke circles, boxes & ellipses, filled or outlined. Add text for graphs & charts. All pix Save-able to disk, to be called from your Applesoft programs.

COMPRESS HI-RES DATA to 1/3 disk space (average) allowing more hi-res pictures per disk.

MANIPULATE IMAGES: Superimpose any two images, or RE-LOCATE any rectangular section of any drawing anywhere on either hi-res page.

HI-RES TYPE: Add text to your pictures with adjustable character-size and large-character color. Type *anywhere* with no Htab/Vtab limits. Type sideways too, for graphs. Includes Tip Book #4.



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619-296-6400

ALL BEAGLE DISKS ARE UNLOCKED, COPYABLE AND COMPATIBLE WITH APPLE II, II+ AND IIe.*
(Don't Settle for Less!)

* DISKQUIK requires Apple IIe.
"APPLE" is a Registered Trade Mark of You-Know-Who.

BEAGLE BASIC
APPLESOFT ENHANCER
by MARK SIMONSEN

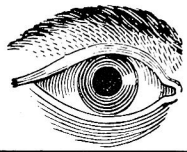
$34.95: Includes Peeks/Pokes Chart & Tip Book #6. Requires Apple IIe (OR II/II+ with RAM Card).

RENAME ANY APPLESOFT COMMAND or Error Message to anything you want. For program clarification, encryption/protection or even foreign translation. Plus add optional NEW COMMANDS:

ELSE follows If-Then statements, like this:
IF X=2 THEN PRINT "YES": *ELSE* PRINT "NO"

HSCRN reads color of any hi-res dot for collision testing. **SWAP X,Y** exchanges 2 variables' values. New **TONE** command writes music with no messy pokes & calls. **SCRL** scrolls text in *either* direction. **TXT2** lets Text Page 2 act exactly like Page 1.

PLUS: GOTO & GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by special ESC CURSOR. Replace awkward Graphics screen-switch pokes with 1-word commands. Change ctrl-G Beep to any tone. **INVERSE REMS** too! All GPLE compatible.



```
1 FOR S=768 TO 773: READ A:
  POKE S,A: NEXT: POKE 232,0:
  POKE 233,3: DATA 1,0,4,0,5,0
2 HGR2: FOR R=0 TO 192: ROT=R:
  SCALE=96: XDRAW 1 AT 140,95:
  SCALE=30: XDRAW 1 AT 140,95:
  S=PEEK(49200): NEXT: RUN
```

PRONTO-DOS
HIGH-SPEED DOS / DOS-MOVE UTILITY
by TOM WEISHAAR

$29.50: Includes Peeks & Pokes Chart

TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra memory by moving DOS.

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
BLOAD LANGUAGE CARD	13 sec.	4 sec.
(Text Files: No Change)		

Boot the Pronto disk or your updated disks, created with the normal INIT command. Compatible with all DOS Commands, GPLE, Double-Take, DOS Boss, DiskQuik and almost all unprotected programs.

MOVE DOS to your Language Card, RAM Card, or standard Apple IIe upper 16K, freeing up **10,000 EXTRA BYTES** of memory for your programs.

15 EXTRA SECTORS per disk. Catalog Free-Space displayed every time you catalog a disk.

TYPE-COMMAND ("TYPE filename") prints contents of sequential Text Files on screen or printer.

NEW! DISKQUIK
DISK DRIVE EMULATOR
by HARRY BRUCE and GENE HITE

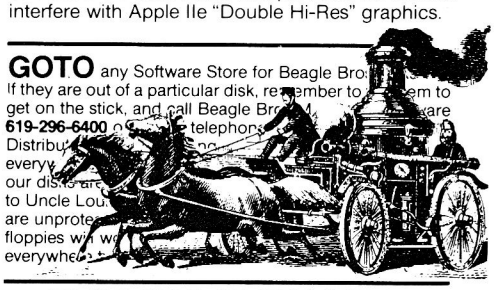
$29.50: Includes Peeks & Pokes Chart
Requires Apple IIe with Extended 80-column Card.

ACTS LIKE A DISK DRIVE in Slot 3, but much faster, quieter, more reliable and $350+ cheaper! Enjoy the benefits of a 2nd (or 3rd or 4th...) drive at less than 1/10th the price. Catalogs normally with "CATALOG, S3" command. Load & Save any kind of files into RAM with normal DOS commands.

SILENT AND FAST: Since no moving parts are involved, DiskQuik operates silently and at super-high speeds. See it to believe it. Your Apple IIe's Extended 80-column Card (required) can hold about half the amount of data as a 5¼" floppy disk!

MANY USES: For example, auto-load often-used files like FID etc., etc., into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.

FRIENDLY & COMPATIBLE with 80-column display, GPLE, ProntoDOS, and all normal Applesoft and DOS commands and procedures. Will not interfere with Apple IIe "Double Hi-Res" graphics.



DOUBLE-TAKE
2-WAY-SCROLL/MULTIPLE UTILITY
by MARK SIMONSEN

$34.95: Includes Peeks/Pokes AND Tips/Tricks Charts.

2-WAY SCROLLING: Listings & Catalogs scroll Up AND Down, making file names and program lines much easier to access. Change the Catalog or List scroll-direction at will, with Apple's Arrow keys.

80-COLUMN COMPATIBLE: All features support IIe and most other 80-column cards.

BETTER LIST FORMAT: Each program statement lists on a new line for *FAST* program tracing & de-bugging. Printer-compatible; any column-width.

VARIABLE-DISPLAY: Displays all of a program's strings and variables with current values.

CROSS-REFERENCE: Sorts and displays line numbers where each variable & string appears.

AUTO-LINE-NUMBER, Hex/Dec Converter, better Renumber/Append, Program Stats, Change Cursor, Space-On-Disk. GPLE/Pronto compatible.

☐ Alpha Plot	$39.50	☐ Frame-Up	$29.50
☐ Apple Mechanic	29.50	☐ GPLE	49.95
☐ A.M.Typefaces	20.00	☐ ProntoDOS	29.50
☐ Beagle Bag	29.50	☐ Silicon Salad	24.95
☐ Beagle BASIC	34.95	☐ Tip Disk #1	20.00
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Using a Versatile Interface Adapter with Your Apple

By popular demand, our author follows up his recent article on interfacing a stepper motor to an Apple with a description of how to program the 6522 versatile interface adapter.

by Jerry Faughn

In a previous article in *inCider* (October, 1983) I discussed interfacing a stepper motor to an Apple. Many readers responded with letters and telephone calls, often to ask how to program the 6522 versatile interface adapter I had mentioned. This month's article deals with this topic and presents a simple example of how the IC can be used in an interfacing situation.

Obviously, connecting an electronic or mechanical device to a computer implies a way for the computer to communicate with the outside world. A convenient approach to providing this communication is through special chips given names such as PIA, peripheral interface adapter, and VIA, versatile interface adapter, of which the 6522 is an example.

The Apple does not come with either a PIA or a VIA, but cards containing them can be inserted in the slots in the rear of the machine. If you have a firm knowledge of interfacing techniques, you can design and construct your own 6522 card to go in one of these slots. If you are unsure of yourself, I would suggest purchasing a card that is already wired for you. One of the best I know of is supplied by John Bell Engineering Company, 1014 Center St., San Carlos, CA 94070. Each card contains two 6522 VIAs, and the program you write to use the card chooses between them. At $65 the Bell card is well worth the investment if you intend to do much interfacing.

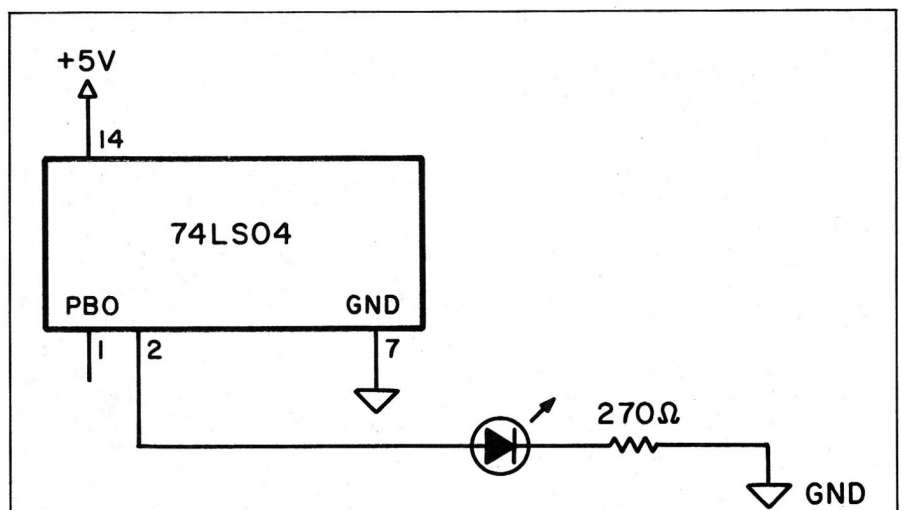

Figure. Sample circuit for use with the listings (next page).

Regardless of the chip used, PIA or VIA, it includes accesses, called input ports, through which information flows to the computer from the outside world, and output ports through which information passes from the computer to the outside world. A 6522 has two such 8-bit parallel ports, which I will refer to as port A and port B. These ports look, to the computer, like memory locations where data can be stored or read. The ports are under complete control of the programmer. That is, both can be input ports, both can be output ports, either can be an input port while the other is an output port, or individual bits of each port can be independently configured as inputs or outputs.

I will refer to the individual pins of port A as PA7, PA6,...PA0, while those of port B will be PB7 through PB0. That is, each port is configured for 8 bits such that if a binary number like 0000 0001 is fed to, say, port A,

You can write Jerry Faughn at the Physics Dept., Eastern Kentucky University, Richmond, KY 40475.



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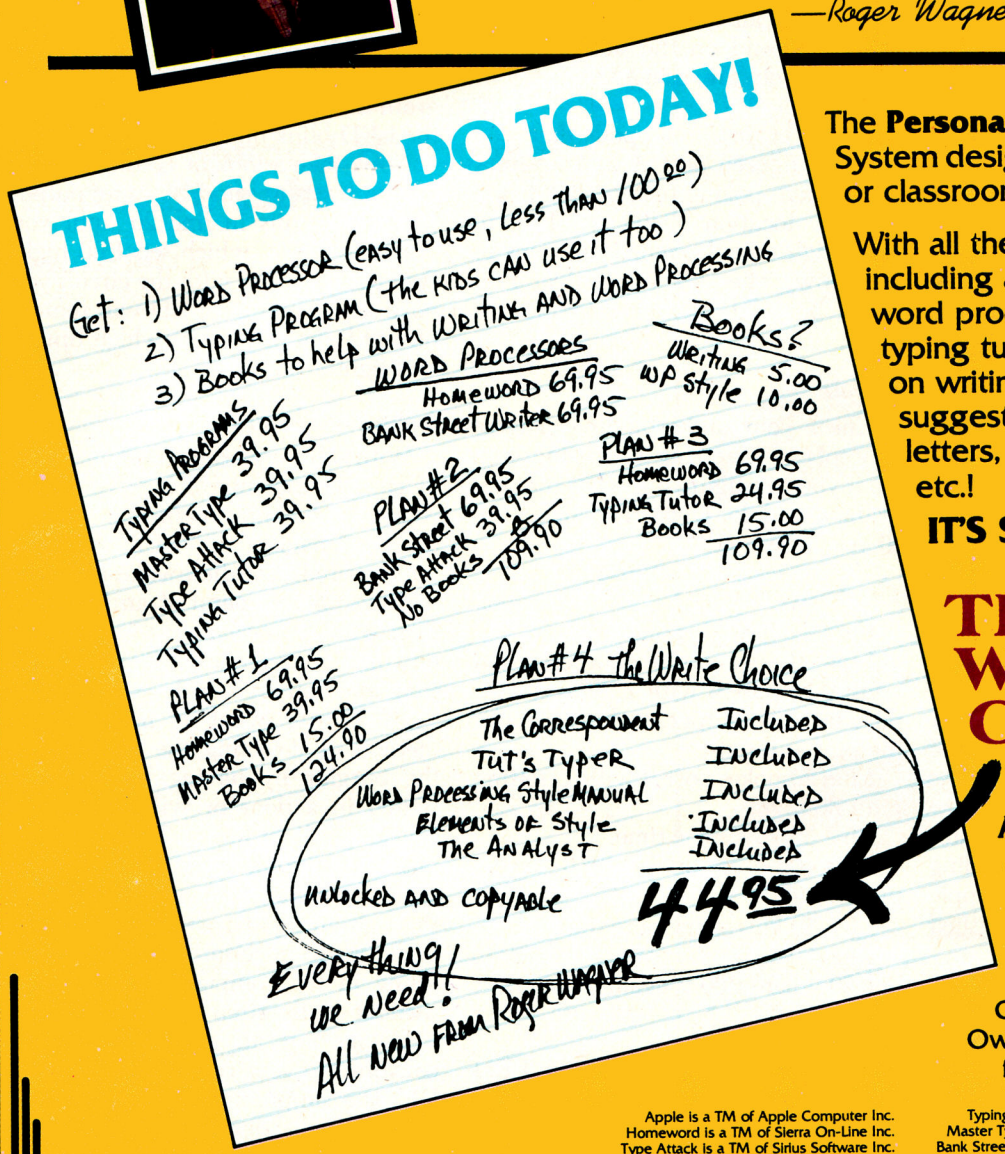

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```
10  POKE 49410,1
20  POKE 49408,1
30  FOR J = 1 TO 3000: NEXT J
40  POKE 49408,0
50  FOR J = 1 TO 3000: NEXT J
60  GOTO 20
```

Listing 1. Sample program for configuring a VIA port.

```
10  POKE 49410,1
20  GET S$
30  IF S$ - "S" THEN  POKE 49408,
     1 GOTO 30
40  GOTO 20
```

Listing 2. Modification of Listing 1 for user control.

pin PA0 goes high (to +5 V) while the other seven pins go low (to GND).

Configuring Ports

The first task in programming ports A and B is to configure them as either inputs or outputs. This is accomplished through memory locations called data direction registers. The addresses of these registers depend on the slot in the computer in which the card is inserted.

As an example, let us assume the John Bell interface card is in slot 1, and also that we plan to use the VIA chip on the card that is nearest the front of the computer. In this case, the address of the data direction register for port A is 49411, and the register for port B is at 49410. Corresponding addresses for other slots in the Apple are given in the literature furnished with the interface card.

If the number 255 is poked into the data direction register for port A (POKE 49411,255), all eight pins of port A are configured as outputs. This occurs because the binary equivalent of 255 is 1111 1111, and feeding a 1 to a bit in the data direction register sets that pin as an output. Similarly, if 0 is stored in the data direction register of port A (POKE 49411,0), then all eight pins become inputs. That is, poking a 0 to a bit in the data direction register sets that particular pin as an input. As another example, poking 49411 with 7 would insert the binary equivalent, 0000 0111, into the data direction register of port A, setting up PA0, PA1, and PA2 as output pins, and the remainder as input pins.

Once the ports have been configured for input or output through the data direction registers, information can be fed to or received from them by means of the following address locations: 49409 for port A and 49408 for port B. (Recall that these memory locations depend on the slot used and whether you are using the front or back VIA.)

As an example, suppose that you have configured port A as an output port. Then, poking the number 1 into memory location 49409 sets PA0 to logic high and the remaining pins to logic low. The +5 V signal at PA0 could be used, perhaps, to close a relay.

A Quiz

Check your understanding of these concepts by referring to Listing 1 to see if you can figure out what the program would do. Don't read ahead until you have tried.

The Answer

Let's see how you did.

Line 10 pokes the data direction register of port B with 1. This sets up pin PB0 as an output, and the remaining pins as inputs.

Line 20 pokes port B with 1, setting pin PB0 high.

Line 30 kills some time.

Line 40 pokes port B with 0, setting pin PB0 low.

Line 50 kills some more time.

Line 60 sends the computer back to line 20 where PB0 is again set high.

The Blinking LED

If a light source such as an LED were suitably connected to pin PB0, this program would make the LED flash on when PB0 is high, then off when PB0 is low. Try the program with the circuit shown in the Figure.

In this schematic the IC 74LS04 is used as a line driver. If you attempt to draw too much current from a 6522 VIA, there is danger of destroying the chip. The purpose of the line driver is to supply the current to the LED while drawing virtually no current from the 6522.

Note that there are actually six line drivers in the 74LS04 chip, but only one of them is being used. Thus, most of the pins on the 74LS04 are not connected to the VIA. Also note that the +5 V and GND connections for the 74LS04 are available from the 6522. These should be used so that there will be a common ground for the computer and the line driver.

Connect the circuit, run the program in Listing 1, and you should see the LED blink on and off.

Now, take a look at Listing 2. This program sets up pin PB0 as an output pin, then waits in line 20 until you press the S key, which sets PB0 high. Run this program with the circuit you have set up and the LED will remain off until you press S, at which time it will light.

A Burglar Alarm(?)

With a little modification and a lot of care in the interfacing, you have constructed a most *inefficient* burglar alarm. Imagine the LED replaced with a siren. You lie awake all night waiting for the sound of an intruder, then when you hear him you press S on your computer. Pin PB0 turns on a siren and you are saved.

Of course, what is needed is a method of detecting the entrance of the burglar by having him open a switch in a door or window, or by breaking a light beam. This is accomplished by connecting an analog to digital converter to your computer through an input port. The input announces the intrusion and a program idling in the computer memory can then set off the siren automatically.

Connecting an analog to digital converter to your computer through a VIA is a simple undertaking, but not appropriately discussed here. I will add a word of caution, however. I advise against modifying the circuit in the Figure to control a household circuit. At best the 120 V could damage your computer, at worst it could damage you. For such an application a different type of line driver and circuit should be used. The John Bell Company mentioned earlier sells a solid state switch that is excellent for controlling large power loads, but you should not try this until you are completely sure what you are doing. ■

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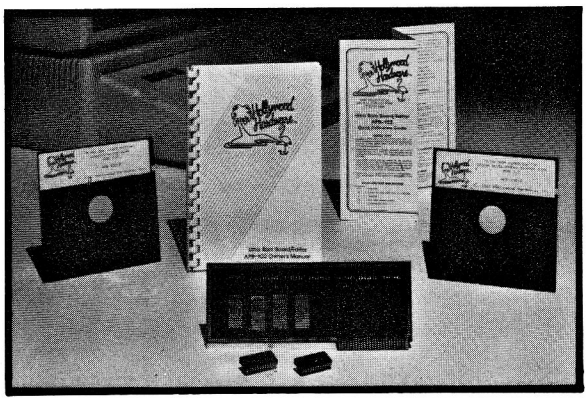

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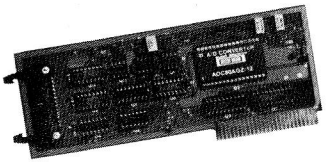

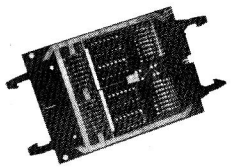

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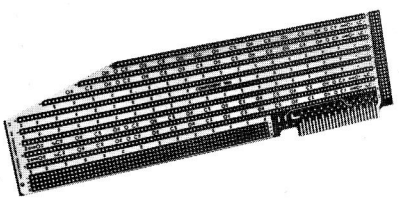

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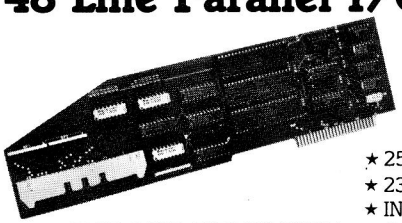

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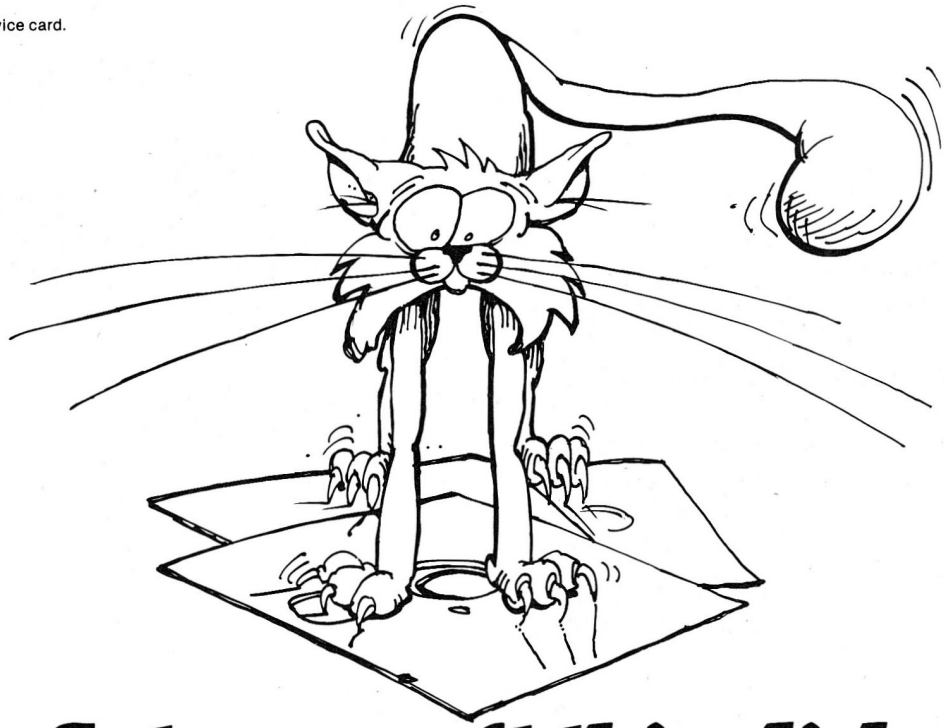

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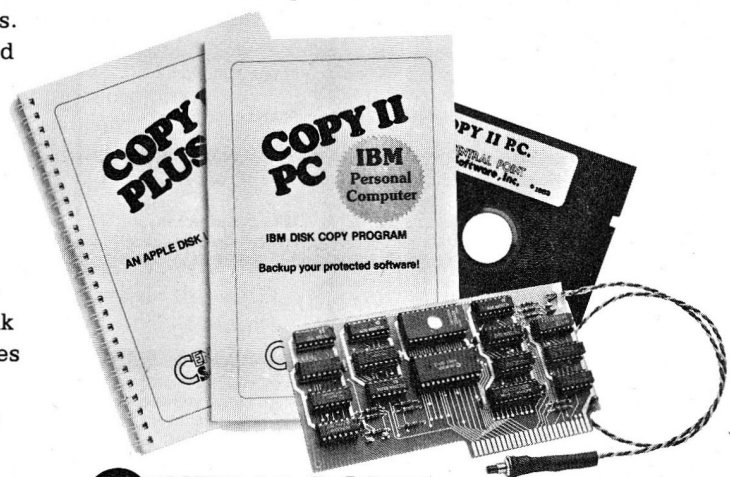

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Printing Multiple Files with DIABLOPRT

Remember all that money you saved last month by typing in our Pascal word processor? This month you can put the finishing touches on it.

by James R. Florini

Last month *inCider* published my program that formats Pascal text files to use the Apple Pascal System as the basis for a sophisticated word processor. It prints boldface, superscripts, subscripts, underlines, takes care of footnotes, includes a second file (such as a table) within the main file, saves empty space for charts or figures, and offers a number of options for format changes during printing. Used in conjunction with my reference series ("Blaising Bibliographies I, II, and III" published in the March, May, and June 1983 issues of *inCider*), the system also provides nearly automatic bibliography formation.

Two things were left out of the Diablo program published last month. That program (which was *quite* long enough as it was!) rather peremptorily proclaimed that there *would be* one-inch margins, single spacing, page numbering, and so on, giving the user no choice in these matters. It was limited to printing only one file at a time. Obviously that is not enough for serious word processing. Here is a rather substantial addition to that program—an "include file" that takes care of several aspects of entering and checking a list of file names and that offers a range of formatting choices. Although I left it out last month primarily to limit the length of the article and program, the file entry part probably should be entered separately because it (or slightly modified adaptations of it) could be useful for any kind of operation in which a series of text-files is to be processed. Indeed, you might want to go back and incorporate the features found here to specify the files to be analyzed by REFCITED if you are using that program.

When I first wrote it, the CHOOSE_FILES procedure consisted of a simple request for a file name; that's what was done in the version published last

Program listing. Additions to enhance DIABLOPRT.

```
{************************  BEGINNING OF DIABLO2 INCLUDE-FILE  ******************}

{The first large part is concerned with getting and listing the names of
 the files that will be printed.}

PROCEDURE SHOW_HEADING;
BEGIN
  WRITE (CHR(12)); WRITELN ('THESE FILES ARE TO BE PRINTED:');
  WRITE_LINE; WRITELN
('            #      File Name              Start New Page?     First Page #');
  WRITE_LINE;
END;

PROCEDURE SHOW_ONE(I:INTEGER);
BEGIN
  GOTOXY (0,I+3); WRITE (I:13,'  ':5,FILENAME[I],'  ':29-LENGTH(FILENAME[I]));
  IF (FIRSTPAGE[I]<>-1) OR (I=1) THEN
  BEGIN
    WRITE ('Yes'); IF FIRSTPAGE[I] > 0
      THEN WRITE (FIRSTPAGE[I]:15) ELSE IF I<>1 THEN WRITE ('Continuing':23);
  END ELSE WRITE ('No'); WRITELN;
END;

PROCEDURE SHOW_LIST;
VAR I: INTEGER;
BEGIN
  SHOW_HEADING; FOR I:=1 TO TOTFILES DO SHOW_ONE(I);
END;

PROCEDURE CHOOSE_FILES;
CONST PROMPTLINE='!_______________!';
VAR FINISHED: BOOLEAN;
    ENTRY: STRING;

  PROCEDURE ADD_TEXT;
  BEGIN
    IF (POS ('.TEXT',ENTRY)=0) AND (POS('.text',ENTRY)=0) THEN
      ENTRY:=CONCAT(ENTRY,'.text');
  END;

  PROCEDURE ENTER_FILE (F: INTEGER);

    PROCEDURE PAGE_NUMBER;
    BEGIN
      FIRSTPAGE[F]:=0; WRITE
('What will be the number of the next page? ("0" to continue in sequence) ');
      READLN (ENTRY);
      IF ENTRY<>NULL THEN FIRSTPAGE[F]:=ROUND(VALUE(ENTRY))
        ELSE FIRSTPAGE[F]:=0; GOTOXY(0,20);
    END;

  BEGIN  {ENTER-FILE}
    GOTOXY(10,23); WRITE('Press <RETURN> with no entry when done.');
    GOTOXY(0,20); WRITELN ('What file will be number ',F,'?');
```

Listing continued.

Jim Florini receives mail c/o the Biology Department, Syracuse University, Syracuse, NY 13210.

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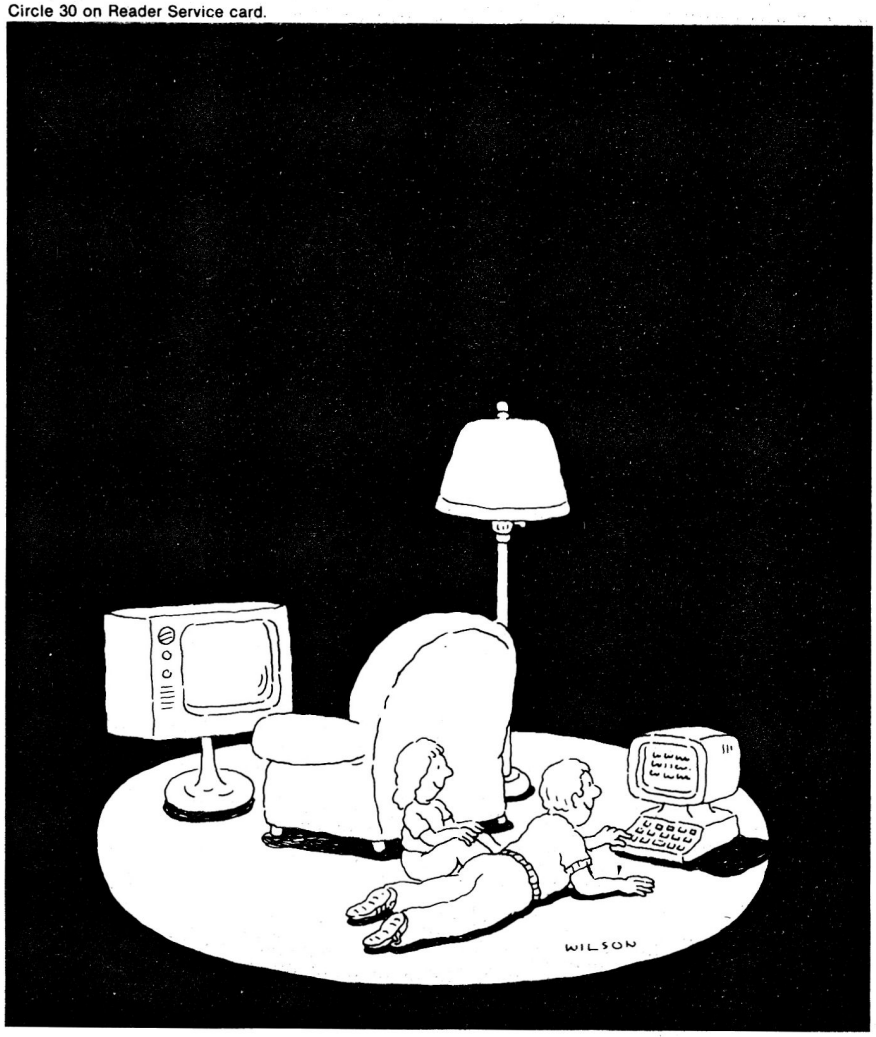

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Listing continued.

```
    IF FIRSTPAGE[F]<>-1 THEN WRITE
('(Starting a new page)                    ')
      ELSE WRITE ('(Enter "page" to
  have this file start a new page.)');
   GOTOXY(34,20); WRITE (PROMPTLINE);
   GOTOXY(35,20); READLN(ENTRY);
   FINISHED:=ENTRY=NULL; IF NOT
   FINISHED THEN
   BEGIN
     IF (ENTRY='PAGE') OR (ENTRY='page')
     THEN
      BEGIN
        PAGE_NUMBER; ENTER_FILE(F);
      END;
    END;
  END; {ENTER-FILE}

PROCEDURE CHECK_FILE(I: INTEGER);
VAR CH: CHAR;
    J: INTEGER;
    TESTFILE: TEXT;
    SEEKFILE: STRING[20];

PROCEDURE READ_DIR (VOLUME: INTEGER);
{This procedure was condensed from
Call-A.P.P.L.E. in Depth, Vol 2}
TYPE POINTER = ^DIRECTORY;
     VOLIDENT = STRING[7];
     FILENAME = STRING[15];
     DATERECORD = PACKED RECORD
                  MON:1..12;
                  DAY:1..31;
                  YEAR:0..99;
                END;
```

Listing continued.

month. A more useful version repeatedly requests file names until a null string (nothing but a carriage return) is entered; this forms an array of file names, and is all that is necessary to print a huge amount of material (depending on the capacity of your disk drives) without further attention. Over the years, bitter experience has taught me that several other features are quite desirable, and still others are rather nice to have. The procedures presented here are a group of conveniences I added over the last three years.

I wrote STANDARD_FORM with the goal of giving the user (me, that is) the widest possible range of choices while answering the smallest possible number of questions. This is done by first presenting a menu of "standard" formatting combinations. If one of them is suitable, only one choice need be made. If not, a bunch of individual choices can be made. Of course, nearly all of these can be specified with command lines in the textfiles, but I find it useful to have alternative ways of doing these things.

How It Works

For CHOOSE_FILES, only two big procedures are called; one enters the files, and the other checks that they are really the ones that are wanted. The first, GET_FILES, prints some simple instructions and then begins building a list of the files to be printed. As each file name is entered, the program checks to see if it is a request to

start a new page (.Page or PAGE); if so, the number to be given that new page is asked, and a file name again requested. Note that a new page can also be specified while entering the file names, or by including .Page accompanied by .Next Number n to specify the page number at the beginning of the text file; I've tried to make this system as versatile as possible by providing these kinds of alternatives.

When the file name is entered, the program adds .TEXT if it is not present, and then CHECK_FILE looks in every possible drive to find a file with that name; Pascal purists might not like this kind of thing, but I am more concerned with user convenience than program purity. If the file is not found (and an exit from CHECK_FILE executed from TRY_IT), the program gives the user a chance to look at the files actually on any disk in the system. As you might guess, I wrote this part for my own benefit; it seems that I am always forgetting the names I assigned to files I want to print. The READ_DIR procedure is a much-condensed version of a *Call-A.P.P.L.E.* program; it has the advantage of letting you see the entire directory (in two columns, if necessary) while entering the file name. When a correct file name is entered, then the complete file list reappears (SHOW_LIST), and more entries can be made using the prompts at the bottom of the screen.

When all the file names are entered, CORRECT_ENTRIES gives you a chance to correct any erroneous entries. In addition, a file may be added to the list or removed from it if you choose. As this is done using the same ENTER_FILE procedure employed in initial entry of the file names, all the same features are available at this stage too.

When you agree that the list of file names is correct, you are given a menu of four frequently used printing combinations (you can change these to fit your own preferences, of course). If you don't want any of them, N will let you make a series of individual choices. Programming this STANDARD_FORM procedure first taught me about the memory-gobbling properties of strings. There is an Apple Pascal

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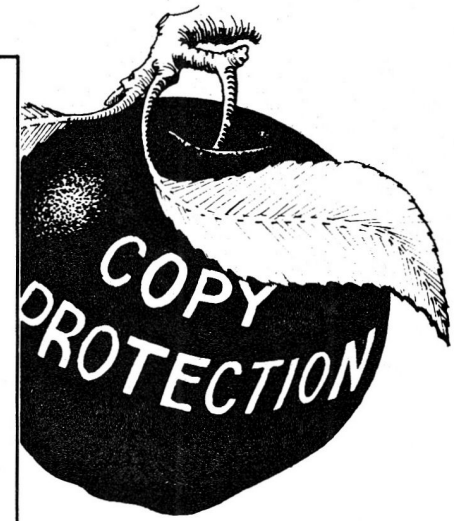

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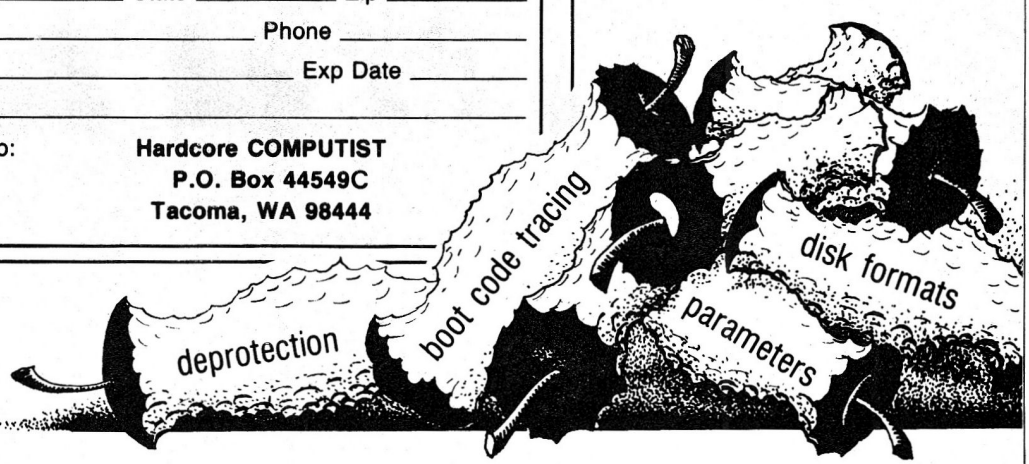


Circle 427 on Reader Service card.

Listing continued.

```
        FILEKIND = (VOL, BADFILE, CODE, TEXT, INFO, DATA, GRAF, FT, SECURE);
        DIRENTRY = RECORD
                     FIRSTBLOCK:INTEGER;
                     LASTBLOCK: INTEGER;
                     CASE DIRFILEKIND: FILEKIND OF
                        VOL, SECURE: (DISKNAME: VOLIDENT;
                                      ENDOFBLK: INTEGER;
                                      FILENUM: INTEGER;
                                      DUMMY:  INTEGER;
                                      LASTBOOT: DATERECORD);
                        BADFILE, CODE, TEXT, INFO, DATA, GRAF, FT:
                                     (DIRFILNAME: FILENAME;
                                      LASTBYTE: INTEGER;
                                      ACCESS: DATERECORD)
                     END;
        DIRECTORY = ARRAY[0..77] OF DIRENTRY;

    VAR NUM: CHAR;
        DIRPOINTER: POINTER;
        I, FILES: INTEGER;
        MONTH, MONTHLIST, VOLNAME: STRING;

      PROCEDURE SHOW_ONE(M: INTEGER);
      BEGIN
        WITH DIRPOINTER^[M],ACCESS DO
        BEGIN
          MONTH:=COPY(MONTHLIST,3*MON-2,3);
          WHILE LENGTH(DIRFILNAME)<15 DO DIRFILNAME:=CONCAT(DIRFILNAME,' ');
          WRITE(M:2,'. ',DIRFILNAME,LASTBLOCK-FIRSTBLOCK:4,
            DAY:5,'-',MONTH,'-',YEAR);
        END;
      END;

      PROCEDURE SHOW_DIRECTORY(N: INTEGER);
      BEGIN
        SHOW_ONE(N); WRITE ('     ');
        IF FILES >=N+15 THEN SHOW_ONE(N+15); WRITELN;
      END;

      BEGIN  {MAIN READ-DIR}
        (*$I-*) UNITCLEAR(VOLUME); IF IORESULT<>0 THEN
        BEGIN
          WRITELN ('VOLUME #',VOLUME,' IS NOT ATTACHED!'); EXIT (READ_DIR);
        END;
        MONTHLIST:='JanFebMarAprMayJunJulAugSepOctNovDec';
        CLEAR_SCREEN; WRITELN ('READING DIRECTORY FOR VOLUME #',VOLUME,':');
        NEW (DIRPOINTER);
        UNITREAD (VOLUME,DIRPOINTER^,SIZEOF(DIRECTORY),2);
        VOLNAME:=DIRPOINTER^[0].DISKNAME;
        WRITELN(VOLNAME:10,':');
        FILES:=DIRPOINTER^[0].FILENUM;
        IF FILES<16 THEN FOR I:= 1 TO FILES DO SHOW_DIRECTORY(I) ELSE
          FOR I:=1 TO 15 DO SHOW_DIRECTORY(I);
      END;  {READ-DIR}

      PROCEDURE GET_DIRECTORY;
      VAR VOL: INTEGER;
      BEGIN
        CASE CH OF
          '1': VOL:=4;
          '2': VOL:=5;
          '3': VOL:=11;
          '4': VOL:=12;
          '5': VOL:=9;
          '6','0': VOL:=10;  {I use "0" for my 128 K RAM card}
        END;
        READ_DIR(VOL); WRITELN ('Now enter the CORRECT file name.');
        GET_ENTRY(12,ENTRY);
      END;

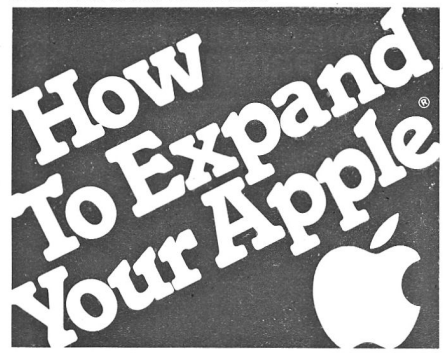
      PROCEDURE TRY_IT (VOLNUM: STRING);
      BEGIN
        (*$I-*) SEEKFILE:=CONCAT(VOLNUM,ENTRY); RESET (TESTFILE,SEEKFILE); (*$I+*)
        IF IORESULT=0 THEN
        BEGIN
          FILENAME[I]:=SEEKFILE; EXIT (CHECK_FILE);
        END;
      END; {TRY-IT}

      BEGIN {MAIN CHECK-FILE}  {I think this is the ultimate in "user-friendly"}
        {Remove vol prefix if the desired file not on the specified volume}
        TRY_IT(''); IF POS(':',ENTRY)<>0 THEN DELETE(ENTRY,1,POS(':',ENTRY));
        {Look in all other possible disk drives}
        TRY_IT('#5:'); TRY_IT('#4:'); TRY_IT('#11:'); TRY_IT('#12:');
        TRY_IT('#9:'); TRY_IT ('#10:');
        {If not found, complain and offer a chance to correct the name}
        CLEAR_SCREEN; GOTOXY(10,10);
        WRITELN (CHR(7),'No file entitled ',ENTRY,' was found.');
        WRITELN
        ('Enter a corrected name for the file, or the number (0 to 6)');
        WRITE('of the drive that might contain it.');
        GET_ENTRY(12,ENTRY); IF ENTRY<>NULL THEN
        BEGIN
          CH:=ENTRY[1]; IF CH IN ['0'..'6'] THEN GET_DIRECTORY;
          ADD_TEXT; CHECK_FILE(I); SHOW_LIST;
        END ELSE FINISHED:=TRUE;
    END;  {CHECK-FILE}

    PROCEDURE GET_FILES;
    VAR PRESS: CHAR;
    BEGIN
      TOTFILES:=0; WRITELN;
      WRITELN
      ('Now enter the names of the files containing the text to be printed');
      writeln
    ('by this program. You need not specify the volume name for the files.');
      writeln ('The "TEXT" suffix will be added, if you omit it.'); WRITELN;
```

Listing continued.

Circle 278 on Reader Service card.



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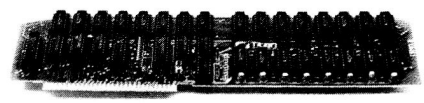

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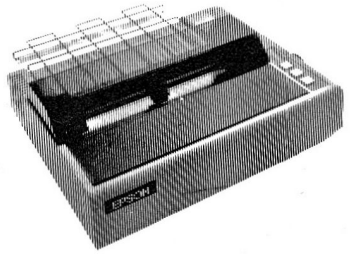

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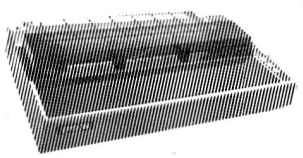

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Listing continued.

```
      WRITE('Press any key to continue.'); READ(KEYBOARD,PRESS);
      SHOW_HEADING;
      REPEAT
        CLEAR_BOTTOM; TOTFILES:=TOTFILES+1; IF TOTFILES=MAXFILES THEN
        BEGIN
          WRITELN ('This is the LAST file that can be written in this set.');
          WRITELN ('Press <SPACE> to continue'); READ (PRESS); CLEAR_BOTTOM;
        END;
        ENTER_FILE(TOTFILES); IF NOT FINISHED THEN
        BEGIN
          ADD_TEXT; CHECK_FILE(TOTFILES); SHOW_ONE(TOTFILES);
        END;
      UNTIL FINISHED OR (TOTFILES=MAXFILES);
      GOTOXY (0,TOTFILES+3); WRITE_LINE; IF FINISHED THEN TOTFILES:=TOTFILES-1;
    END;  {GET_FILES}

    PROCEDURE CORRECT_ENTRIES;
    VAR CHOICE: CHAR;
        I: INTEGER;

         PROCEDURE REMOVE_ONE;
         VAR I, R: INTEGER;
             S: STRING;
         BEGIN
           CLEAR_BOTTOM;
           WRITE ('Number of file to be removed? '); READLN (S);
           REPEAT
             R:=ROUND(VALUE(S)); IF (R<1) OR (R>TOTFILES) THEN
             BEGIN
               WRITE(R,' is outside the numerical range; enter corrected one: ');
               READLN(S);
             END;
           UNTIL (R>0) AND (R<=TOTFILES);
           CLEAR_BOTTOM; WRITE ('SURE you want to remove #',R,' - ',
             FILENAME[R],' ? ');
           CHOICE:=GET_CHAR(NULL,NULL,['Y','N']);
           IF CHOICE='Y' THEN
           BEGIN
             TOTFILES:=TOTFILES-1;
             FOR I:=R TO TOTFILES DO
             BEGIN
               FILENAME[I]:=FILENAME[I+1]; FIRSTPAGE[I]:=FIRSTPAGE[I+1];
             END;
           END;
           SHOW_LIST;
         END;  {REMOVE-ONE}

    BEGIN  {MAIN CORRECT-ENTRIES}
      REPEAT     {Don't quit until ALL are correct}
        REPEAT   {Extra lines in GET_CHAR mess up listing, so don't use it here}
          CLEAR_BOTTOM;
          WRITE ('Are all of these correct? '); READ (CHOICE); WRITELN;
          IF NOT (CHOICE IN ['Y','N','y','n']) THEN
            WRITELN (CHR(7),'ONLY "Y" OR "N" ANSWERS HERE, PLEASE!');
        UNTIL CHOICE IN ['Y','N','y','n'];
        IF CHOICE IN ['n','N'] THEN
        BEGIN
          WRITE ('Which one is wrong? ("R" to remove one.) '); READLN(ENTRY);
          CLEAR_BOTTOM; IF LENGTH(ENTRY)=1 THEN
          BEGIN
            CHOICE:=ENTRY[1]; IF CHOICE IN ['R','r'] THEN
            BEGIN
              REMOVE_ONE; CORRECT_ENTRIES; EXIT(CORRECT_ENTRIES);
            END;
          END;
          I:=ROUND(VALUE(ENTRY));
          IF I>TOTFILES THEN
          REPEAT
            IF I=TOTFILES+1 THEN
            BEGIN  {Allow addition of one file to list}
              GOTOXY(0,TOTFILES+4); WRITE (CHR(29));
              TOTFILES:=TOTFILES+1
            END ELSE
            BEGIN
              CLEAR_BOTTOM; WRITE (CHR(7));
              WRITELN (I,' is larger than the number of files listed.');
              WRITE ('Enter a corrected value: '); READLN (ENTRY);
              I:=ROUND(VALUE(ENTRY)); CLEAR_BOTTOM; FIRSTPAGE[I]:=-1;
            END;
          UNTIL (I>0) AND (I<=TOTFILES);
          ENTER_FILE(I); IF NOT FINISHED THEN
          BEGIN
            ADD_TEXT; CHECK_FILE(I);
            GOTOXY (0,I+3); WRITE (CHR(29)); SHOW_ONE(I);
          END;
        END;
      UNTIL CHOICE IN ['y','Y']; GOTOXY (0,TOTFILES+4); WRITE_LINE;
    END;  {CORRECT-ENTRIES}

    BEGIN  {MAIN CHOOSE-FILES}
      CLEAR_SCREEN; GET_FILES; CORRECT_ENTRIES;
    END;

    {*************************************************************************}
    {The second big part of this include-file takes care of making a series
     of choices concerning printout format, so they don't have to be specified
     in each textfile}

    PROCEDURE SET_FORMAT;
    VAR S: STRING;

      PROCEDURE PAGE_CHOICES;
      BEGIN
          PRINTNUM:=TRUE; CHOICE:=GET_CHAR
            ('Print "Page" in front of the page number? ',NULL,['Y','N']);
          IF CHOICE='Y' THEN PRINTPAGE:='Page' ELSE PRINTPAGE:=SPACE;
```

Listing continued.

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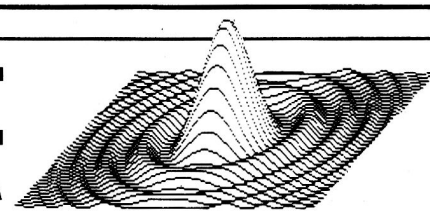

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Color fill portions of picture	X	—	—
Scroll pictures 4 ways	X	—	—
View picture before printing	X	—	X
Print any portion of picture	X	—	X
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Listing continued.

```
        CASE GET_CHAR
           ('Print page number at L)eft, M)iddle, or R)ight of page? ',NULL,
           ['L','M','R']) OF
          'L': BEGIN
                 PAGEPLACE:=5; HEADPLACE:=LENGTH(RUNHEAD)
               END;
          'M': BEGIN
                 HEADPLACE:=36+TRUNC (LENGTH(RUNHEAD)/2); PAGEPLACE:=38;
               END;
          'R': BEGIN HEADPLACE:=75; PAGEPLACE:=73;  END;
        END;  {CASE}
        WRITE ('What is the number of the first page? ');
        READLN (S); PAGE:=ROUND(VALUE(S));
      END;

    BEGIN   {MAIN SET_FORMAT}
      CLEAR_SCREEN;
      FORMATTING:=GET_CHAR('Format printout? ',NULL,['Y','N']='Y';
      PLUSMINUS:=GET_CHAR
      ('Print "+" signs as "plus or minus"? ',NULL,['Y','N']='Y';
      UNDERSPACE:=GET_CHAR('Underline SPACES when underlining?','',['Y','N']='Y';
      WRITE ('What margin (in inches) at the top and bottom? ');
         READLN (S);WRITELN; MARGINS:=ROUND(6*VALUE(S));
      CHOICE:=GET_CHAR ('How many spaces between lines? ',NULL,['1'..'9']);
         S:=SPACE;S[1]:=CHOICE;
         LINESPACE:=TRUNC (VALUE(S)); WRITELN;
      PAUSE:=GET_CHAR ('Pause at the end of each page',
        'to allow insertion of single sheets of paper? ',['Y','N']='Y';
      IF GET_CHAR ('Print page numbers? ',NULL,['Y','N']='Y'
        THEN PAGE_CHOICES ELSE PRINTNUM:= FALSE;
  END;        {SETFORMAT}

  PROCEDURE STANDARD_FORM;

    PROCEDURE CHOOSE_FORM;
    BEGIN
      CASE GET_CHAR(' Choose one of the above, or enter "N" if none of them. '
        NULL,['1'..'4','N']) OF
        '1': BEGIN MARGINS:=6;LINESPACE:=2;PAUSE:=TRUE; END;
        '2': BEGIN MARGINS:=6;LINESPACE:=2;PAUSE:=FALSE;END;
        '3': BEGIN MARGINS:=4;LINESPACE:=1;PAUSE:=FALSE;END;
        '4': BEGIN MARGINS:=6;LINESPACE:=1;PAUSE:=FALSE;END;
        'N': SET_FORMAT;
      END;  {CASE STATEMENT}
    END;        {CHOOSE-FORM}

  BEGIN        {MAIN STANDARD-FORM}
    CLEAR SCREEN;
```

Listing continued.

limit of 1200 bytes of object code in one procedure or function, but it is rare to encounter the Syntax Error #253—Procedure too long compiler error message. Even the long list of nested case statements in READ_COMMAND uses only 530 bytes; it has no strings, just a lot of chars and procedure calls. When first written, STANDARD_FORM had more writelns and didn't use the :n output formatting technique to avoid unnecessary spaces. It bombed with an Error #253. Even the shortened version presented here uses 883 bytes. No wonder the old-timers who started on 16K machines use such short prompts in their programs!

If you enter N, CHOOSE_FORM calls SET_FORMAT to set many of the parameters individually. To avoid unnecessary questions, you are asked about various aspects of page numbering only if you indicate that pages are to be numbered. The result of a function (GET_CHAR) can be used directly as the selector in a CASE statement (as in CHOOSE_FORM and PAGE_CHOICES) or as part of a Boolean expression (as in SET_FORMAT). Before I realized this, I wrote all of these things as two-step operations, using the CHOICE variable a lot. The current version is more elegant.

When all of these choices are made, the program returns to the main DIABLOPRT program and prints all the files you have specified, with all the formatting features you want. I should point out that the current value of MAXFILES is established on the basis of the 24-line Apple screen; lines 0–3 are used for the header above the file names, and 20–23 are used for the messages that illustrate numbers of words, lines, and pages printed. This leaves lines 4–19 for the list of files and the line beneath them; I can't recall any time that I have printed more than ten files, but if you should need a larger number, there is really nothing wrong with increasing the value of MAXFILES to whatever you want. The screen display will be messed up, but, after all, this is primarily a *printing* program.

To incorporate this extended utility into your DIABLOPRT program, first type it and save it as DIABLO2 on the

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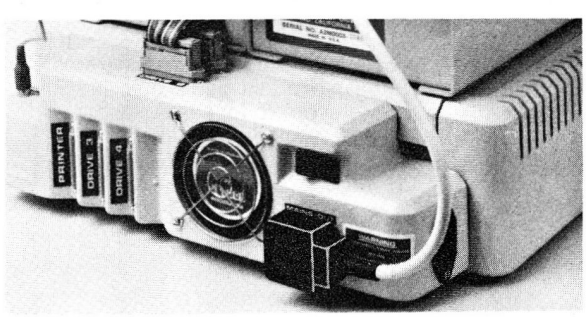

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disk in your drive 2; have the DIABLOPRT program on that same disk. Now remove the CHOOSE_ENTRIES and STANDARD_FORM procedures from your DIABLOPRT file, and put (*$I #5:DIABLO2*) in their place. Save the changed file to disk, and then use N from the filer to remove the workfile. Make sure that at least 28 contiguous blocks of free space are available on the disk in drive 2 so you'll have room for the codefile. Then return to the command mode, and enter C to compile. In response to the Compile what text? prompt, enter #5:DIABLOPRT, then enter $ when asked To what codefile?; this will give the resultant codefile with the same name on the same disk.

These entries are necessary to take advantage of the UCSD system's helpfulness in putting the cursor wherever errors are detected by the compiler. Using an include-file, if you compiled System.Wrk.Text in the usual way, any errors in the DIABLO2 file would lead to the cursor being placed at a completely meaningless spot in the workfile. Compiling as shown above gets a No workfile present prompt when you go to the Editor after a compiler error; just respond with #5:DIABLO2 when asked what file to get. That way, the cursor will go to the location at which the error was detected. Unfortunately, that doesn't necessarily mean the point at which it occurred, but at least you have a better chance to figure out what is wrong. Assuming that you have entered and successfully compiled the DIABLOPRT program last month, any errors that turn up this time must be located in the include-file.

This completes this extensive DIABLOPRT program. Using it for several years has been very satisfactory; it does everything I want it to do. It has certainly made my writing and reviewing chores a lot less onerous, because I find it much faster to type things on the computer than to write them by hand. Unfortunately, I haven't figured out a way to feed raw data into the program and have it automatically write papers and grant applications for me. If you have a program that solves this little problem, please let me know. ■

Listing continued.

```
    PLUSMINUS:=TRUE;FORMATTING:=TRUE;PRINTNUM:=TRUE;
    UNDERSPACE:=FALSE;
    PAGE:=1;PRINTPAGE:='Page';PAGEPLACE:=73;HEADPLACE:=75;
    WRITELN ('The following combinations are pre-arranged:');WRITELN;
    WRITE_LINE;
    WRITELN (' PARAMETER','CHOICE':32);
    WRITELN (
   ---------------  ------------------------------------------------------------');
    WRITELN ('#1':23,'#2':12,'#3':12,'#4':12);
    WRITELN;
    WRITELN (' Margin (t & b)     1.Ø inch     1.Ø inch     Ø.67 inch    1.Ø inch');
    WRITELN (' Spacing             double       double       single       single');
    WRITELN (' Pause at bottom','yes':8,'no':12,'no':12,'no':12);
    WRITE_LINE;
    WRITELN; IF RUNHEAD <> NULL THEN
    IF (RUNHEAD='F') OR (RUNHEAD='f') THEN WRITE ('Name of each file ') ELSE
      WRITELN ('"',RUNHEAD,'"'); WRITELN('printed at right of each page.');
    WRITELN (' Pages numbered at the right starting with page 2.');
    WRITELN (' All except superscripted "+" printed as "plus or minus"');
    CHOOSE_FORM;
  END;  {STANDARD-FORM}

  (****************** END OF DIABLO2 INCLUDE-FILE ********************************)
```


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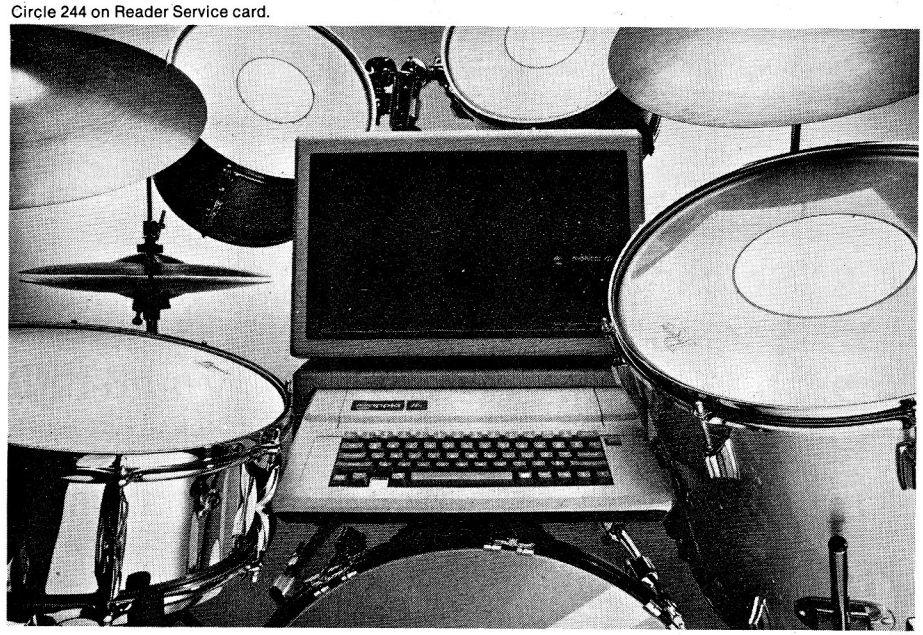

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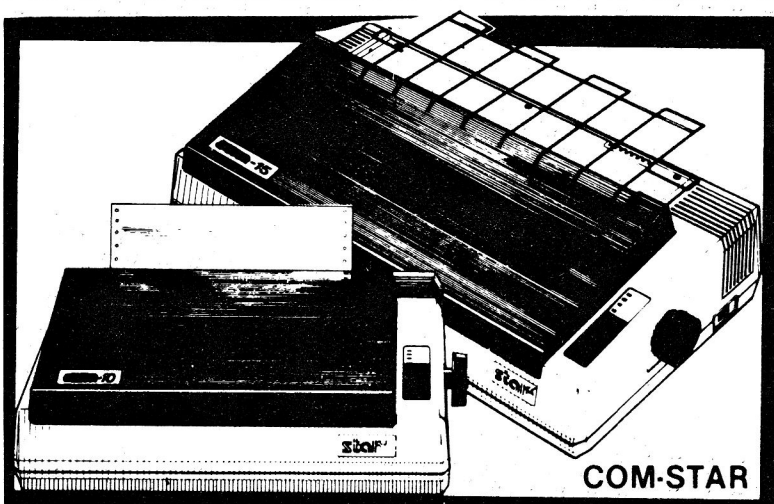

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The Compleat Text File Primer

Part 4—Text Files

Our series gets down to the heart of the matter.

by Lee Swoboda

In the previous three articles in this series, I have examined data as it appears on disk, in the computer's memory and passing between. I will now discuss one of the most useful forms for data—the text file. The two types of text files, sequential and random access, are different, but they share some similarities.

Files, Records and Fields

Data starts, of course, as individual characters: alphabetic, numeric or symbolic. Text processing treats numbers the same way it does alphabetic characters. For example, the number "1" is represented in a text file as the ASCII character 49 (see page 138 of *The Applesoft Manual*), not as the value 1.00000. Numbers occupy one byte of a text file per digit rather than the seven bytes they occupy in a variable table (see Part 2 of this series in the April *inCider*).

These characters cannot be left to go scampering around in memory unattended, so we collect them into groups of related characters called *fields* (see Figure 1). A field is a discrete data element—a name, for example.

We can also collect related data fields into related groups called *records*. A record is the unit of data that DOS processes in text files, although I will also discuss data management at the field level later in this article. A record might contain several data fields which represent first name, last name, and address.

We can now collect related records into groups called *files*. A file might contain the name/address records for all our friends and relatives. There is one higher unit—the data base—but that is a study in itself, so I'll limit this discussion to the file level and below.

An analogy will help illustrate the relationships between fields, records and files. Visualize the classic filing medium: the two-drawer filing cabinet. All the letters you receive might be stored in the top drawer. You now have a *file* of incoming correspondence. Each letter is a *record*. Each sentence is made up of individual *characters* forming a discrete unit analogous to a *field* (see Figure 2).

Now let's reverse the analogy. If our file is merely a collection of random letters in the file drawer, it is of limited use. When you want to find something, you will have to riffle through the drawer, examining each letter until you find the one you want. Obviously, you need to arrange the letters in some logical fashion which will ease your search. The most apparent groupings would be either by date or by originator. Let's select the latter. You would prepare one folder for each

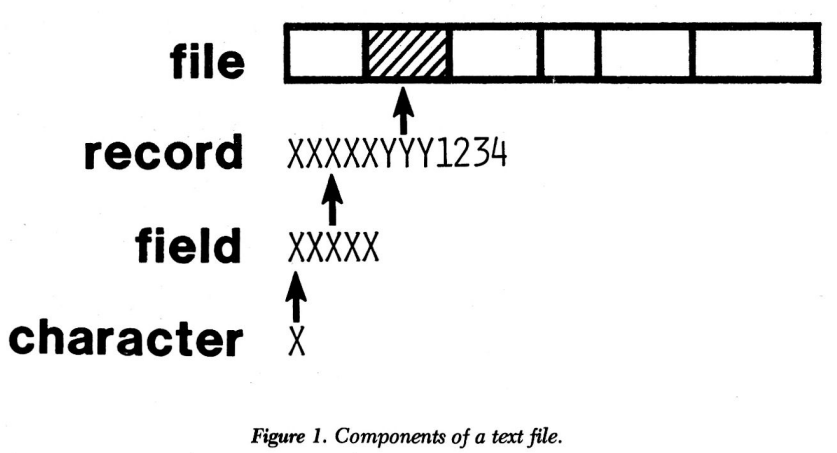

Figure 1. Components of a text file.

You can write to Lee Swoboda c/o Padapple Computer Consulting, 1451 NE Paulson Road, Poulsbo, WA 98370.

originator and file all letters from that person in the same folder.

To find a specific letter, you engage in a two-level search. First, you look for the correct file folder. Second, you search through all letters in that folder to find the one you want. If the letters are arranged in the folders by date, that would facilitate the search even more.

Now let's apply this to text files. If you store data in a text file randomly, you must search through all the data every time you want to find something. Arranging records in a file logically will speed searches and sorts, as I will discuss in the next two articles in this series.

File Structures

Visualize a glass tube and an egg carton. These represent sequential and random access text files, respectively.

Place a stopper in both ends of the glass tube and select an egg carton with a lid. The function of the stopper and lid is, of course, to make certain the contents don't fall out. Both types of text files also have "lids." When the file is "closed," it is protected from losing data or gaining undesirable data. Just as both our containers must be opened to gain access to the contents, sequential and random access files must be "opened" before the contents are available.

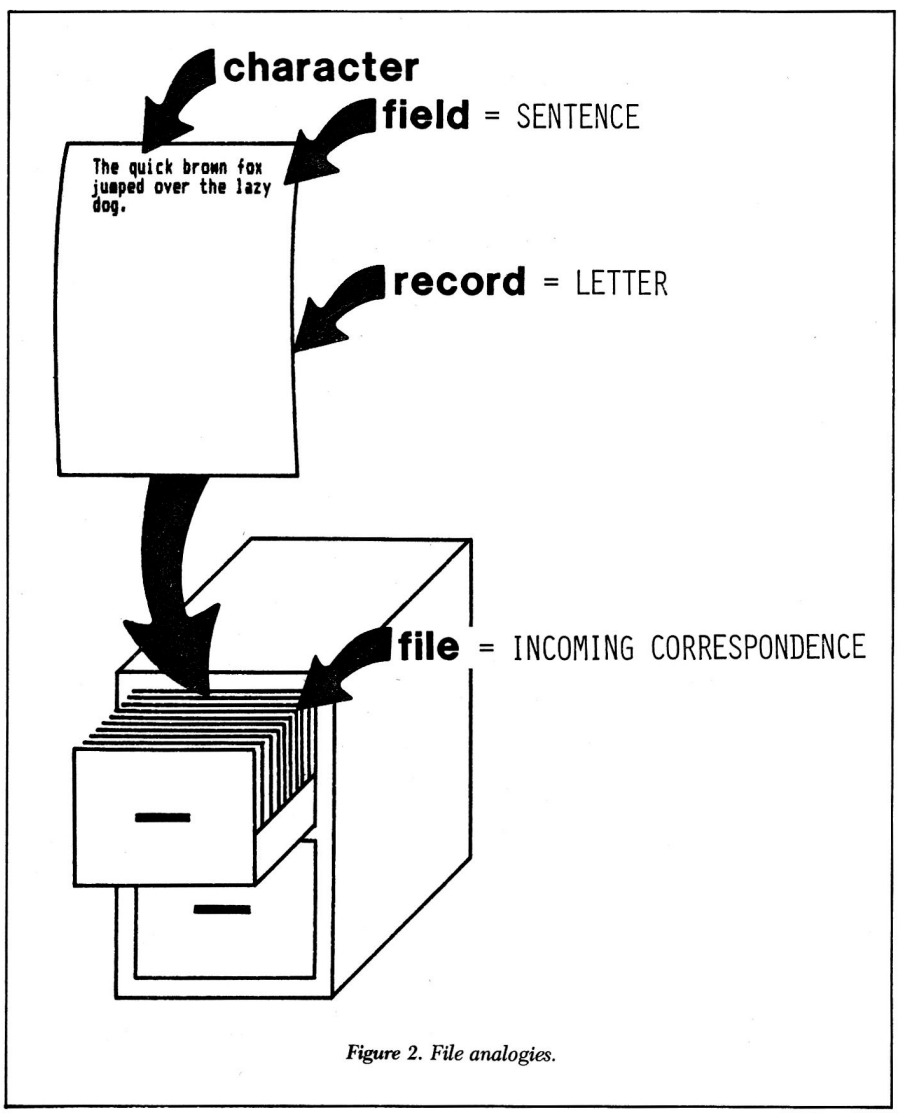

Figure 2. File analogies.

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Sequential Files

Now imagine three different color marbles, red, green and blue, a little smaller than the inside diameter of the glass tube. Hold the glass tube vertically. Take the top stopper out and drop the marbles into the tube. Replace the stopper. You have just created a sequential text file (in analogy, of course). Now remove the bottom cork and let the marbles drop out. You have just read a sequential text file.

Note some of the characteristics that our analogy shares with the real sequential text file:

- The height of the marbles in the tube depends on the number and size of the marbles. The length of a sequential text file depends on the number and length of the records it contains.
- The marbles came out in the same order in which they went in. This is the principle known as *FIFO:* First In, First Out. Sequential text files have a FIFO format. The first record you write to the file will be the first record you read.
- In order to get the blue marble, you must first take the red and green marbles out of the tube. A sequential text file is so named because the records are in sequence. In order to find the third record, you must first read the first and second records.

Sequential File Commands

Sequential text files have a greater variety of commands available than do random files. Let's examine each command, including examples.

OPEN

FORMAT: PRINT D$ "OPEN FILENAME"
Note: D$ is CTRL-D or CHR$(4), the ASCII value 4, which calls DOS. (See page 30 of *The DOS Manual.*)

A file can be opened to read data from the file or to write data to the file, but not both. Recall from Part 3 of this series that DOS reserves a file buffer for each file that is open. Therefore, unless we change MAXFILES, we can have three files (either sequential or random) open at any one time.

The OPEN command sets the file pointer to the start of the file. This means that, unless we use the POSITION command or "B" parameter, the file will be read from the beginning.

CLOSE

FORMAT: PRINT D$ "CLOSE FILENAME"

Here again, we have an option. If the command to close a file quotes the file name (PRINT D$ "CLOSE FILENAME"), DOS will close only that file, leaving all other open files open. If the command does not quote the file name (PRINT D$ "CLOSE"), DOS will close all open files. Generally, a program has only one file open at a time, so we can save some memory (and typing) by not using the file name.

WRITE

FORMAT: PRINT D$ "OPEN FILENAME"
PRINT D$ "WRITE FILENAME"

Once OPEN has reserved a file buffer for FILENAME, we can specify that we want to write data to the disk with WRITE. When a file is set to write, all PRINT commands will send data to the disk to be stored. Data being sent to the disk will not be echoed to the screen, as is the case with the printer.

Since OPEN sets the file pointer to the beginning of the file, the file will be written FIFO, overwriting any data that may have existed in a previous version of the file.

However, both the READ and WRITE routines in the DOS file handler (see Part 3 of this series) open the file if it is closed. You can switch back and forth between READ and WRITE without having to close and open the file. Since READ and WRITE do not create a file if one does not exist, you must use OPEN for new files.

READ

FORMAT: PRINT D$ "OPEN FILENAME"
PRINT D$ "READ FILENAME"

We can also designate a file to be read from a disk. As with WRITE, OPEN sets the file pointer to the start of

Circle 40 on Reader Service card.



the file, so the data is read FIFO. With a file set to be read, INPUT and GET both seek data from the disk rather than the keyboard.

Obviously, a file cannot be open to both read and write, although one file can be opened to write at the same time another is opened to read. This is the standard method for merging two files, such as daily time records into annual time records in a payroll program. The two files to be merged are opened to read, while a third merge file is opened to write. The two source files are searched for matching data, which is then written to the merge file. This function, I presume, is why the default value for MAXFILES is three.

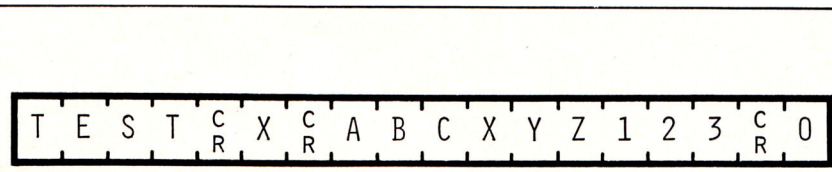

Figure 3. Sequential text file structure.

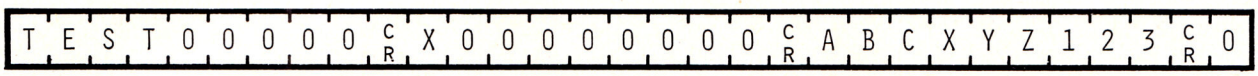

Figure 4. Random access text file structure.

APPEND

FORMAT: PRINT D$ "APPEND FILENAME"
PRINT D$ "WRITE FILENAME"

The APPEND command functions similarly to the OPEN command, except that the file pointer is set to the end of the file rather than the beginning. APPEND is useful for adding records to unordered sequential files, because it precludes having to read all the records in the file into memory just to add one.

Let's return for a moment to our analogous glass tube. Without APPEND, to add a new marble to the tube, we would have to remove the bottom stopper, take all the marbles from the tube and replace the bottom stopper (read the file). Then we would need to remove the top stopper and drop all the marbles, including the new one, back into the tube one by one, in order (write the file). APPEND allows us to add a new marble

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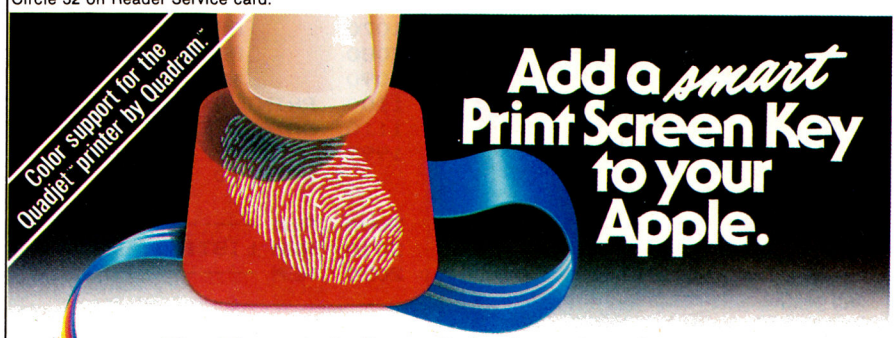

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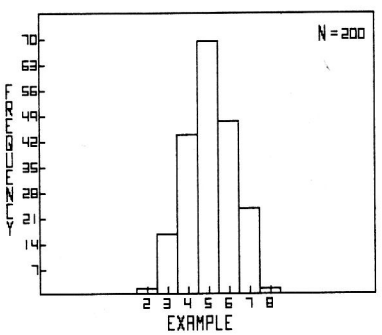

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Program listing. Illustration of text file commands.

```
10    HOME
20    PRINT "THE COMPLEAT TEXT FILE PRIMER"
30    PRINT "BY LEE SWOBODA"
40    PRINT "PART 4 -- TEXT FILES"
50    PRINT "======================================="
60    PRINT
70    PRINT "-------- SEQUENTIAL TEXT FILES --------"
80    PRINT
90    PRINT "1 -- CREATE" TAB(20)"4 -- APPEND"
100   PRINT "2 -- READ" TAB(20)"5 -- POSITION"
110   PRINT "3 -- MAP" TAB(20)"6 -- 'B' PARAMETER"
120   PRINT
130   PRINT "------- RANDOM ACCESS TEXT FILES ------"
140   PRINT
150   PRINT "7 -- CREATE" TAB(20)"9 -- MAP"
160   PRINT "8 -- READ" TAB(20)"10 - 'B' PARAMETER"
170   PRINT
180   PRINT "----------- DATA MANAGEMENT -----------"
190   PRINT
200   PRINT "11 - BLOCKED" TAB(20)"12 - DELIMITED"
210   VTAB 22
220   INPUT "WHICH SELECTION? - ";A$
230   A = VAL(A$)
240   IF A < 1 OR A > 13
        GOTO 210
250   HOME
260   ON A GOTO 1000, 2000, 3000, 4000, 5000, 6000, 7000,
      8000, 9000, 10000, 11000, 13000

1000  REM -----------
1010  REM LISTING 4-1
1020  REM -----------

1030  D$ = CHR$(4)
1040  PRINT D$"OPEN TEST.SEQ"
1050  PRINT D$"WRITE TEST.SEQ"
1060        FOR I = 1 TO 3
1070        READ A$(I)
1080        PRINT A$(I)
1090        NEXT I
1100  PRINT D$"CLOSE TEST.SEQ"
1110  DATA "TEST","X","ABCXYZ123"
1999  RESTORE
    : GOTO 10

2000  REM -----------
2010  REM LISTING 4-2
2020  REM -----------

2030  D$ = CHR$(4)
2040  PRINT D$"OPEN TEST.SEQ"
2050  PRINT D$"READ TEST.SEQ"
2060        FOR I = 1 TO 3
2070        INPUT A$(I)
2080        PRINT "*"A$(I)"*"
2090        NEXT I
2100  PRINT D$"CLOSE TEST.SEQ"
2999  VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

3000  REM -----------
3010  REM LISTING 4-3
3020  REM -----------

3030  D$ = CHR$(4)
3040  PRINT D$"OPEN TEST.SEQ"
3050  PRINT D$"READ TEST.SEQ"
3060  PRINT TAB(15)"TEST.SEQ"
3070  PRINT "======================================="
    : PRINT
3080  PRINT "------------ FILE CONTENTS ------------ "
```

Listing continued.

Listing continued.

```
3090        FOR I = 1 TO 17
3100        GET A$
3110        PRINT CHR$(1);
3120        IF A$ = CHR$(13)
              THEN INVERSE
          : PRINT "^";
          : NORMAL
          : GOTO 3140
3130        PRINT A$;
3140        NEXT I
3150  PRINT "O";
3160  PRINT
    : PRINT
    : INVERSE
    : PRINT "^";
    : NORMAL
    : PRINT " = CARRIAGE RETURN"
3170  PRINT
    : PRINT D$"CLOSE TEST.SEQ"
3180  PRINT
    : PRINT
3190  PRINT "---------- DISK SECTOR MAP ------------ "
3200  PRINT "00- D4 C5 D3 D4 8D D8 8D C1  TEST.X.A"
3210  PRINT "08- C2 C3 D8 D9 DA B1 B2 B3  BCXYZ123"
3220  PRINT "10- 8D 00 00 00 00 00 00 00  ........"
3999  VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

4000  REM ------------
4010  REM LISTING 4-4
4020  REM ------------

4030  D$ = CHR$(4)
4040  PRINT D$"APPEND TEST.SEQ"
4050  PRINT D$"WRITE TEST.SEQ"
4060  PRINT "XXX"
4070  PRINT D$"CLOSE TEST.SEQ"
4080  PRINT D$"OPEN TEST.SEQ"
4090  PRINT D$"READ TEST.SEQ"
4100        FOR I = 1 TO 4
4110        INPUT A$(I)
4120        PRINT A$(I)
4130        NEXT I
4140  PRINT D$"CLOSE TEST.SEQ"
4999        FOR I = 1 TO 2000
          : NEXT
    : PRINT D$"DELETE TEST.SEQ"
    : GOTO 1000

5000  REM ------------
5010  REM LISTING 4-5
5020  REM ------------

5030  D$ = CHR$(4)
5040  PRINT D$"OPEN TEST.SEQ"
5050  PRINT D$"POSITION TEST.SEQ, R0"
5060  PRINT D$"READ TEST.SEQ"
5070  INPUT A$
5080  PRINT A$
5090  PRINT D$"POSITION TEST.SEQ, R0"
5100  PRINT D$"READ TEST.SEQ"
5110  INPUT A$
5120  PRINT A$
5130  PRINT D$"CLOSE TEST.SEQ"
```

Listing continued.

by merely removing the top stopper and dropping the new marble into the tube.

POSITION

FORMAT: PRINT D$ "OPEN FILENAME"
PRINT D$ "POSITION FILENAME, R3"
PRINT D$ "READ FILENAME"
or PRINT D$ "OPEN FILENAME"
PRINT D$ "POSITION FILENAME, R3"
PRINT D$ "WRITE FILENAME"

POSITION moves the file marker upward through the file, beginning at the start of the file, where OPEN places it. POSITION is essentially a carriage return counter. It moves the file marker N+1 carriage returns from the current position of the marker. In the format examples above, the marker is at the beginning of the first record after the OPEN command. The

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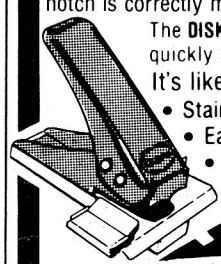

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Listing continued.

```
5999  VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

6000  REM ------------
6010  REM LISTING 4-6
6020  REM ------------

6030  D$ = CHR$(4)
6040  PRINT D$"OPEN TEST.SEQ"
6050  PRINT D$"READ TEST.SEQ, B12"
6060  INPUT A$
6070  PRINT CHR$(1)A$
6080  PRINT D$"CLOSE TEST.SEQ"
6999  VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

7000  REM ------------
7010  REM LISTING 4-7
7020  REM ------------

7030  D$ = CHR$(4)
7040  PRINT D$"OPEN TEST.RAN, L9"
7050        FOR I = 1 TO 3
7060        PRINT D$"WRITE TEST.RAN, R"I
7070        READ A$(I)
7080        PRINT A$(I)
7090        NEXT I
7100  PRINT D$"CLOSE TEST.RAN"
7110  DATA "TEST","X","ABCXYZ123"
7999  RESTORE
    : GOTO 10

8000  REM ------------
8010  REM  LISTING 4-8
8020  REM ------------

8030  D$ = CHR$(4)
8040  PRINT D$"OPEN TEST.RAN, L9"
8050        FOR I = 1 TO 3
8060        PRINT D$"READ TEST.RAN, R"I
8070        INPUT A$(I)
8080        PRINT "*"A$(I)"*"
8090        NEXT I
8100  PRINT D$"CLOSE TEST.RAN"
8999  VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

9000  REM ------------
9010  REM LISTING 4-9
9020  REM ------------

9030  D$ = CHR$(4)
9040  PRINT D$"OPEN TEST.RAN, L9"
9050  PRINT TAB(15)"TEST.RAN"
9060  PRINT "========================================"
    : PRINT
9070  PRINT "------------ FILE CONTENTS ------------ "
9080        FOR I = 1 TO 3
9090        PRINT D$
9100        VTAB 6
          : HTAB(9 *(I - 1) + 1)
9110        PRINT D$"READ TEST.RAN, R"I
```

Listing continued.

"The advancement is from the current file marker position, not from the beginning of the file."

"R3" parameter (for Relative field position 3) moves the marker three fields, which places it at the beginning of the fourth record. An INPUT command after the READ command would then obtain the fourth record from the file.

Note that the "R" parameter in sequential files relates to a *relative* position in the file, not an absolute (unlike the "R" parameter in random files). The advancement is from the current file marker position, not from the beginning of the file, except the first time the POSITION command is used after the file is opened.

POSITION must be succeeded by READ or WRITE, since it only repositions the file marker.

"R" Parameter

See "Position," above.

"B" Parameter

FORMAT: PRINT D$ "OPEN FILENAME"
PRINT D$ "READ FILENAME, B13"
or PRINT D$ "OPEN FILENAME"
PRINT D$ "WRITE FILENAME, B13"

The "B" parameter is similar in function to the POSITION command, in that it also moves the file marker. There are two differences, however.

1) The "B" stands for "byte," so the "B" command counts bytes, not carriage returns.

2) The measurement is absolute, not relative. In the above format example, the file marker is placed N + 1 or 14 bytes from the beginning of the file.

When the file is set to be read, INPUT will return all data between the file marker and the next carriage return. GET will return the next character. See "Cautions" below for uses of the "B" parameter with WRITE.

EXEC

FORMAT: PRINT D$ "EXEC FILENAME"

EXEC is a sleeper command. It pos-

sesses far more power and finesse than the average program demonstrates. It allows the programmer to enter direct commands and program code or subroutines under computer control just as if they were being entered from the keyboard. What this means is that we can create a text file that *looks* like a Basic program, and, by EXECing it, add it to a running program.

Illustrating Sequential File Commands

The listing (subdivided into Listings 1–12b) illustrates the use of the various text file commands. Enter the listings and run the program. The menu in lines 10–260 will allow you to select the command you desire. The sub-listings are "typical" and can be modified easily for use in your own programs.

Listings 1 through 6 illustrate the commands we have discussed. Listing 1 creates a sequential text file, TEST.SEQ, with three records: TEST, X and ABCXYZ123. Note that the OPEN command is mandatory here, since the file does not exist the first time you run the program.

"It possesses far more power and finesse than the average program demonstrates."

Listing 2 reads the file TEST.SEQ in the usual manner, with the DOS command INPUT (as opposed to the Applesoft command INPUT). If the sample strings in the text file had contained any "illegal" characters (commas or colons), we would have had to use the DOS command GET to retrieve the data (see pages 53–54 of *The DOS Manual*).

Listing 3 maps the text file, showing the ASCII value of each character in the file. This produces a pattern like Figure 3. This figure also shows an actual disk map of the text file to illustrate how a sequential text file looks on disk.

All the values are in hexadecimal, of course, because that is the way they are stored on the disk. The left-most column is the address of the byte within the sector (only the pertinent part of the sector is shown). The right-most column shows the ASCII equivalents of the values in each of the other columns. The middle eight columns represent the hexadecimal value of each character. In all cases, the Most Significant Bit (MSB) is high. The

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value 8D is a carriage return. The other values are the high-range ASCII values (128 plus ASCII) of the letters and numbers in the file.

Listing 4 shows how APPEND is used. Remember, however, that APPEND adds the newest record to the end of the file, so if your data is organized within the file (sorted alphabetically, for example), APPEND will destroy the order.

Listing 5 shows the use of the POSITION command. Note that the parameter R0 advances the file pointer one record. The first call (line 5050) begins with the file pointer at the head of the file, where OPEN puts it. The second call (line 5090) moves the file pointer one record, which is the second record. If we had opened the file and issued an R2 parameter, we would have found ourselves in the third record (ABCXYZ123), so the function of POSITION when it occurs immediately after OPEN is similar to the R parameter in random files.

> "Now take your same three marbles and drop them in the cups of the egg carton."

Listing 6 shows the function of the "B" parameter. Note that the "B" parameter measures its position from the beginning of the text file.

Both POSITION and the "B" parameter can be used with WRITE as well as READ.

Random Access Files

Now take your same three marbles and drop them in the cups of the egg carton (open the lid first). You have just created a random access text file. Pick up the blue marble. You have just read a random file. Note the similarities between our analogy and the random file:

Listing continued.

```
9120        GET A$
9130        PRINT CHR$(1);
9140        J = J + 1
9150        IF A$ = CHR$(13)
              THEN INVERSE
          : PRINT "^";
          : NORMAL
              : FOR K = 1 TO 9 - J
              : PRINT "O";
              : NEXT K
          : J = 0
          : GOTO 9180
9160        PRINT A$;
9170        GOTO 9120
9180        NEXT I
9190  PRINT
    : PRINT
    : INVERSE
    : PRINT "^";
    : NORMAL
    : PRINT " = CARRIAGE RETURN"
9200  PRINT
    : PRINT D$"CLOSE TEST.RAN"
9210  PRINT
    : PRINT
9220  PRINT "---------- DISK SECTOR MAP ------------ "
9230  PRINT "00- 00 00 00 00 00 00 00 00  ........"
9240  PRINT "08- 00 D4 C5 D3 D4 8D 00 00  .TEST..."
9250  PRINT "10- 00 00 D8 8D 00 00 00 00  ..X....."
9260  PRINT "18- 00 00 00 C1 C2 C3 D8 D9  ...ABCXY"
9270  PRINT "20- DA B1 B2 B3 8D 00 00 00  Z123...."
9999  VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

10000 REM ------------
10010 REM LISTING 4-10
10020 REM ------------

10030 D$ = CHR$(4)
10040 PRINT D$"OPEN TEST.RAN, L9"
10050 PRINT D$"READ TEST.RAN, R3, B5"
10060 INPUT A$
10070 PRINT A$
10080 PRINT D$"CLOSE TEST.RAN"
10999 VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

11000 REM -------------
11010 REM LISTING 4-11A
11020 REM -------------

11030 BLANK$ = "
    : REM 30 SPACES
11040 N1$ = "APPLE"
11050 N2$ = "COMPUTER"
11060 AD$ = "SILICON VALLEY"
11070 A$(1) = LEFT$(N2$ + BLANK$, 20) + LEFT$(N1$ +
      BLANK$, 20) + LEFT$(AD$ + BLANK$, 30)
11080 PRINT A$(1)

12000 REM -------------
12010 REM LISTING 4-11B
12020 REM -------------

12030 PRINT
12040 N2$ = LEFT$(A$(1), 20)
12050 N1$ = MID$(A$(1), 21, 20)
12060 AD$ = RIGHT$(A$(1), 30)
12070 IF RIGHT$(N1$, 1) = " "
        THEN N1$ = LEFT$(N1$, LEN(N1$) - 1)
    : GOTO 12070
```

Listing continued.

Listing continued.

```
12080 IF RIGHT$(N2$, 1) = " "
        THEN N2$ = LEFT$(N2$, LEN(N2$) - 1)
    : GOTO 12080
12090 IF RIGHT$(AD$, 1) = " "
        THEN AD$ = LEFT$(AD$, LEN(AD$) - 1)
    : GOTO 12090
12100 PRINT N1$
    : PRINT N2$
    : PRINT AD$
12999 VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10

13000 REM -------------
13010 REM LISTING 4-12A
13020 REM -------------

13030 N1$ = "APPLE"
13040 N2$ = "COMPUTER"
13050 AD$ = "SILICON VALLEY"
13060 A$(1) = N2$ + "#" + N1$ + "#" + AD$
13070 PRINT A$(1)

14000 REM -------------
14010 REM LISTING 4-12B
14020 REM -------------

14030 PRINT
14040 N1$ = ""
    : N2$ = ""
    : AD$ = ""
14050 L = LEN(A$(1))
14060       FOR I = 1 TO L
14070       A$ = MID$(A$(1), I, 1)
14080       IF A$ = "#"
              GOTO 14110
14090       N2$ = N2$ + A$
14100       NEXT I
14110       FOR J = I + 1 TO L
14120       A$ = MID$(A$(1), J, 1)
14130       IF A$ = "#"
              GOTO 14160
14140       N1$ = N1$ + A$
14150       NEXT J
14160 AD$ = RIGHT$(A$(1), L - J)
14170 PRINT N1$
    : PRINT N2$
    : PRINT AD$
14999 VTAB 23
    : PRINT "PRESS ANY KEY ";
    : CALL - 756
    : GOTO 10
```

Listing continued.

- The size of egg carton we need depends only on the number of marbles we want to store, not their size. A large marble or small marble (or no marble for that matter) take the same size cup. In a random file, all the records occupy the same disk space, even if the record contains no data.
- We can add or remove marbles in any order. We only need to know where the marble is stored. A random access file is so named because we can change one record without having to read or otherwise disturb other records.

Random File Commands

Random access text files share some commands with sequential files; the differences are subtle.

OPEN

FORMAT: PRINT D$ "OPEN FILENAME, L40"

The OPEN command is similar to the command for sequential text files. However, you must specify the record length when reading random files (see "L" parameter, below). OPEN is mandatory for all random access text files.

CLOSE

FORMAT: PRINT D$ "CLOSE FILENAME"

The CLOSE command is identical to the command for sequential text files. The file name is again optional if only one file is open or you want to close all open files.

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READ

FORMAT: PRINT D$ "OPEN FILENAME, L300"
PRINT D$ "READ FILENAME, R31"

The function of the READ command is similar to the command in sequential text files. The difference between the two READ commands is that, for sequential files, READ places the file pointer at the beginning of the file. In random files, READ places the file pointer at the beginning of the Rth record (the beginning of record 31 in the example above).

WRITE

FORMAT: PRINT D$ "OPEN FILENAME, L20"
PRINT D$ "WRITE FILENAME, R3"

The function of the WRITE command is similar to the command in sequential text files. However, you must specify the record number when writing to a random file (record 3 in our example above).

"L" Parameter

The "L" parameter is a necessary evil for random files. The "L" specifies record length. Since all records in a random file are the same length, the computer uses the "L" parameter to locate records on the disk. In effect, if you ask the computer to read the third record, DOS will count 2*L bytes, knowing that it is now at the beginning of the third record.

The "L" parameter must be in the range 1–32767. This means that we can build records far longer than those in the sequential files, which are limited to 255 characters.

The "L" parameter corresponds to the size of the cup in our analogous egg carton. The cup must be large enough to hold the largest marble; smaller marbles roll around with room to spare.

"R" Parameter

The "R" parameter in random files is not at all like the parameter in sequential files. In random files, the R stands for Record number, not Relative field. The "R" parameter is always measured from the beginning of the file, so it is an absolute position, not a relative.

The "R" parameter is what allowed us to select a marble from any cup in our egg carton without disturbing other marbles. Think of the "R" parameter as the address of each record in a random access file.

"B" Parameter

FORMAT: PRINT D$ "OPEN FILENAME, L9"
PRINT D$ "READ FILENAME, R3, B0"
or PRINT D$ "OPEN FILENAME, L9"
PRINT D$ "WRITE FILENAME, R3, B0"

The "B" parameter in random files is also not quite like the parameter in sequential files. It does move the file pointer B bytes ahead, as it does in sequential files, but since the "B" parameter must be used with the "R" parameter, the position that DOS uses for reference is the beginning of the Rth record. Thus in random files, B is



	SEQUENTIAL	RANDOM ACCESS
Access Method	FIFO	Any record
Size of Records	Variable	Fixed
Number of Records	Variable	Variable
Maximum Size of a Record	255	32767
Parameters to Open	None	L (=Length of Record)
End of Record Marker	CR	CR (ASCII = 13)
End of File Marker	00	00 (ASCII = 0)
Commands OPEN	Yes	Yes *
CLOSE	Yes	Yes
READ	Yes	Yes **
WRITE	Yes	Yes **
APPEND	Yes	No
POSITION	Yes	No
EXEC	Yes	No
"B" Parameter	Yes	Yes
"R" Parameter	See Text	Read
"L" Parameter	No	Read

* Requires "L" parameter

** Requires "R" parameter

Table. Summary of text file commands and characteristics.

the absolute position of a character in a specific record (the first byte of the third record in our example above).

Cautions

Using some of the fancier features of text files requires some special care.

When using the "B" parameter in either sequential or random files and writing to a file, be careful that you control the length of the data you are writing. DOS does not adjust the record length, so if the new data is shorter than the old, some extraneous data from the old record could be left. Likewise, if the new data is longer than the record length, the carriage return that marks the end of the record could be overwritten. DOS will lose its bearings when trying to read the file, with disastrous consequences. This is particularly true in random files where the carriage return marks the end of the valid data and the beginning of the zero fillers.

One of the major problems with random files is that, if you lose track of the value of the "L" parameter, there is no way to find its value short of a disk mapping utility. DOS will interpret the zero fillers in the first record as an end of file marker and issue an END OF DATA error on the first record. A good practice is to add the record length as part of the file name, e.g.: FILENAME (L=31).

Apple Computer apparently never anticipated that sequential text files would contain more than 32767 records. Above that number, the APPEND command does not correctly add new records. For a correction to this bug, see "Squashing a Nasty DOS Bug," in *All About DOS* by A.P.P.L.E.

Illustrating Random File Commands

Listings 7–10 illustrate random access file commands. Listings 7 and 8 create and read a sample random file, TEST.RAN, similar to the file TEST.SEQ. The "L" parameter (lines 7040 and 8040) is specified as 9 to correspond to the longest string that will be stored (i.e.: ABCXYZ123). In contrast to the sequential file, which required only one READ or WRITE command, the random file must call a

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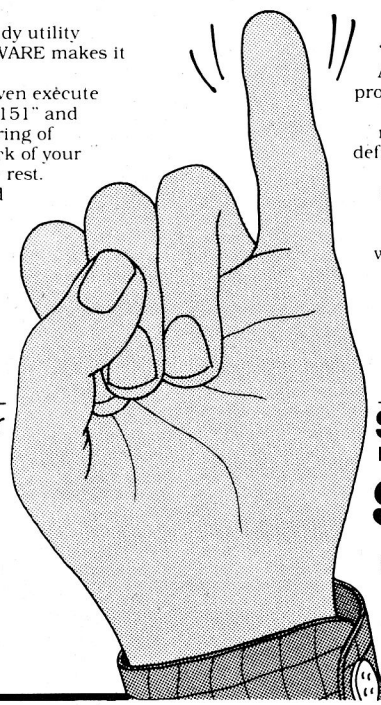

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Figure 5. Pattern of a blocked record.

READ or WRITE for each record (lines 7060 and 8060).

Listing 9 is a map of the text file. Since DOS cannot get a 00 without issuing an OUT OF DATA error, I have "fudged" zeros. The resulting map looks like Figure 4. This figure also shows a map of the way the file actually appears on disk.

As with the sequential file disk map above, all numbers are in hexadecimal and the MSB is high. Note two major differences between the two maps, however. The random file map contains all 00 for the first record. This is because random files always start counting at 0. Since we did not declare a 0th element, the string is null. Note also that the other records are padded with 00 to fill them out to nine characters. The extra zeros follow the carriage return, so when DOS reads the file, it does not detect the zeros, but they do occupy space on the disk. This is also why you cannot read a random file without knowing the length. DOS encounters the first 0 following the first record and interprets it as an end of file marker.

Listing 10 demonstrates the use of the "B" parameter with random files. Note that the "B" refers to a byte position within the called record, not an absolute position in the file, as was the case with the "B" parameter in sequential files. The table summarizes the text file commands and characteristics.

Organization of Data

Organization of data is vital to the success of your program. In our file cabinet analogy, if we filed each letter in a separate folder, we would soon have an incoming correspondence file little more useful than stuffing our letters in a desk drawer. Similarly, if we saved our names, addresses, telephone numbers, and whatever in our hypothetical program as separate records, we would soon have so many records to keep in order that we would find it difficult to manage the data. Additional array variables would also quickly increase program overhead to the point that we would tax available memory. Generally, we combine the information we want to store into one record, making it easier to handle and generally requiring less

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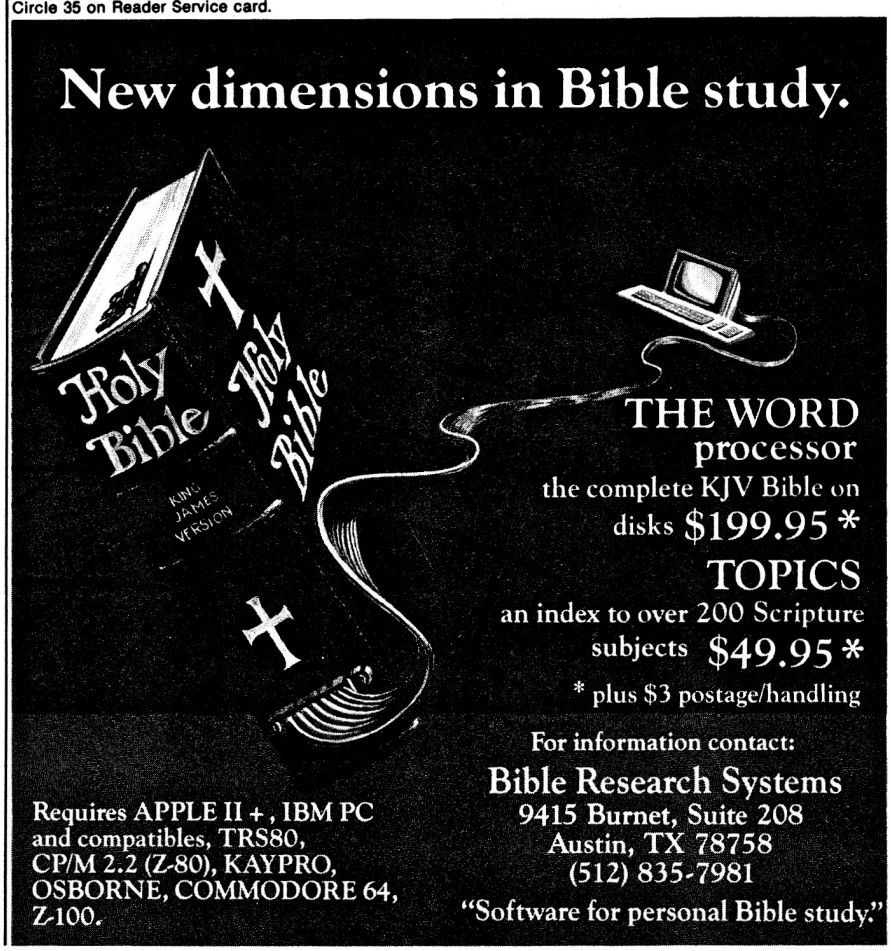



Figure 6. Pattern of a delimited record.

overhead. The two ways to format several fields into one record are blocking and delimiting.

Blocking is nothing more complex than adding spaces (or other characters) to string values so that they become consistent in length and so that data fields lie at a consistent location in the string. Figure 5 illustrates a blocked record.

We may also choose to use a special character (delimiter) to mark the data fields in a record. The delimiter must, of course, be a unique character, one that will not appear in any strings. Control characters (ASCII 1–31) are good candidates, but don't use CTRL-M because it will confuse DOS into thinking the end of the field is really the end of a record. Avoid commas and colons, since INPUT will truncate all characters after the comma/colon, when it reads a file from the disk. Figure 6 illustrates a delimited record.

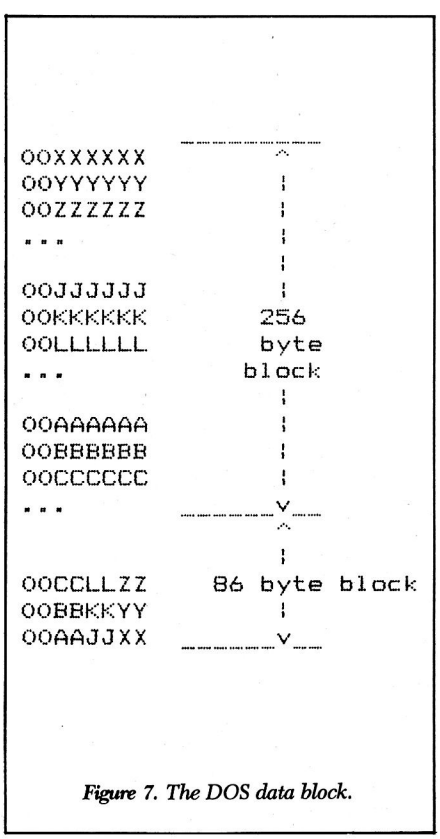

Figure 7. The DOS data block.

Listings 11a and 11b provide algorithms for concatenating and dividing a blocked record. Listings 12a and 12b provide algorithms for concatenating and dividing a delimited record.

The blocked record lends itself well to random access files since the record length is consistent. The consistency of the location of data fields within the record makes use of the "B" parameter easy. Blocked records also have the advantage of being simple to divide into data elements, although this is less simple if your application requires removing the trailing blanks (lines 12070–12090).

The delimited record lends itself to sequential files since no extra disk or memory storage is required for unneeded blanks. However, the process of dividing the record into data fields creates a great deal of "garbage."

The process you choose will depend on your application, but a little thought at this point of program design will save you a lot of headaches later.

Further Reading

Chapters 6 and 8 of *The DOS Manual* discuss sequential and random access files respectively.

Now we can create and read two different types of text files. That ability is necessary before we can proceed to the next step, but hardly useful in itself. Next month, we will examine ways of sorting all that data into some logical order. Text files are probably the most useful feature of the Apple, so I hope you aren't finding this whole subject sordid. ■

Addendum to Part 1

Part 1 of this series generated a lot of interest. I'd like to clarify some points raised by readers of the March *in-Cider*.

1. Yes, Figure 3 was labelled incorrectly. The last track is the 35th track, but since tracks are numbered beginning with zero, it should have read track 34. The same can be said for the reference to track 35 in column 3, p. 104.
2. Also, the 126K of disk storage cited on page 106, column 2, line 28 is calculated by 16 times *31* times 256. There are indeed 35 tracks or 143,360 (16 times 35 times 256) bytes of potential data storage, but DOS and the catalog remove four tracks from user access, leaving 31 tracks or 126K.
3. I have been asked why the 6 by 2 prenibblizing used by Apple DOS 3.3 for storing text results in a 342 byte data block rather than a 512 byte block. If we extrapolate the logic on page 106 of the March 1984 issue of *in-Cider*, it would seem that if DOS took each byte of data and stored six bits in one place and two bits in another, it would indeed take 512 bytes (256 times 2) to store a block of data.

The 342 byte block used by DOS is divided into two sections, one 256 bytes long and the other 86 bytes long. Each storage byte in the first block contains the major six bits from one data byte. Each storage byte in the second block contains the minor two bits, but stored in groups of three pairs. So DOS fills each of the 342 bytes with six bits each. The size of the 86 byte block is determined by common arithmetic: It takes 86 bytes to store 256 pairs of bits at three pairs per byte. The first 256 storage bytes contain bits from the same data byte; the second 86 storage bytes contain six bits from three different data bytes each. The data block looks like Figure 7.

I'm sorry if my original (incomplete) explanation confused you, but I was trying to simplify things.

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Bent on Business

by Gregory R. Glau

Breakin' It Down

One of the most difficult aspects of any selling situation is exactly *how* you explain your price to your prospect. There must be just the right blend of benefits that s/he can expect to receive in relation to the cost of what you're selling.

For anyone who handles big-ticket items, this can be an acute problem because the dollar amounts are so high. When you start throwing huge figures at your prospects, the first thing they do is to focus on the total price, often to the exclusion of all the benefits you've been talking about. It's only natural to do this; the last time you looked at a new car, what was the first figure you read on its price sticker? Right—*the total.*

Once you got over the initial shock of the listed price, you probably at least scanned the rest of the sticker, which tells not only the base or starting price, but also what all the extras cost. You can see exactly what you'd pay (if you bought this car) for air conditioning, cruise control, power windows, and so on.

You still might not be convinced—the total may still seem too high—but at least you might understand where the price came from. You may even start to think that, well, once you add up all the extras (that you'd really want, if it came down to it), the total price isn't really out of line.

Breaking Things Down

One thing that can help your sales of expensive items is to use a spreadsheet program on your Apple to create a *bid breakdown* to detail what you're selling, much like that sticker on the new car. The idea is to give your prospect a list of each item that makes up the total price of what you're trying to sell, so s/he will understand where your cost comes from and how many things enter into it. It's one thing to tell a prospect that the air conditioning system you propose will cost $3,000, and quite another to present a full page of prices, that of course add up to that same $3,000 figure, but none of which—individually—seem out of line.

There's another benefit to creating a detailed list of what you sell. Many of us work on a bid basis—we present written estimates for the work we propose to do. To arrive at that estimate, we usually make a cost breakdown, a list of what all of our expected costs will be for each job.

Instead of doing this with paper and pencil, why not use your spreadsheet program so you can take advantage of its math power? It can total a column of figures much more quickly and accurately than you can by hand. Then take things a step further and create a detailed bid breakdown for each job, on a retail level. You present this, along with your written estimate, to your prospect, so s/he can see how you arrived at the total price for the job.

Gregory R. Glau breaks it all down for you at PO Box 1627, Prescott, AZ 86302.

A2 (L) COST C1
17

	A	B	C	D
1				
2	COST	ITEM		
3				
4	165.11	FURNACE		
5	37.11	VENT		
6	241.11	DUCTWORK		
7	75.00	GRILLS		
8	150.00	WIRING		
9	82.50	GAS PIPE		
10	350.00	LABOR		
11				
12				
13	1100.83	TOTAL		
14				
15				
16				
17				
18				
19				
20				

Figure 1. A VisiCalc worksheet that shows the cost prices for a furnace installation.

"When you sell a job you can recall and print out your cost sheet and have a list of materials for the work."

Figure 1 illustrates a simple cost breakdown sheet for a furnace installation. This example is done with VisiCalc, but if you used another spreadsheet it would look much the same. The materials are listed along with their estimated costs. The cost total is also shown. This is what you'd use internally to calculate your total anticipated expenses for a job.

Organization

This picture might seem backwards, as we'd usually have the item description in column A and the cost to its right, in column B. However, it's necessary to do things this way, as it makes it easy to figure, show and print the retail prices.

Figure 2 takes things a step further and asks the spreadsheet program to add column C, which calculates and displays the retail prices for the items. In this case, the cost prices in column A are divided by .64. This puts a 36 percent markup on the cost amounts (100 – 64 = 36). All figures are shown formatted on a dollars and cents basis.

Finally, Figure 3 is the retail bid breakdown you'd print and present to your prospect. Since you can ask your spreadsheet program to print just a section of your worksheet, you instruct it to print cells B2–C13 to create this breakdown sheet. Now (hopefully) your prospect will appreciate all of the different elements that make up the price of this job, and won't focus just on the total cost. It's probably a good idea to add a few words of explanation along the top of any printout you give your prospect, to let him/her know this is a detailed breakdown of the job you propose, to thank him/her for letting you present your estimate, and so on.

One other plus this method brings to your business is that if you save each of these little worksheets on disk, when you sell a job you can recall and print out your cost sheet and have a list of materials for the work (just print columns A and B). It's an instant ordering sheet. It also tells you what total costs you can expect to incur for a particular job, and exactly what materials should be used—something you can compare to the actual materials your people end up using.

An added benefit of all this is that when you're going over your worksheet with your prospect, it gives him/her a chance to say, "Hey, let's skip this one part of the job for now, and we'll add it later on, when we've paid for the rest of the work." Often in our own business we get people who want to do some of the work, and this breakdown shows them exactly what they'll save if they take on part of the project themselves.

While these illustrations show a simple worksheet, the concept is what's important: to show your prospect what each individual item costs to help him/her understand why what you're proposing costs what it does. Few major items are sold today without a number of component parts that combine to form a significant dollar total. Once your prospect sees where all the costs come from—and that they're each a necessary part of the work—s/he's more likely to buy. ■

A2 (L) COST C!
17

	A	B	C	D
1				
2	COST	ITEM	RETAIL	
3				
4	165.11	FURNACE	257.98	
5	37.11	VENT	57.98	
6	241.11	DUCTWORK	376.73	
7	75.00	GRILLS	117.19	
8	150.00	WIRING	234.38	
9	82.50	GAS PIPE	128.91	
10	350.00	LABOR	546.88	
11	---------		---------	
12				
13	1100.83	TOTAL	1720.05	
14				
15				
16				
17				
18				
19				
20				

Figure 2. A worksheet done on VisiCalc that shows both the cost and the retail prices of a furnace installation.

ITEM	RETAIL
FURNACE	257.98
VENT	57.98
DUCTWORK	376.73
GRILLS	117.19
WIRING	234.38
GAS PIPE	128.91
LABOR	546.88

TOTAL	1720.05

Figure 3. The final printout that details the retail price breakdown for a furnace installation.

by Bill O'Brien

The Apple III—Great Company!

When computer historians look back at today, to trace the origins of their own modern-day machines, and they have compiled all the facts, one computer will probably stand out. With none of the bias that sometimes tinges the considerations of our contemporaries, they will see that it was the precursor of almost all that, in that future time, currently exists.

Analyzing, for that is the way of computerists, they will note that it was the first computer to employ a standard memory configuration larger than an 8-bit processor could normally support. They will enumerate its video outputs: composite color, RGB color, and two composite black-and-whites. They will catalog its other output capabilities: serial RS-232, dual analog joystick, one thermal printer, four disk drives, and audio. They will delight in its display capabilities, with six graphics memory pages to fill, text included; they will laud its preeminence as one of the first computers to use color and still handle text in 80 columns; and they will wonder at its delicious variety of character sets.

They will marvel that all of this was contained in one machine with no additional boards, bangles or beads. *And that machine is the Apple III.*

Now, you might consider this just a fantasy of some sort, but let's examine the facts. The Apple III is an *abstract* computer. There is no ROM (read only memory) to direct its actions. All that the machine is, it becomes when RAM (random access memory) is loaded. If the disk you place in the internal drive contains Pascal, then the III is a Pascal computer. With Forth or Fortran or Cobol, it could be any of those things as well.

The way the Apple III handles output is, perhaps, the role model for all operating systems to come. If you want to print to the screen, you open a pathway there and do it. When you change your mind and want to output to the printer, just rename the pathway. And it works the same for the disks, for the modem, or for anything else. Each pathway, or logical device driver, controls the physical device to which it leads. If the characteristics of the device change, you simply modify the driver to reflect the differences. There is no need to alter hundreds of lines of code.

You can dedicate the Apple III to a single occupation or have it perform multiple functions. One company, Haba Systems, has an Apple III doing database work while, *at the same time*, it monitors the phone line, recording the length of a call and calculating its cost. It will even dial the call.

SOS

The Apple III's Sophisticated Operating System, SOS, is another achievement. Its ability to handle many directory levels is a feature found on larger, more expensive machines. Added to the IBM PC, it's called a system of "pipes" with directory "trees" and proclaimed Unix-like and evolutionary. On the Apple III it's just a convenience that offers root directories to which you can attach other, more specific directories that further refine your ability to catalog and handle information.

Even Apple's own Macintosh and Lisa, for all the windows, desktops and mice, are only Apple IIIs dressed up to go out. Once you get inside the windows and look around, you find folders with files in them and a way to print through something called an Imagewriter file. It's the next step in the evolution of the SOS INTERP, KERNEL and DRIVER files—and that's all it is.

Of course, there are now 16-bit and 32-bit processors that, supposedly, make 8-bit machines like the Apple III obsolete—but they do the same things. They are faster at actual calculations, but that only accounts for about one third of the computer's time. You print it, you store it to disk, or you send it over the phone lines; any computer attached to the same device will be limited by the speed of that device.

From this point on, if someone gives you a hard time about your Apple III, ask them if their computer can do simultaneous foreground and background tasks. Ask them how many boards they had to add before they could see what they were doing, either on a screen or on a printer. Ask them, also, how long it took them to get comfortable with their keyboard, and how many times a day they still grouse at it. Best of all, try and find out why the company that manufactures a computer that is supposedly a modern and highly efficient tool for information processing only compares it to the Apple II.

I've become somewhat intimate with the Macintosh for a project I'm doing, and am cognizant of the PC for various and sundry reasons. They're good—I'd be lying to you if I

Send your correspondence to Bill O'Brien at his new address, PO Box 1010A, Fort Lee, NJ 07024.

said they weren't. But what you've got is just as good, and in some ways a lot better. And the Apple III is going to stay one of the best machines on the market for the next few years.

A Crossroads

Unfortunately, while it's true that the Apple III is an evolutionary machine, it's also true that less is being done with it than with the Apple II series. As a columnist, I have reached the point where I have related just about all I know that will be of help to my readers.

inCider, too, senses the lack of broad interest in the III. As part of an editorial stocktaking, and because the "well is running dry," so to speak, we have decided to discontinue the "III's Company" column as is. I will

"The Apple III is going to stay one of the best machines on the market for the next few years."

be trying on new boots with a column, "O'Brien's Journal," focusing on how the business and professional person with an Apple II can best apply the computer products on the market to his or her own situation.

We are not, however, abandoning our Apple III readers. I and the magazine will continue to address Apple III issues on an inquiry basis. Write in with your questions and I'll answer them in the Letters department. Or, if a significant enough issue comes up, I'll do an article on it.

Those of you who have written before, keep writing, and those who have not—now's the time. I'll look forward to hearing from you. Meanwhile, remember—we have a great machine. Be proud of it!

Live long and program. Aloha, AppleAmerica! ■

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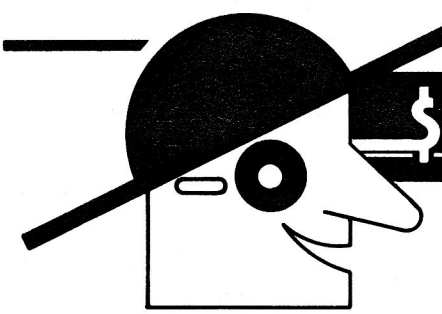

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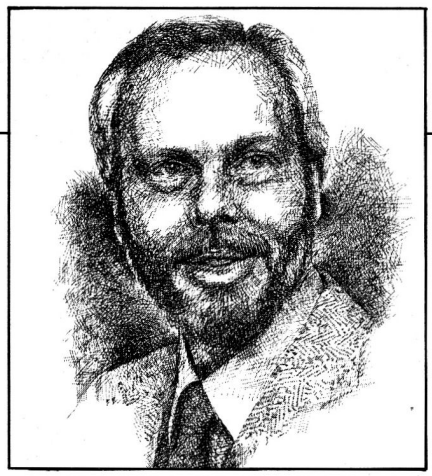

The Apple Clinic

by Earle Hancock

•Double Seven Loses
•Printer Code Blues
•Sound Off

I have an Apple II Plus with 48K, a language card, a Grappler card, an Apple dot matrix printer, two disk drives, an Apple Monitor III, and a Taxan RGB color monitor. The language card, Grappler card, disk card, and Taxan RGB II card are in slot 0, slot 1, slot 6, and slot 7 respectively. I recently bought the Supersprite card and software from Synetix Inc. However, the Supersprite card goes in the same slot as the RGB II card. I've tried the RGB II card in the other slots and it doesn't work. What can I do? I'm not afraid to modify the hardware.

F. Mahon
Lakeworth, FL

Unfortunately, both the RGB monitor and the Supersprite card require the composite sync and color burst video signals available only in slot 7. The sync signal regulates the horizontal and vertical scans of the electron beam in the monitor, keeping them in correct timing with one another. The monitor uses the presence of the color burst to determine whether an incoming signal is a color or a non-color signal.

Even if it were possible for the two cards to somehow share slot 7, the power requirements of the Supersprite card (350 milli-amps) are such that an overload of the Apple's supply might occur if many other cards were in the system with the Supersprite card. See the December *Apple Clinic* for more on peripheral card power consumption.

Many thanks to the technical support staff at Synetix for their help.

I hope you can help me with this problem, since it seems that no one else can (On-Line, SSM, and Leading Edge). I have an Apple II Plus, Microsoft 16K, SSM APPIC/G parallel card, 8510 Prowriter parallel, and On-Line Screenwriter word processor.

None of the embedded commands in the Screenwriter do what they are supposed to do. They end up being printed out on the paper rather than directing the print copy. On-Line sent me a list of replacement commands for underlining and a few other operations, leaving 90% of the Screenwriter useless to me. I bought it to write footnotes and so on. At present, I get straight print out of it, which is OK, but not for research papers and other uses which I bought it for. If you or any of your readers can help, please do.

E.J. Lima Jr.
Narragansett, RI

It sounds like the printer is expecting certain control codes that Screenwriter is not sending. Each printer company (and sometimes different printers from the same company) uses its own set of codes to control print size, vertical spacing, underlining, bold print, emphasized print, superscripts and subscripts, and other functions. Usually, the word processing software offers a way to change the codes so they match your printer.

I have never used and do not own Screenwriter, but a call to the Sierra On-Line product support group got me on the right track. They have eight technicians on call from 9 a.m.–5 p.m. Pacific time, Monday through Friday. You can call them with your questions and problems at (209) 683-6858.

So, what did I find out? Well, you're correct in assuming that only a few printer codes are specifically outlined by Screenwriter. They are underline and boldface. Other printer codes are identified in the same manner, but you must do some legwork to get at them.

The codes are usually escape sequences—a small list of symbols starting off with an ESC (escape). Since letters, numbers and other symbols in a computer have a numerical value called ASCII code, we will use those numbers. The ASCII code for ESC is 27. For Screenwriter's purposes add 128 to the normal ASCII value—ESC is 155.

To use the printer codes in Screenwriter they must be defined or declared (not unlike Pascal) before they are used. The best place for the codes is at the beginning of each file. Once defined, the codes can be saved in an otherwise empty file ready for the next document. Just load the "empty" file and start to write.

Here is an example of the definition of condensed print. Type .RE #155—the .RE stands for replacement, delta ( ) stands for space, # stands for ESC and 155 is the ASCII value for ESC (27 + 128, remember?). Then type .RE @209 (81 + 128) for condensed on and .RE %206 (78 + 128)

Earle Hancock has directed the microcomputer project at Minuteman Regional Vocational School, Lexington, MA, for three years. He has served as an advisor to the Massachusetts Association of Vocational Administrators, and is an active member of the Boston Computer Society and other computer organizations. Address correspondence to him c/o inCider, *Pine St., Peterborough, NH 03458.*

for condensed off. Other codes are constructed in a similar manner. To use this declaration in your writing, type #@ where you want condensed print to begin and #% where it is to stop. See your Screenwriter manual for further details.

If this explanation sounds a bit esoteric, remember that there is a price for being first. Three or four years from now a question like this will be (or had better be) unnecessary. I wonder how many automobiles would be sold if we had to rebuild the carburetor to change brands of gasoline.

I have not been able to find out how to connect the AUDIO IN section of the COLOR-I PLUS to my Apple IIe. I would like to control the sound, up and down. Is this possible? What must I do? If this can't be done, what are the alternatives? Thanks for your interesting column!

L. Motherwell
Atascadero, CA

Because one pin of the Apple speaker output is connected to five volts, the output is unsuitable for connection to most audio inputs with an audio amplifier, like the audio input on your Amdek Color 1.

In my classroom, the sound of seven to ten Apples all playing the music accompanying Lemonade drove me to design an external speaker with a volume control (read potentiometer). I connected the external speaker to the Apple speaker output, and was able to turn down the volume so that barely any sound came from the speaker. When I wanted to listen to music on the computer, the external speaker was louder and produced better quality sound. Best of all, the whole project cost less than $30.

All you need to make your own volume controlled speaker is a speaker (Radio Shack has several to choose from under $25), a 1000 ohm potentiometer, and some wire.

To disconnect the Apple speaker, pull up gently on the Molex connector, removing it from the posts on the Apple motherboard. Coil up the Apple speaker wire and secure it with tape to the inside of the case, out of the way. Don't remove the Apple speaker—you may want it someday.

"I wonder how many automobiles would be sold if we had to rebuild the carburetor to change brands of gasoline."

Connect one wire to each of the two speaker connections on the motherboard. I use small insulated alligator clips for this. Pass the wire out the back of the computer, providing a strain relief so an accidental tug won't dislodge the alligator clips from the posts.

Find a good place for the volume control. You may want it in the speaker or placed separately. Some may wish to drill a hole in the side of the computer and mount the control there (the wire from the motherboard speaker connection would first go to the volume control before exiting the back of the computer, if the control is so placed). I will assume that the control will be mounted in the speaker housing.

One wire from the motherboard goes to a connector on the volume control. Another wire connects the other side of the volume control to the speaker (this is called connecting in series). The third wire goes directly from the motherboard connector to the speaker and *voila!* The sound is controlled.

This column depends on you. If you have any hardware problems, please write me. I enjoy hearing from all of you. See you next month! ■

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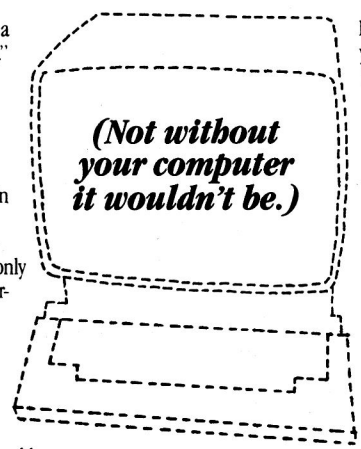

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Beating Fre (0) with HIMEM

by Paul P. Dymerski

The Apple's most frustrating feature when working with strings is the garbage collection routine. The routine is in the Apple's ROM memory, and is automatically called by the Apple monitor when string storage is nearly full. This could happen during program operation at inconvenient times. The operating program disappears for several seconds, leaving the user wondering how he or she "killed" the computer.

Things get worse if you move DOS into the 16K language card, as I discovered when I attempted to fit more than 1000 one-word strings into memory. To my surprise, when I ran the finished program the monitor called the garbage collection routine and disappeared for over one minute.

I looked at several alternatives to this annoying problem. These were:

1) Disable the garbage collection routine.
2) Modify the routine.
3) Replace the garbage collection routine with a faster one.
4) Give up.

The first two solutions will not work, since GARBAG at $E484 is in ROM (read only memory), as is the calling routine. ROM cannot be patched as RAM can. (That's why you can't patch the Apple II to get upper- and lowercase.)

The third option offers faster housekeeping routines. Randy Wiggington, in the January 1981 issue of *Call A.P.P.L.E.*, presents a quick, compact, machine language clean-up routine that is faster than the ROM routine. This routine, however, takes up space I could not afford to give away. The program still disappears for several seconds because it scans memory from the top of graphics page two (LOMEM for my program), to memory location 48000. My program has to call this routine on every pass to keep the ROM routine from jumping into the act.

One possible shortcut checks free space on every pass of the program for needed housekeeping:

```
2001 IF PEEK(112)*256+PEEK(111)-(PEEK
(110)*256-PEEK(109))<2000 THEN CALL
768
```

This is cumbersome and, if the space (2000 bytes) is set too small, the monitor GARBAG routine occasionally acts first for a one minute delay.

The Solution

Rather than opt for the last alternative and give up, I played with LOMEM and HIMEM. Since I loaded strings into memory which wouldn't be changed during program execution, I loaded these strings into memory, and then set HIMEM just below the bottom of the strings. It was worth a try. Do it this way:

1) Load a string memory array into memory.
2) Check the bottom of strings by ?PEEK(112)*256+PEEK(111).
3) Set HIMEM to this value with HIMEM:.
4) Try to print the first element in the strings you entered.

You lost your strings! The reason: HIMEM is a short ROM routine that performs several functions and moves the top of string memory pointers. In the process, HIMEM clears all strings. Poke the values into the HIMEM locations (115, 116). This will trick the garbage collection routine into thinking HIMEM is lower than it is.

Repeat steps 1 and 2 above, or better yet, for step 2 try:

```
2) POKE 115,PEEK(111): POKE 116,PEEK
(112)
```

This places the memory location of the bottom of your string array into the HIMEM pointer locations. Try to print the first string element.

```
3)  ?A$(1)
    HELLO
```

Voila! It's still there. Will the ROM garbage collection routine accept this as HIMEM? Enter:

```
4) ?X FRE(0)
```

For the clean-up routine, try step 3 again to see if the strings are still intact. Surprised? It works.

If your program initializes a group of strings on start-up that you'll read but never change during program operation, load this first. Move the HIMEM pointer to the bottom of this string area. Let the garbage collection go on its way.

Remember, if you try to change a string in your protected area, the monitor relocates the string position below the new HIMEM. Your original string is lost. You may, however, add more strings to the top of the array. ■

Paul Dymerski is head of the research staff at International Software Systems, PO Box 5427, Richmond, VA 23220.

BLOAD Spec-Finder

by Jeff Creamer

Here is the best BLOAD spec-finder ever published, to my knowledge, in any Apple magazine. It's a one-line EXEC file that you create with your word processor; it gives you the address and length of the last BLOADed file in both hex and decimal. Best of all, it accomplishes this without disturbing your Applesoft program or any machine-code routines in memory—low-impact programming that is also worry-free.

Any word processor that creates text files can be used to enter the BLOAD Finder (Applewriter IIe, for instance, will do just fine). If your word processor doesn't have this capability, you can also use a good text file editor such as the Editor-Assembler provided in the DOS Toolkit. Just type in the program as shown in the program listing, being careful not to include any stray blanks or carriage returns. This single line weighs in at 239 characters, which is the limit for a legal line of Applesoft. (Actually, you could add one more character, since the final double-quote mark is not necessary.)

Any number of lines can be entered into an EXEC file. Everything is packed into one line here to get the nicest possible printed output. This way no Applesoft or Integer Basic prompts will spoil the neatness of the resulting display.

When you enter the EXEC file, save it as LAST BLOAD. Your BLOAD statistics are now easily found by the following procedure: First, BLOAD any binary file of interest. Then type: EXEC LAST BLOAD. After a very short interval, the address and length of the file you loaded will appear on the screen.

You may recognize the ? symbols in the program listing as Applesoft equivalents to print statements. Use of this symbol allows you to pack more onto one line. The CALL -372 statement accesses a part of the GO routine in the Apple Monitor at $FEB9. This routine loads the 6502 registers with the contents of the monitor's pseudo-register bank at $45–$48, then does an indirect jump to the routine whose address is stored in locations $3A–$3B (the pseudo-program-counter).

In this case, the pokes to locations 58 and 59 point the indirect jump to location $F941. This is what starts the hexadecimal conversion. It is the beginning of the PRNTAX routine, which prints the contents of the A and X registers in hexadecimal. The other peeks and pokes calculate the decimal lengths and addresses by a standard method.

I have found the LAST BLOAD routine especially handy in my work with Apple shape tables, and in deciphering old routines that I entered using the monitor before I got my assembler. ■

```
HOME:A=-21902:L=-21920:POKE58,65:
POKE59,249:AH=PEEK(A+1):AL=PEEK(A
):LH=PEEK(L+1):LL=PEEK(L):VTAB2:?
"BLOAD STATS":?"ADDRESS: ";AH*256
+AL;" ($";:POKE69,AH:POKE70,AL:CA
LL-327:?")":?"LENGTH: ";LH*256+LL
;" ($";:POKE69,LH:POKE70,LL:CALL-
327:?")"
```

Program listing. *EXEC file that prints address and length of last BLOADed file in both hex and decimal.*

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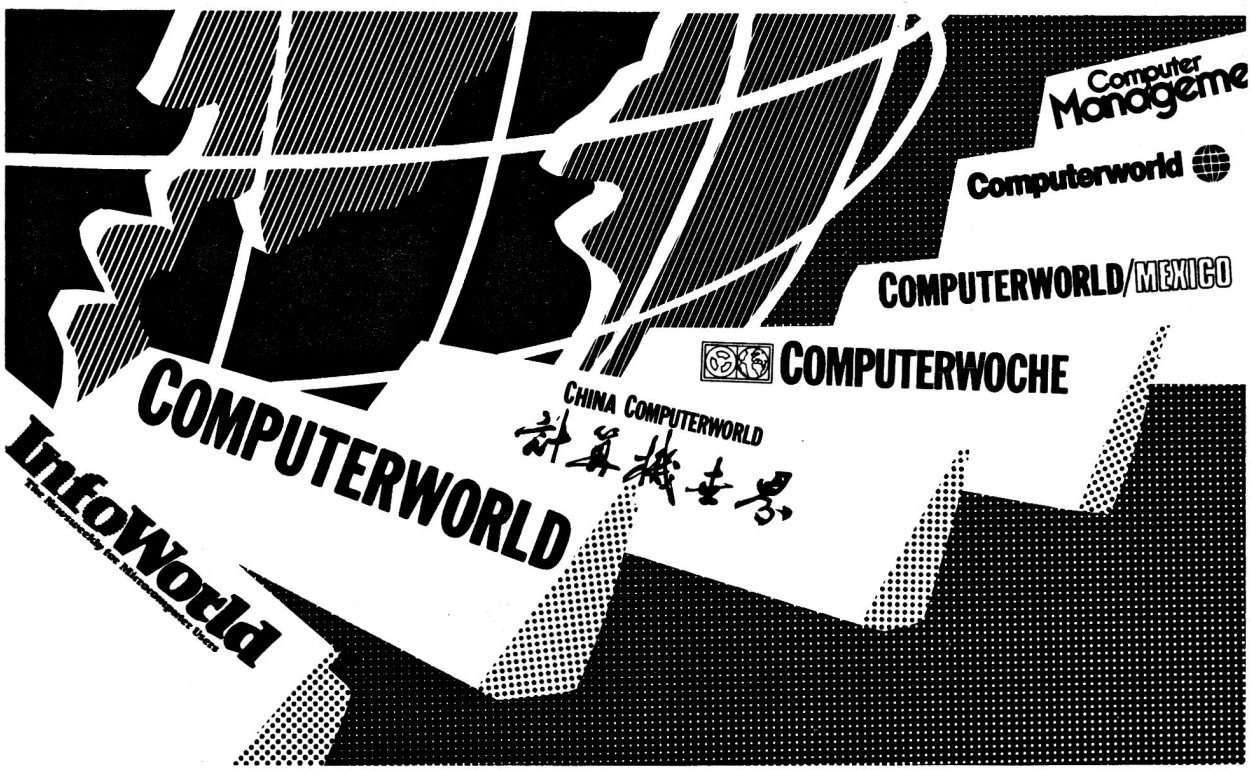

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Book Reviews

Apple II Applications

by Marvin L. De Jong

Howard W. Sams & Co. Inc.
4300 W. 62nd St.
Indianapolis, IN 46268
Softcover, $13.95

The Apple II computer gets much of its versatility from its easy connections to the outside world. Most personal computers drive a monitor, a printer, and one or more disk drives and that's it. With the Apple and its eight 50-pin peripheral interface slots, this easy adaptability makes the Apple II into a word processor with 80-column display, a precision laboratory real-time monitor and controller or any number of devices. But, many Apple owners lack the knowledge necessary to take advantage of the computer's versatility. *Apple II Applications* helps fill that need.

"This book shows how you can use the Apple II to make measurements of physical quantities, to control other devices, and to communicate with other computers," the author states in his preface. He continues: "The goal of this book is not only to show that measurement, control, and communications applications are interesting and fun, but also to give you the necessary skills to create and solve your own applications problems." The book easily achieves these goals.

Chapter one, on serial communications and information transfer between computers, begins with a brief discussion of input/output fundamentals, and follows with the best explanation of asynchronous serial communications I have seen in computer hobbyist literature. Applications discussed include interface to an acoustic-coupled modem and communication via telephone lines using a Hayes direct-connect modem.

Another chapter explores some of the possibilities offered by the Apple's game connector port, which offers four built-in analog inputs, three one-bit inputs, and four one-bit outputs, all easily accessible to the user. This chapter shows how to measure light intensity and temperature using photoresistors, phototransistors and thermistors with those same inputs.

In the third chapter the author discusses various non-volatile memory devices at the beginning, then devotes the bulk of the chapter to the particulars of programming a 2716 EPROM using a commercial programmer.

Digital-to-analog and analog-to-digital conversion are the subjects of the next two chapters. Each begins with a discussion of the fundamentals, then follows with an explanation of the hardware used in the applications that follow.

The final chapter, Timing and Counting, contains a concise explanation of the two timer/counters in the 6522 VIA, some applications and uses for the Mountain Computer clock interface board in timing and counting.

Each chapter begins with a brief statement of purpose and content, then ends with a list of reading for further information and study. Applications are accompanied by several program listings, in both Basic and assembly language, relevant to the topic presented.

Two appendices are concerned with machine language fundamentals and a programming reference to the features of the 6522 VIA.

The book contains numerous charts, tables and diagrams with genuinely useful information. Program listings are well-structured and documented with REM statements.

All of this material has been covered before. What is unique is that the material is gathered all in one place, and it is well presented. There are, after all, only so many ways you can connect a computer to the world, and that is the purpose of this book.

This is easily the best book for users with little or no interfacing or hardware construction experience. The interface cards required are all commercial, readily-available units and are reasonably priced. Little or no test equipment is required for the applications described. Most of the required components can be purchased at Radio Shack and mail-order suppliers.

This book is intended for both beginners and experienced users, and its approach to the material displays it. Topics are covered assuming no prior knowledge or experience on the part of the user. The coverage is such, however, that even the experienced user will find it useful as a concise summary of the most important components of the topics explored.

Apple II Applications is one of the Blacksburg Continuing Education Series of educational texts. Consistent with the rest of the Blacksburg series, it is at least as hardware-oriented as software-oriented. If you like to pop the top off your Apple and plug things into it, you will enjoy this book. ■

F. Kuechmann
Vancouver, WA

Learning with Logo

by Daniel Watt

McGraw-Hill Company
1221 Avenue of the Americas
New York, NY 10020
Softcover, $19.95

Learning with Logo by Daniel Watt is well-written, liberally illustrated with excellent turtle graphics and cute cartoon characters—the turtle, the Logo wizard and Logo's robot helpers. These characters focus attention on specific detail in the presentations, emphasizing pitfalls, powerful ideas, explorations and helpful hints.

Consistent with computer programming style, the book starts out with chapter 0, which tells us about the book, who it's intended for, what it's intended to do and how to use it. Each chapter contains a general introduction to its contents. Explanations and procedures are clear and well stated; each major concept is clarified by exposing possible errors that may be encountered in using the procedures. Explorations and power-

ful ideas with the examples guide and extend the learner's capability. Throughout the book, helper's hints, in smaller type, summarize and clarify information being presented.

Learning with Logo was written for the Terrapin and Krell versions of Logo, but the activities explained in the book can be used with Apple Logo and TI Logo also. Slight differences between the three versions of Logo are explained in the appendix.

I like the appendix list of Logo commands discussed in the book. Appendix IV gives a quick reference guide listing the command, its short form where applicable, the page reference for further explanation and a one-line example of the syntax of the command. This is very useful—often when writing procedures I cannot recall whether I should use the [] or the (), the : or " delimiters.

Learning with Logo is over 350 spiral bound pages (it folds back flat on the cluttered computer table) packed with excellent information about the Logo language, written in easy to read, easy to understand English. Containing many wonderful ideas, the book will educate, entertain, and challenge the reader for many hours.

If you are learning the Logo language, buy this book. Daniel Watt and his cartoonist Paul Trap are to be congratulated on an excellent reference manual. ■

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Edmonton, Alta.

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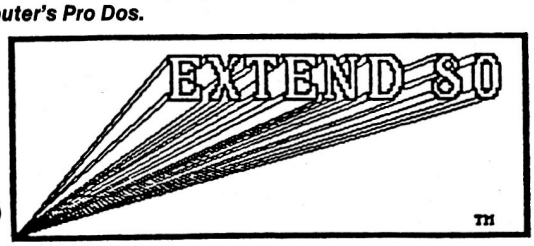

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The Apple House

by John Blankenship
Prentice-Hall Inc.
Englewood Cliffs, NJ 07632
Paperback, $14.95

One of the big selling points for personal computers has been the potential for handling routine chores around the house. While most applications have centered around things that you can do at home, Blankenship's Apple II literally handles chores directly connected with his house. *The Apple House* is subtitled "*How to Computerize Your Home Using Your Apple Computer.*" The book describes in some detail the system that the author has actually running in his own home. Home security, lighting, heat control, and telephone management are a few of the areas covered in this book.

Like other personal computer owners, I read advertisements and articles describing home control applications. Most of the information published did little to explain exactly how to integrate my home and Apple.

The book is organized for easy readability. The first few chapters provide an introduction and overview of the system and its compo-

nents. Chapters 4–12 describe each of the hardware items in greater detail. The software for each of the modules is described in chapters 13–20. Installation, maintenance, expansions and enhancements are covered in the last two chapters. Appendices provide actual program listings and sources of products.

Blankenship outlines five major goals for the system described:

- Use of off-the-shelf equipment wherever possible.
- Easy installation.
- Easy expansion and customization.
- Some degree of cost effectiveness for frills contained in the system, such as voice recognition and speech synthesis.
- User-friendliness and helpfulness.

The home control system has five basic functions organized in a modular fashion:

- The *voice request module* uses wireless microphones to allow the user to talk to the computer and access submodules that control house lighting, provide time status, turn on the security system, place phone calls, and so forth.
- The *phone control module* serves as an intelligent answering machine. Provisions are included for obtaining status information and home control from a remote location.
- A *security management module* provides monitoring of movement both inside and outside the home. Appropriate action is taken depending on the circumstances at the time.
- *Event timing* establishes a pattern of anticipated activity according to entries in event tables and represents a specific action to be taken when time and conditions are correct for it to occur.
- *Internal movement* is monitored by another module to keep track of where people are in the house.

Another module, although not labelled as such, is described in Chapter 7. A simple fail-safe system must be included in any type of home control application. In this one, a software counter is running continuously. When the system programs are functioning properly, the counter is reset to zero periodically. If the counter reaches a predetermined figure it means that one or more of the modules are malfunctioning and the entire system reboots. While this approach to making programs fail-safe is hardly revolutionary, it is simple and effective.

The final chapter offers a few ideas for enhancing any computerized home system—watering grass, adding smoke alarms to the security system, controlling garage door openers, monitoring doorbells, and whatever else you can think up.

Flowcharts, schematics and illustrations visually illustrate the ideas being discussed. The programs listed are well documented by the text and REM statements.

There are some inherent problems in describing specific hardware for an application such as this. As pointed out in Chapter 4, the Heuristics Speech Link used is no longer available. Other hardware described will just as certainly become unavailable or substantially changed. The author recognizes this fact and offers suggestions for using other pieces of hardware.

The Apple House is a well organized and well written book. The author avoids as much technical jargon as possible while still providing accurate information. This is no beginner's tutorial, however, since a fair knowledge of both Basic and electronics is presumed at the outset. Blankenship notes (rather accurately, I suspect) that "few, if any individuals are going to run out and buy a microcomputer system just to control their home. It is much more likely that this book is being read by someone who already has a computer and is looking for a new and novel way of using it."

I was somewhat disappointed by the lack of information regarding part-time use of the Apple II for home control. It appears the author's system is devoted to home control on a full-time basis. That may be fine for him, but I use mine for other things. While designing a system to work part-time may not be substantially different from that described, some

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functions would need modification for such use. Suggestions for such modifications would be a valuable addition to this book.

If you have any interest in using your computer for home control, I can heartily recommend this book. *The Apple House* describes a well integrated and operational system in such a way that the reader should have little difficulty understanding how a computer can be used for such an application. Armed with this understanding, computer owners are in a better position to decide whether or not to let theirs become the "first Apple House on the block."■

Leslie R. Schmeltz
Bettendorf, IA

The Apple II Circuit Description

by Winston D. Gayler
Howard W. Sams & Co. Inc.
4300 W. 62nd St.
Indianapolis, IN 46268
Softcover, $22.95

If you ever want a book that covers the main logic of an Apple II from revision 0 to the latest RFI revision D or a schematic of the older type keyboard or the newer two-piece type, this book has eight chapters that give you a detailed circuit description of the Apple II with timing diagrams and schematics. It is not a cookbook, I/O interface or 6502 experiment book. It is an expanded *Apple II Reference Manual* to provide information for your specific application.

Chapter one gives some idea of what you should be familiar with, such as binary and hex number systems, TTL gates, flip-flops, registers, multiplexers and a basic knowledge of microprocessor and microcomputer architecture. This chapter also helps you determine the revision of your Apple and the differences between each revision. It defines the jargon that will be used throughout the book and has a glossary of terms at the end.

Chapter two uses a block diagram to give a brief overview of the Apple II.

Chapter three starts the detailed explanation of the Apple II. In this chapter the clock generator and horizontal timing are discussed. At the end of this and the following chapters, the signals discussed are summarized.

The fourth chapter is about the video timing—vertical, horizontal, blanking, synchronization, color burst and composite video. If you are not familiar with any of these terms, Appendix A helps you understand some basics about television.

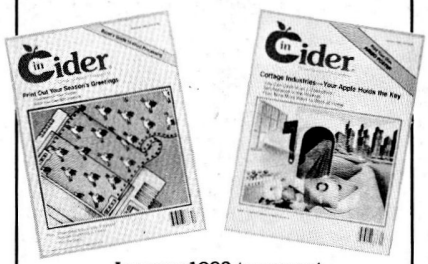
The Apple II uses the 4116 dynamic RAM, which needs refreshing to keep the data from being lost. The video display circuitry refreshes the memory in the Apple II, so a separate refresh circuit is not needed. In chapter five, this is explained in detail, along with Apple's multiplexing technique, a separate memory read and write timing example, and how the different video screens are displayed.

Chapter six gives a short overview of the different pins on the 6502. It also deals with the systems bus, address decoding, direct memory access, daisy chains, keyboard and peripheral access, the different interrupts and RAM/ROM access.

Chapter seven is about the onboard input/output: the cassette I/O, the game port, the speaker and an extensive section on the keyboard. The chapter also involves the cassette port, the speaker, game switches and game paddles. The author provides you with a few calculations that show you what to expect from the circuit and shows some wave forms for better understanding.

The video display is what helps sell so many Apples. In chapter eight you will find extensive information on where the different screens are located in memory, how the colors are produced, and (in great detail) the operation of each type of screen the Apple can display (text, lo-res, hi-res and mixed mode).

BACK issues



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The last half of the book contains appendices. Appendix A explains the basics of television. Appendix B describes the motherboard and keyboard circuit changes that have taken place since Apple II's initial design. Appendix C discusses the schematics and the symbols used. Appendix D is a list of references for each of the chapters and appendices. The rest of the book is schematics, block and timing diagrams for revisions 0 through RFI revision D, and the one- and two-piece keyboards.

The nicest thing about this book is that each of the schematics and diagrams fold out for full view while you are reading the book. My only disappointment is that you have to unfold the schematic or diagram you want to look at to find the figure number. Since this ruined my concentration, I marked the figure number in the upper right corner of each folded schematic and diagram. This made it much easier and quicker to locate any figure that I was referred to.

This book is well worth the money if you are interested in building any peripherals, modifying the Apple or just getting a better picture of how your Apple ticks. ■

Kenneth McMillen
Merritt Island, FL

inSidious inSolubles Solutions, from page 51

Solution to Text File (Listing 1):

Two things wrong here. First, because of a glitch in Apple DOS, you should always follow a GET statement with a PRINT statement or the next DOS command will not be executed. Second, there is an unwanted semicolon in line 100 after the first N$.

If you inserted the PRINT statement and ran the program before you removed the semicolon, you will have ended up with a file called "NAMES.TXTREAD NAMES.TXT" on your disk. If you tried to delete this file you would have received a FILE NOT FOUND message.

```
90  GET A$: PRINT
100  PRINT D$;"OPEN "$N$: PRINT D
     $;"READ "$N$
```

With the semicolon in line 100, there is a control-D in this unwanted file's name, just before the R. Do you understand why?

Solution to Hi-Res Viewer (Listing 2):

Before running this program you may want to BLOAD a picture on page 1 or 2. Use BLOAD (binary file name),A8192 or BLOAD (binary file name),A16384. All of the POKEs in lines 100, 140, 150, and 160 have to do with selecting the various Apple text and graphic modes. The POKE −16304,0 missing in line 140 sets the graphic display mode.

```
140  POKE  - 16304,0: POKE  - 162
     97,0: POKE  - 16302,0
```

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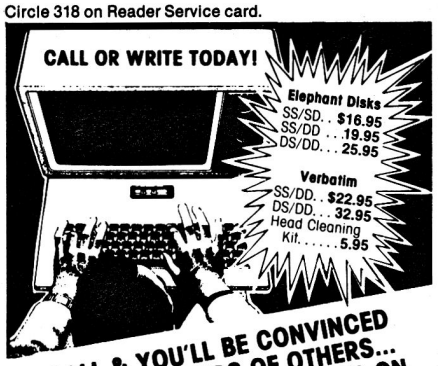

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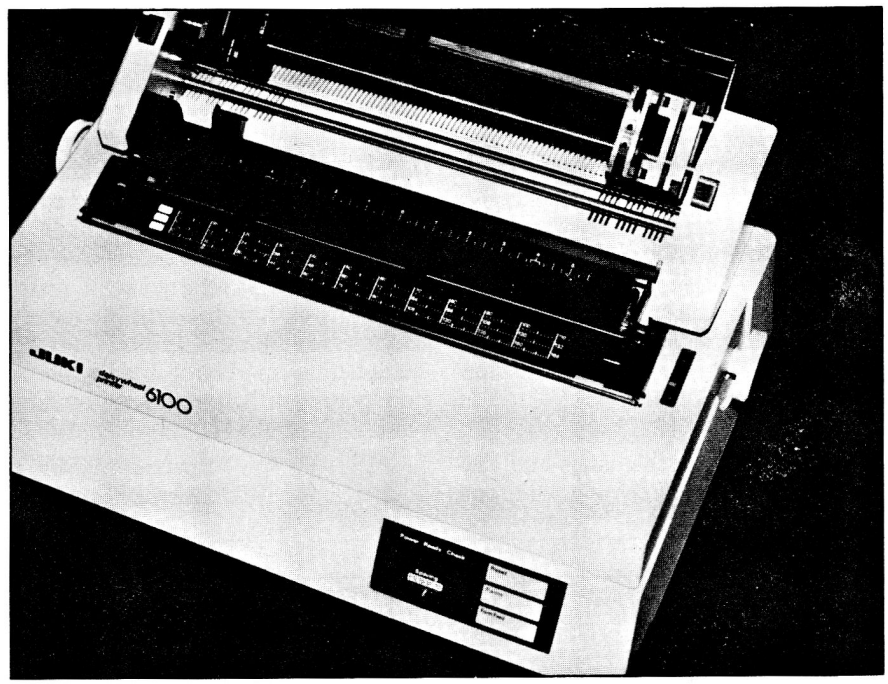
Juki 6100 Printer



The Juki Model 6100 with optional tractor-feed mechanism installed.

After making do with a no-frills dot-matrix printer for several years, the need for better print-quality resumes, business letters, and other formal documents led me to the Juki Model 6100—a low-priced, little-advertised Japanese import.

Using a bi-directional, logic-seeking print mechanism, the Juki 6100 churns out crisp copy at up to 18 characters per second. Its carriage is 13 inches wide, and it will print an 11-inch line—well over 132 columns at narrow pitches. Four pitches can be selected by computer control or by a switch on the front panel: 10, 12, 15, and proportional spacing. You can select odd pitches, such as 20 or 11, by computer control only. (Of course, you have to be careful not to use too narrow a pitch for your print wheel.)

The printer uses a 100-character, plastic print wheel that contains all ASCII characters needed for printing Basic program listings. It also accepts Triumph-Adler print wheels. The TA wheels have a slightly different character set, and come in script, italic, and optical character recognition. The Juki uses the IBM Selectric II ribbon, either single-strike or multi-strike.

The standard paper-handling system is friction feed; a tractor-feed unit is optional. The printer's front panel has touch-sensitive membrane switches for pause, reset, and form feed. Three front panel LEDs indicate power-on, ready-to-print, and check, which lights to alert of an error or a normal pause. The power switch is at the left rear, as on the Apple II. A Centronics parallel interface is standard; an RS-232 serial interface is available as an option. The printer weighs about 28 pounds, and is not terribly bulky.

The Juki 6100's daisy wheel is mounted in a drop-in mechanism for fast, easy insertion and removal; pull one lever, drop in the wheel, push back the lever, and the wheel is mounted and centered. This feature makes it easy to vary print styles within a document—just pause the printer, insert a new wheel, and pick up where you left off.

Another feature lets you advance individual sheets of paper to a one-inch top margin by activating the pause control and then pulling back the paper bail lever as you insert the sheet. A built-in 2K print buffer can expand to 8K by adding three more 2K chips.

The noise level of the Juki is lower than that of other daisy wheel machines (nominally, 63 db A at a one-meter distance), and with the clear plastic acoustic cover in place over the platen and a foam rubber pad under the unit, the sound level is not disturbing. The bi-directional printing doesn't miss a character. Even when you pause the printer to change paper or ribbon, the printing picks up where it left off, once you press the reset switch.

The special printing features meet my expectations. You can control underlining, boldface, shadow printing (a heavy boldface), superscripts, and subscripts by sending escape sequences to the printer. For example, escape-E turns on underlining, and escape-R turns it off. I don't have any difficulty using these features with Screenwriter II, because of the program's ability to embed control characters (and escape sequences) in the text. Underlining and boldface are printed using the standard features of Screenwriter II; the Juki behaves similarly to the Diablo 630 for configuring word-processing software. There are some variations, though, and you should check the printer with the configuration you'll be using before you make a purchase.

One slight inconvenience arises when you use the six special characters on the 100-character print wheel. You have to use escape sequences, either from the keyboard or from software, to produce these symbols. They cannot be printed by using the CHR$ Applesoft function. The six characters vary according to the settings of three DIP switches. These settings let you set the Juki for different language print wheels, but also cause the special characters to vary for the wheel of any one country. For example, using the Juki wheel for the

United States, an escape-J produces an umlaut, a superscript 3, or an accent mark. To complicate matters, the Triumph-Adler print wheels have a different character set from the Juki wheels.

On the positive side, the Juki's documentation is excellent. The manual has 164 pages with illustrations and tables. The writing is concise, taking pains to explain the major procedures and technical matters. The book covers the procedures for interfacing with the Apple II, IBM PC, Kaypro, Osborne, and TRS-80 Model III, and the set-up sequence for using WordStar. There is one nice bonus for Apple II users—the manual includes listings of three Applesoft programs that show off the Juki's features, including graphics.

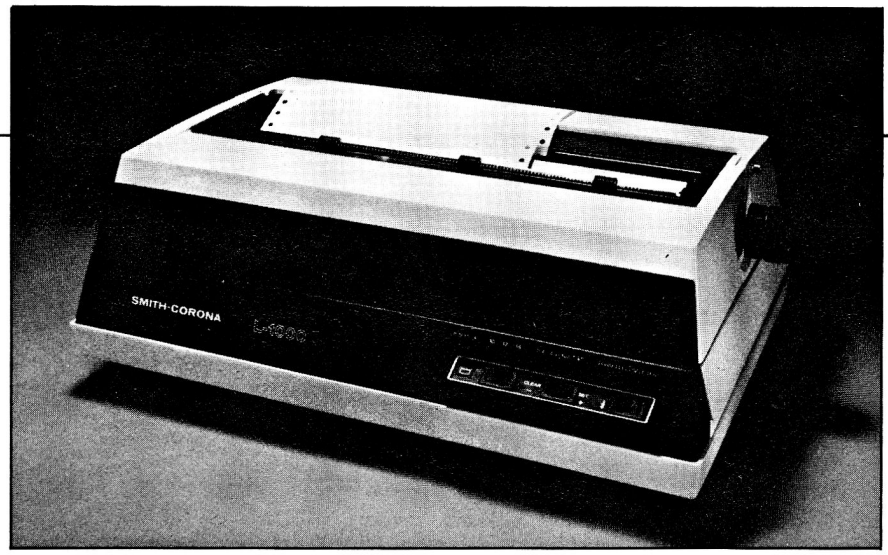
I recommend the Juki 6100 for those who need true letter-quality printing. The price is low, the speed is adequate for home use, and the ease of operation is excellent. The printer offers the special features you would expect in this price range. The only caveat I would offer is to make sure your word-processing software can handle escape sequences if you need to print the six special characters on the print wheel, or if you need to access printer-control functions with embedded commands.

For further information, contact Juki Industries of America, Inc., 299 Market Street, Saddle Brook, NJ 07662. List price is $699. ■

Alexander S. White
Annandale, VA

Smith-Corona L-1000 Printer

You get a warm, secure feeling inside when you use a typewriter-quality printer made by a longtime American typewriter manufacturer. Smith-Corona's L-1000 is the result of a marriage between the electric typewriter and the microchip. It's not as fast or as fancy as more expensive daisy wheel printers, but it performs well enough with the quality and simplicity that will keep it working for a long time.



The Smith-Corona L-1000.

The L-1000 produces letter-quality printing admirably. Character evenness and alignment are excellent, and the mechanism handles paper smoothly. You can pay more for a daisy printer, but you won't get better looking output.

Of course, there are no laws saying how fast a letter-quality printer has to do its job, or how quietly. Daisy printers are slow and noisy. The L-1000 is among the slowest. It's rated at 12 cps (characters per second) and takes about three minutes to print a full page of double-spaced 80-character lines. Faster daisy printers finish the task in one third the time, but they also cost more.

This printer is not any noisier than the average daisy, though its sound is a bit different from the faster ones that have a low, rattling vibration. At 40 or 50 cps, you can't hear individual hammer taps. The L-1000 sounds like an electric typewriter; you hear each tap.

The Mechanics

The paper feeding mechanism is a standard rubber platen. Just like a typewriter, a spring-loaded paper bail with three adjustable rollers holds the paper against the platen above the printing head. A sliding metal ear, marked for 8½ and 11 inches, guides the left edge of the paper as you roll it in. (Maximum paper width is 13 inches.) There's even a lever to set single, one and a half, or double line spacing. A tractor-feed mechanism is available for continuous fanfold paper.

Under the hinged cover, you almost expect to find a fanned array of metal arms with typebars attached. What you do see is a cavity with the ribbon and printhead mechanism mounted on a lateral track. A circuit board is mounted at the back. The option switches are accessible through a rear panel.

Removing and installing the cartridge ribbon is neat and simple. You don't have to thread the ribbon. When you press the cartridge into place, the ribbon slides smoothly into alignment. To release the cartridge, just press the lever. Replacing the daisy wheel is easy, too. You just turn the hammer release knob and pull the daisy off. Pressing another wheel on and repositioning the hammer takes no more effort.

Front-panel controls consist of three rocker switches. The best one has three positions labelled 10, 12, and 15. No software-generated codes are needed to change printing pitch (characters per inch) on this printer. You control pitch with software, but you also set it with this convenient switch. Since some word processing programs cannot send printer control characters, this is a real boon.

The second rocker switch, Top of Form, sets two forms-handling options. One handles continuous lengths of paper and the other is for single sheets. In the Set position, the printer automatically spaces over page breaks, leaving top and bottom margins. In the Clear position, it

prints lines without such skips.

The third rocker switch advances the paper to the next line or next page, depending on the Top of Form switch setting. It also actuates a self-test feature if held down when turning the printer on.

On the back panel is the power switch, connectors for the serial and parallel interfaces, and a removable grill covering the internal DIP switches.

Programmable Features

The L-1000 has the basic programmable features necessary for letter-quality printing applications. One feature underlines characters, including spaces. The L-1000 cannot print boldface (multiple-strike), superscripts, or subscripts. The L-1000 sets the top, bottom, and left margins, as well as the page length. You can set any of three common pitches: 10, 12, and 15. Proportional spacing, however, is not available.

Program up to 16 tab stops just as you would on a typewriter—move the printhead to a certain position and send a code to set a tab there. Clear single tabs the same way or clear all the tabs with a single command. Another typewriter-like feature is a margin release that temporarily overrides the set margin.

Documentation

Few user manuals are easy to read or use. The operator's manual that comes with this printer is an exception. The manual is not any more intimidating than the ones that come with household appliances. The technical information is there, but the style, language, and illustrations are the same as you'd expect to find in the manual packed with your new microwave oven.

I recommend the L-1000 for letter-quality printing. It's no speed demon, and it's hardly quiet as a whisper. But, the printer's design and performance are impressive.

I'm impressed, too, with its ease of use. Its sensible typewriter-like operation, excellent user manual, and up-front pitch control will make users feel comfortable very quickly.

The L-1000 is available through Smith-Corona Consumer Products, 65 Locust St., New Canaan, CT 06840. List price is $595. ■

Jon Voskuil
Milford, NH

The Silver-Reed EXP 500

The Silver-Reed EXP 500 is an inexpensive daisy wheel printer that delivers superior print quality at a reasonable price. For letters, articles, technical manuals, and newsletters, this printer produces significantly better looking copy than other printers or typewriters on the market.

Features and Functions

The Silver-Reed EXP 500 is surprisingly lightweight and compact for a letter-quality printer. It's only a little larger and heavier than my Epson MX-80F/T. Silver-Reed's office typewriter experience is evident in the design of the EXP 500, which is designed to deliver years of reliable service in a home or small office. It has an internal self-test, and it's quiet, attractive, and particularly easy to interface.

One of the printer's best features is that instead of implementing unique command sequences for vertical and horizontal spacing, tabs, or pitch settings, its print commands mimic those of the Diablo 1610. (It possesses the same commands as the Diablo 630 except for proportional spacing found in the more expensive Silver-Reed 550.) Any word processor designed to work with the Diablo should work with the Silver-Reed 500. Since it can be purchased with the Centronics parallel interface, the Silver-Reed 500 is compatible with most computers and word processors.

Every time I used it with a different computer, the Silver-Reed worked the first time. I used the Silver-Reed 500 with Apple Writer 1.0 and The Word Handler, and with both the Epson and the inexpensive Coex standard parallel interfaces. The printer's capabilities with The Word Handler are particularly impressive—underlining, superscripts, boldface, and even true microspace justification print without inserting complicated control sequences.

I tried the Silver-Reed with a VIC 20 equipped with a CardPrint parallel interface, and also with a Kaypro. It worked on the first try. After the uneventful experiences I had in matching computers, word processors and printers, I found this compatibility amazing. Chalk one up for the foresight of Silver-Reed's designers and for standardization of computer interfaces.

Silver-Reed's ribbons are interchangeable with Olivetti ET series typewriter ribbons, but Silver-Reed's long-lasting multiple strike ribbons are recommended for everyday use. A variety of typefaces is available. Unfortunately, the print wheels are not interchangeable with Diablo or other brand print wheels.

The Silver-Reed EXP 500 handles single sheets of typing paper with an automatic sheet feed. When paper is inserted behind the platen and the "TOF Set" and "Form Feed" buttons are depressed, the platen spins and the sheet is automatically cycled into position, ready to print. Because of this feature, the Silver-Reed is easier to use with single sheets than the Epson MX-80F/T. You just raise the paper bail, insert the paper, push the buttons, and you're ready to print. A tractor feed option is also available.

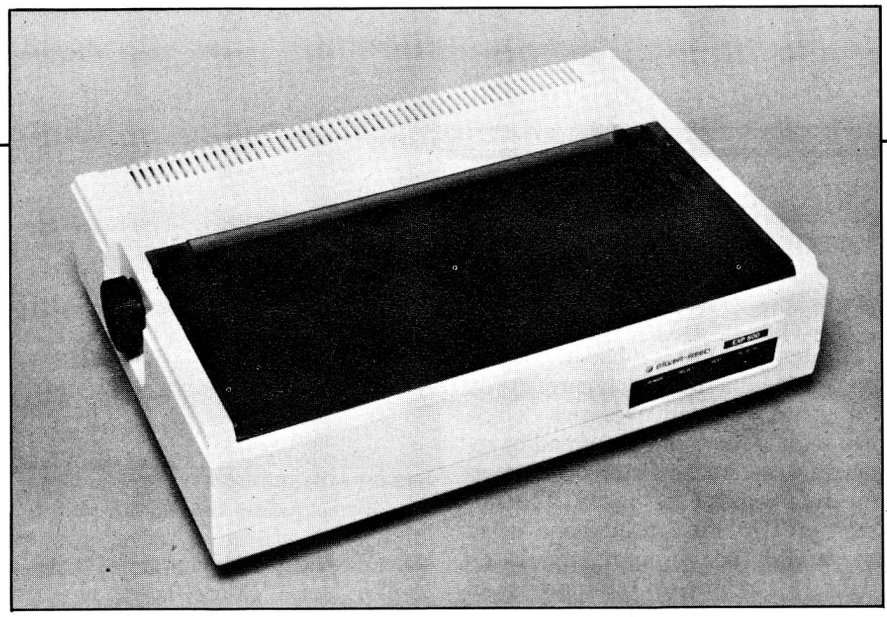
So Nobody's Perfect

Silver-Reed shares a shortcoming with other letter-quality printers in its price range—speed. Although it chugs out a perfectly respectable 12 characters per second, I find it difficult to wait while the Silver-Reed prints a single page at a time. But let's face it. Faster letter quality printers sell for more than twice the price of the Silver-Reed, and that's a lot of money to spend for a few minutes every other hour. I cannot imagine using a relatively slow, single-page printer as my only source of hard

copy for serious programming. A word processing program, such as The Word Handler or Wordstar, is essential if you are determined to get along with a Silver-Reed 500 as your only printer.

I plan to keep my Epson dot matrix for draft copies and program listings. This combines the best of both worlds—fast, legible copy and letter-quality print for correspondence, articles, and academic papers. A cheaper dot matrix would serve as well, but you need a faster dot matrix for everyday work when speed, rather than quality, is important.

Silver-Reed's manual is adequate, but won't provide enough information for an inexperienced user to assess the printer's advanced features. I was grateful for the thorough Epson manuals which help explain Silver-Reed's concise documentation.



The Silver-Reed EXP 500.

The Silver-Reed EXP 500 performs exceptionally well and at $599, it rivals the more expensive letter-quality printers. The printer is manufactured by Silver-Reed America, Inc., 19600 S. Vermont Ave., Torrance, CA 90502. ■

Herb Rand
Amherst, VA

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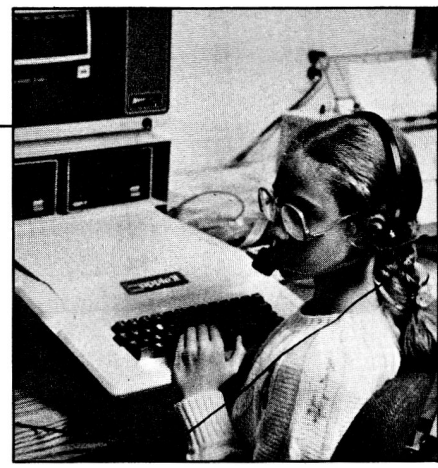
Voice-Based Learning System



The Voice-Based Learning System.

The Voice-Based Learning System (VBLS) is a hardware/software combination which permits you to create interactive lessons which can be answered orally instead of requiring the student to type answers on the computer keyboard. The student speaks into a headphone when the appropriate prompt appears on the screen or presses the spacebar to control the speed of presentation of the prompts. The author must know the lesson to be taught, the questioning method to be used, and how to operate the Voice-Based Learning System to create the lesson.

The system can be coordinated with a filmstrip projector, Kodak Carousel slide projector, a printer or all three. The teacher can use available materials with the new technology—something developers of new methods and materials frequently ignore. Teachers can print out the pretests, post-tests and student scores.

System Requirements

The VBLS consists of the VET (voice-entry terminal) or "Shadow/VET" unit produced by Scott Instruments Corporation (a headphone, terminal box, interface card and cable), plus the software which allows the user to create teaching programs without knowledge of programming techniques. To use the VBLS, you need an Apple II or an Apple IIe with 48K RAM. To use the Authoring System your computer should have two disk drives, but to use the Study System you need only one disk drive.

The VBLS is a "speaker-dependent" voice entry system. It must "hear" the word or phrase several times before it "learns" it. This applies both to the author creating a teaching program and the student using the Study Disk, as the computer must learn to "recognize" each person's voice. This makes the system very flexible and enhances the possibilities of use with students who have speech-related problems.

The Voice Entry Terminal uses speech recognition procedures to analyze user input. When the computer-using "author" speaks into the microphone, the sounds are analyzed and stored as patterns of electronic signals in the computer's memory. These "templates" are stored on the disk and then used as a basis for comparison to the answers later entered (spoken) by the student. The computer can "understand" or recognize words spoken in any language and pertaining to any subject.

In the reference manual, the user will find a complete introduction and an overview of the VBLS. Also included is an excellent tutorial which guides the user through all the steps necessary to create a successful teaching unit. It includes sample lessons, a Lesson Design Worksheet which may be reproduced for future use, and a section on evaluating courseware complete with its own form.

The VBLS is surprisingly easy to install and use with your Apple computer. The microphone snaps into its holder; the cable attaches easily and securely to the card. Once the card is placed in slot 4, the programs run smoothly and effortlessly with good error trapping and easy exits. Even when I tried it without reading the instructions in the reference manual, it worked well.

Where to Begin

The three separate components of the Voiced-Based Learning System software are the Authoring Mode, the Library Disk and the Study Disk. The Authoring Mode first creates the teaching programs which are stored on the Library Disk and from this disk the student's study disk can be made (again by use of the Authoring Mode). The Study Disk contains both the teaching program and the programs which make it run smoothly.

Before using the Voice-Based Learning System, you should copy the Master Disk; both a copy program and instructions for its use are included in the package. Then the original disk should be put away and the copy used for program authoring. The copy program can also be used later to make duplicate library disks and study disks for back-up purposes.

The blank target disk (Library Disk or Study Disk) must then be placed in the second disk drive and initialized, using the program which appears on the menu of the Master Disk. Once this is done you are ready to begin.

The Authoring Mode

The Authoring system is menu-driven. When it is booted, its menu appears and shows the following choices:

1. Run lesson
2. List lessons
3. Disk functions
4. Change study disk
5. Change profile record
6. Review performance history
7. Author new lesson
8. Change old lesson
9. Train old vocabulary

After choosing number 7 (author new lesson) a new menu appears and offers several more choices. The teacher is asked whether there will be multiple speakers, or whether "branching" will be used in the program. (If a student answers a question correctly, the program moves to one series of questions. If the question is answered incorrectly, the program displays another series of questions.)

You then type in the first question. (Questions should be planned before using the VBLS to create the lesson.) You indicate the end of a question by pressing the escape key and are then prompted to type in the answer.

The VET can only accept answers

which are spoken within three seconds. All questions must either be short-answer format or else use a multiple-choice format where the student will choose a short word or number to indicate the answer.

Each of the answers must have a distinct and different sound pattern for the program to be able to distinguish among choices. The example used in the reference manual is "John Adams" vs. "Don Adams," which the computer cannot distinguish reliably. Even when the VET is set for maximum sensibility, it is not as discriminating as the human ear and is likely to accept similar-sounding words for one another. Although this can be an advantage in some situations (as with a student with pronunciation problems), in others it is not. If the system is used to ask questions requiring answers in a foreign language, it will sometimes accept mispronounced words as correct. While using the student disk, I was able to get the computer to accept as a right answer both "dis" and "dyaz" for the Spanish word *dias*. Even when I adjusted the sensitivity, the computer accepted "diaz" for "dias." When several speakers initialize the sound patterns of answers, this problem increases.

Each answer must be entered into the computer orally (using the VET) five times. This allows the computer to fix the range of acceptable patterns. Once this is done, the user signals the end of lesson creation and returns to the main Authoring menu.

The system is very flexible. If you wish to change a lesson, you can reenter the lesson from the menu. Before anything is irreparably changed, you are asked whether you are certain that this is what you wish to do. A "no" answer will return you to the menu for further choices. The menu choices also let you "retrain" old vocabulary.

The Authoring Mode can review the "Performance History" of the students if you have set the "Study Disk Profile" to include making a record of the student performance. The Author Disk is placed in drive 1 and the Study Disk in drive 2. Menu choices do the rest. Scores are presented by showing the number of questions, the number correct, the number of attempts by the student to answer each question, and the percentage of correct answers when the Post-test (if chosen) is given.

The teacher can choose from 40 "items" or variations of program instructions when deciding the format of the Study Disk. They pertain to screen presentation (should the instructor's name or the title of the program appear on the screen, should the spacebar be used to activate the microphone or should it be automatic, should question numbers appear, how many times should input be repeated in the tutorial mode, do you want the student's name to be used in the program?), record keeping and applications. At present seven of these items are marked "Reserved" for placement of future items.

The user's manual gives a full description of each item and instructions to be followed if you wish to make changes from the default values. This profile can then be printed out and saved for future reference. I found the printout to be very useful when I was experimenting with different configurations.

To create a study disk, you select "Disk Functions" from the main menu. This formats and transfers the profile to the initialized disk you have placed in drive 2. Then you can use the "copy lesson" option to copy your lesson to the student disk.

The Study Disk

When the student boots the study disk, a menu of the lessons appears on the screen. The instructor has already decided the modes in which the lessons are to be presented. The elements of the presentations are combinations of:

- Pre-test, which can also be printed out using a printer.
- Word drill, which allows the student to practice the lesson's vocabulary. A graph compares the student's pronunciation to the template of the instructor's voice.
- Tutor/Review—The tutor presents questions with answers. The student is prompted to say the correct response. To review, questions are presented without answers, and the student must enter them when the prompt appears. The teacher controls the number of times a student may input an answer. After this number of attempts, the answer appears on the screen. Correct answers receive appropriate supportive comments. A score-screen may be presented to the student at this time. An option is available so the student can repeat these two modes if it has been pre-programmed by the instructor.
- Post-test, which asks the questions again either sequentially or randomly, as chosen by the teacher. (This option is also available for the Review mode).

The teacher can choose either spacebar control of the program or the computer-controlled prompt. The former allows the student to control the speed at which the program moves from one question to another, but the second method can make the VBLS easier for younger children or students who have limited use of their hands.

Although the Voice-Based Learning System is advertised as ideal for foreign language instruction, it is not at present sufficiently developed for that purpose. Use of a tape and slide unit, or any other sound unit, mitigates the problem somewhat. There is no provision for the display of accents or punctuation not used in English.

The Voice-Based Learning System is an excellent educational tool for many subjects and, if the new capabilities are incorporated with the same concern for quality and ease of use as in the present unit, the Voice-Based Learning System may well become the "magic key" to the world of computers for many teachers.

The VBLS costs $895. For more information, contact Scott Instruments Corp., 1111 Willow Springs Drive, Denton, TX 76205. ■

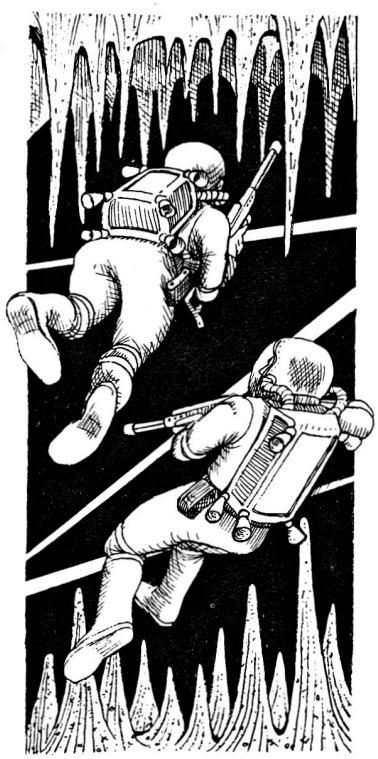
Janet Meizel
Davis, CA

Software Reviews

Caverns of Callisto

All is not quiet on Callisto, one of Jupiter's moons. The caverns, which are man-made mines for the extraction of plimsil, were supposed to be deserted. It was quite a surprise when a horde of mutant creatures emerged from the caverns and tore apart your spaceship!

The beasties made off with the ship's ion drive and 40 panels, which they left scattered all over the caverns. Since it's a 400 million mile walk back to Earth, you've got to explore the caverns and find the parts, no matter what.



The object of the game is to find all 40 panels and the ion drive and return to the ship. The panels are located in five major rooms of the cavern, so you must explore each chamber carefully. You also amass points for shooting aliens and for progressing from room to room.

You control five spacesuited cavern explorers one at a time with your joystick. Each has a backpack thruster to move them around the maze-like interior of the caverns.

Your spacemen are armed with high-energy plasma rifles operated by pressing Button 0 and the joystick and firing with Button 1. Learning to aim and shoot smoothly is a good survival technique, because the caves are crawling with beasts so deadly that even to touch one means instant disintegration.

Of course, there are other dangers in the old mines, such as fiery geysers and a guardian laser beam that can burn through a spacesuit. Watch the gun and fuel gauges, and look for cannisters of fuel the miners left behind so you can replenish your supply. Also look for pools of plimsil. If you dip a man in one of these pools, his spacesuit becomes impervious to harm for a little while.

Caverns of Callisto does not require expert arcade skills, but it does call for good judgement, patience, and strategy. Caverns of Callisto is manufactured by Origin Systems Inc., 1545 Osgood, #7, North Andover, MA 01845. The list price is $34.95. The game will run on the IIe and on any 48K Apple II Plus. ■

Brian J. Murphy
Fairfield, CT

Gruds in Space

Gruds in Space is the adventure you must undertake if you hope to save the universe from the invading alien horde of Gruds and deliver fuel to the incapacitated battlewagon floating aimlessly in space.

Scenarist Joseph Dudar and programmer Chuck Sommerville have constructed a puzzling plot that has more twists and turns than a plate of spaghetti. You start with a few basic items—like a screwdriver and a spray can—and with these simple tools you fight monsters and explore dank caves and dense alien jungles as you search for a way to get the heliotropanite fuel you need.



One or two of the aliens may rope you into a wild scheme that could get you in hot water. On the other side of the coin, the Gruds may prove to be helpful in assisting you with your quest. More hints than this, I cannot give you, but knock on every door and watch out where you get your flashlights from.

There are traps that will prevent you from making any progress until you learn to ignore logic and approach the puzzles from a perspective you may not have used in other games. Early on in the game, you will think that you are on the right track when you find some objects that seem obvious. When the answer seems obvious in Gruds in Space, that is the time to beware.

This is not a game that you will solve in one night. You can expect to meet many a grisly fate as you attempt to unravel this knotty trail of logic. Remember to make a backup copy of the second side of the game disk and to save the game frequently, especially when any enterprise seems even the least bit dangerous.

The exceptional quality of the high-resolution color graphics, the interesting and appropriate sound effects, and good humor that characterize this game will make up for the frustrations ahead.

Gruds in Space is the product of Sirius Software Inc., 10364 Rockingham Drive, Sacramento, CA 95827. The list price for this game, which will operate on an Apple II, II Plus and IIe with disk drive, is $39.95. ■

Brian J. Murphy
Fairfield, CT

Chivalry

"The days of old when knights were bold" sets an attractive theme for Chivalry, a splendid game by Weekly Reader Software. Chivalry combines high-resolution color graphics with handsome packaging and clearly-written documentation to delight mom and dad as much as their eight-year-old child.

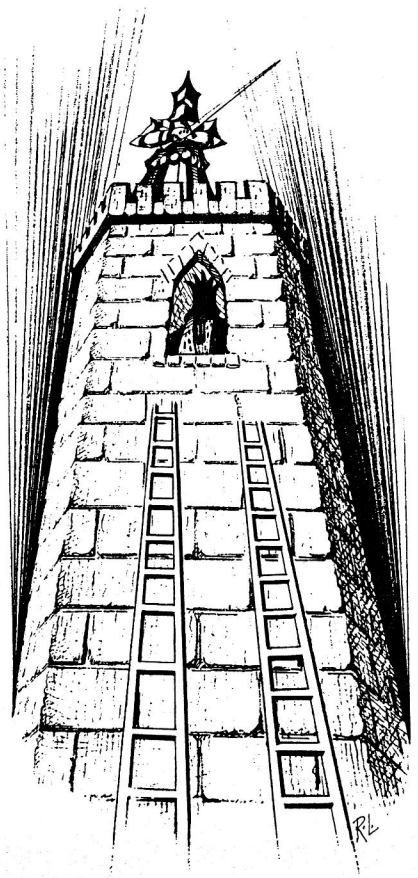
The game mixes the appeal of traditional board games such as Candyland, Chutes 'n' Ladders, and Uncle Wiggly with today's arcade video games. The level of arcade challenge is not exceptionally high, but the idea is to make the game accessible to all players, regardless of skill level.

As the game begins, you learn that the King is a prisoner in the Castle of the Black Knight. Up to four adventuresome heroes may join the quest to cross the kingdom, brave its hazards, and storm the castle to rescue the King from his captors. Players use tokens on a game board to keep track of their progress. On screen, the computer determines how many places the players will move on the trail to the Black Knight's castle.

You must rely on strategy and skill to overcome obstacles blocking the route to the castle. Can you hit a moving target using your bow and arrow? If so, the Archer's Meet won't delay you. But there's always the chance you won't dodge a rolling barrel on Rolling Hill. How well can you operate a catapult? It takes good timing.

Sometimes the simplest tasks are the most difficult, such as using your wagon to catch sacks of flour dropped from a mill loft. After you drop your fifth sack, expect a severe tongue-lashing from the peasant who runs the mill. More than once, oh noble knight, you'll walk away with the cry of "Dolt! Dolt!" ringing in your ears.

A real hero dismisses ridicule. The true test comes from crossing the bridge guarded by a giant troll armed with a mammoth club, winning the jousting tournaments at the Templar's castle, and finding your way through the Laurel Maze with the Black Knight's paid assassin on your trail. Beware of the Pit, wild bears, and dragons.



During the quest, you'll run across clues that will help you with the more vexing obstacles, such as paths in the south forest and the Wizard's tower. The wizard forces you to choose one of three doors. One door is "evil" and one is "good." Which do you pick? Use your clues to select the right path.

To enter the Black Knight's castle, you must dodge stones thrown by the defenders. Use the catapult to smash the drawbridge mechanism, and free the gate to let you enter. Once inside, climb the wall of the inner keep and avoid the boulders hurled by the Black Knight. If you survive these challenges, you win.

This software captures the imagination of youngsters while challenging parents to join in the fun. Chivalry's amusement value is enhanced by the computer graphics created by Richard Hefter. His pictures are among the most original and well-executed computer images designed for Apple II software.

Chivalry is manufactured by Weekly Reader Software/Xerox Education Publications, 245 Long Hill Road, Middletown, CT 06457. The game package includes a hard-backed, full-color game board, playing pieces, a rule book, and disk. The list price is $49.95. The game will run on the Apple II, II Plus (48K with one disk drive), the IIe, and the Apple III in emulation mode. ■

Brian J. Murphy
Fairfield, CT

Magic Memory

When I first took Magic Memory home for review, I wondered if the world was ready for yet another address book program. To my surprise, I discovered that Magic Memory is a very good piece of software. Anyone considering the purchase of a personal address book program, a small business mailing list manager, or a computerized record keeper should take a long, hard look at Magic Memory.

Magic Memory is aimed squarely at the neophyte computer user. It emulates an ordinary address book by dividing Magic Memory into sections that correspond to the letters of the alphabet. These sections are referenced by tabs, just as any address book is. For example, to enter or examine entries in the "R" section, you position the cursor over the "R" tab in the View Memory menu. The data that you stored in the "R" section will then be loaded into memory, ready to be added, deleted, edited, sorted, printed, or moved to another tab section at your command.

The contents of the various sections are presented to the user via the Memory Book display. This display consists of the entries list, which dis-

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plays a key line (called the View Line) from each entry in the tab section, and the View Window, which displays the complete contents (or a user-defined portion thereof) of any single entry that you indicate. Of course, not all of the entries in a section can fit on one Memory Book display (there can be up to 250 entries per section). Magic Memory lets you scroll through a section and examine View Lines until you find the entry you want.

Each Memory Book (which is contained on a single data disk) consists of 24 tab sections identified by a letter of the alphabet (X, Y, and Z are combined into one section), and an additional 24 sections with user-defined tabs. Thus, you can create a separate Memory Book for every application from personal addresses to a list of political contributors. The program is not limited to storing names and addresses, however. You can store any information that you feel is amenable to the tab system used in Magic Memory.

Magic Memory's printing subsystem permits you to create various print formats for different purposes and to store these formats until they are needed. The formatting options are more than adequate and are easy to use. Speaking of hard copy, the documentation provided with Magic Memory is excellent. The format is similar to the documentation used in the PFS software line.

While Magic Memory can be described as a data base program, it should not be confused with its more powerful (and more expensive) cousins. It lacks many of the features of a true, generalized data base management system. Magic Memory is best described as a *specialized* data base system. In the performance of its specialized function, Magic Memory is excellent. That's all I ask, and more than I usually get, from any piece of software.

Magic Memory is a product of ARTSCI Inc., 5547 Satsuma Ave., North Hollywood, CA 91601. It retails for $99.95.■

Bob Ryan
***inCider* Staff**

The Graphics Magician

I get the feeling other people are making more money from The Graphics Magician than its publisher, Penguin Software. According to Mark Pelczarski, Penguin president, this Apple-based utility is part of Adventure International's development system for its Apple games, of Sir-Tech's Police Artist (among others), of Sierra On-Line's newest educational products (such as Troll Tales), and will contribute to several upcoming creations from Mattel.

Now, to be fair—and Penguin explains this early-on in the manual—TGM isn't for the computer rookie. You have to know some Basic programming and have at least a minimal knowledge of machine language to create anything like the really sophisticated programs above. But, if you're just starting out, you can focus on learning to structure games and get results without knowing how to write assembly language animation routines. In fact, creating some simple games will help you understand more about both TGM and programming.

The main criticism of the earlier version of TGM was the denseness of the documentation. The new manual—even with a tutorial and more programming examples and tips—still requires a goodly amount of serious study. But in fairness the various routines do so many things you can't really expect them to be explained in Dick-and-Jane terms. It would help, however, if the manual were indexed. The Table of Contents is complete, but doesn't aid with features that really need to be cross-referenced.

Future Compatibility

A neat thing about TGM is that, eventually, once figures and backgrounds are designed, programmers will be able to use the exact same ones on a number of computers. Penguin plans versions of The Graphics Magician for IBM, Atari and Commodore in addition to the Apple. You'll need

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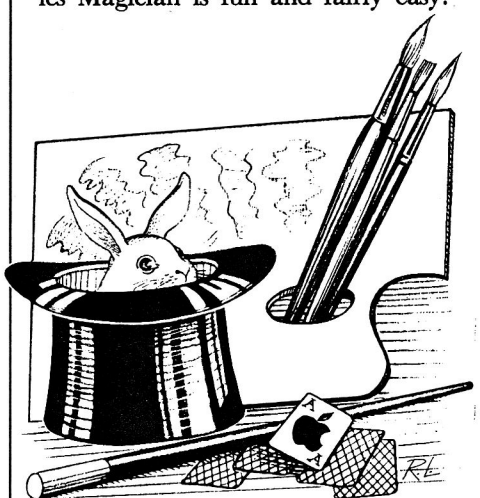
only write new programs for the other computers to access what you've already developed on your Apple II Plus or IIe. You'll be able to build a library of critters and aliens and little people—all hopping or zooming or jogging, alone or in groups—and use them over and over.

Creating and animating objects with the latest version of The Graphics Magician is fun and fairly easy.



Doing the backgrounds—forests, rooms, space stations, whatever—is a bit more tedious, but you can use paddles, a joystick, the Apple Graphics Tablet, Houston Instruments' HI-Pad, or even a Koala Pad if you have one. The backside of the fully-copyable disk offers a demonstration program (the manual explains how it's put together) and a huge number of different types of TGM files for you to inspect and fool around with.

Two Systems

TGM is divided into two parts: the Animation System and the Picture System. You use the Animation System to create a "shape" (critter, cowboy, funky flower), and to make a "path" (tell the shape where to go on the screen). The Animation Editor lets you orchestrate the sequence. You can move the same shape on different paths, different shapes on the same path, or different shapes on different paths—each with little parts moving about, mostly flicker-free, of course. The composition is entirely up to you—and, I might add, can be hysterical when you get results you don't expect.

You can get a nifty printout with all sorts of technical data about an Animation File. You'll find it most helpful to refer to this hard copy when composing a particularly complicated program.

I tested several of the sample programs to control TGM objects, both with paddles and from the keyboard. They worked well and helped me learn even more about my Apple. Penguin includes a chapter full of "technical stuff" that you won't need right away, but will be vital when you get into machine language routines (necessary to speed up action in arcade-style games).

You use the TGM Picture System to create backgrounds for your animation routines. Or you can use it alone for adventure-style games without animation. The people at Penguin have found a way to save just the moves you make when drawing, instead of the entire hi-res screen. In this way they've reduced sectors needed for storage to as few as four or five, instead of Apple's typical 33 or 34. As a result, you can pack five to six times the usual number of pictures onto an Apple disk (Penguin says 75 to 100), and time to load is cut dramatically.

Penguin includes a sample program—and a disk routine—to combine several pictures for loading at program start. They also provide a way to save your picture in the usual way, which is necessary for the Animation System to work over a background.

Picture This

You create a picture in four basic steps:

1) Draw a line with one of eight colors.
2) Use a brush, ranging from pinpoint to quite large, and select from a 108-color palette.
3) Fill an entire area with one of the colors.
4) Insert text anywhere you want in your picture.

You add letters by moving the cursor to the chosen spot and typing T to

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access the text mode. Control-L toggles between upper- and lowercase. The first time I added text, I found it very difficult to make corrections in a word three lines up from my current position. Keep track of your X,Y coordinates before you select the text mode so you can relocate the cursor exactly. Also, save a version or two of your picture without text so you can reload it if you change your mind about text placement. Later you can add, delete or change lines and colors to make your picture better. TGM provides a number of utilities to put on your own disks to capitalize on all this work.

If you're serious about writing animated software or fast-moving adventure games—or learning how to—you'll want to take a long look at TGM. It won't design your games or write the programs. You still need to do that yourself. But even at a buck an hour, you'd "spend" more than the $59.95 to write all those machine language routines yourself. TGM is a superb utility—true graphics magic for the Apple.

The Graphics Magician is manufactured by Penguin Software, 830 4th Ave., Geneva, IL 60134. ■

Ann Baldridge
Bloomingdale, IL

Speed Reader II

Speed Reader II is a well designed package that improves reading skills as well as reading speed. To review the program with me I drafted a high school sophomore who had just completed his second consecutive speed reading course. "Those six-week courses cost me $45 each," he said, "but I figure it was a good value because I doubled my reading rate."

"That's terrific," I told him. "Now help me decide if this software program is a good value."

We read by moving our eyes across reading material in spurts. Our eyes pause frequently, then move on quickly. It is this eye movement that determines the speed at which we read. The exercises in Speed Reader II are designed to increase your eye span (the number of words you read at each pause), perception (the duration of each pause), and eye movement (the speed with which you move from one group of words to the next).

Speed Reader II is a six-part program. The first two, Letters and Words, are warm-up exercises. In Letters, two, three, or four randomly selected letters are flashed briefly on the screen. You are to type the letters that you saw. Correct responses decrease the time that the following set of letters are visible on the screen. If you read quickly and accurately, you'll proceed through 15 speeds. Each time you err the display time increases. As you advance from two to three to four letter displays, you widen your eye span, thus increasing your reading rate. Our only complaint was that, due to the nature of the graphics used to create the letters, we had difficulty distinguishing between some letters (like m and n).

Like Letters, Words directs you to watch for the "flasher," a small white square which appears in the middle of the screen. By focusing on the flasher and reading the words to its left and right, you expand your peripheral vision. "When you have to



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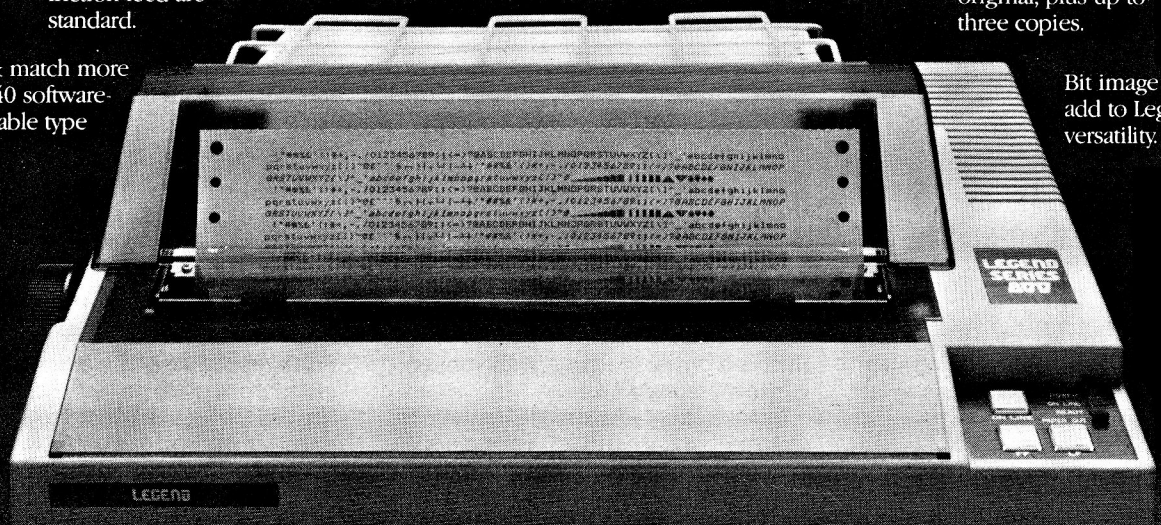

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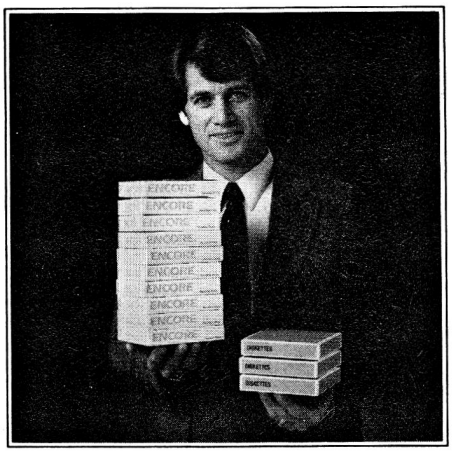

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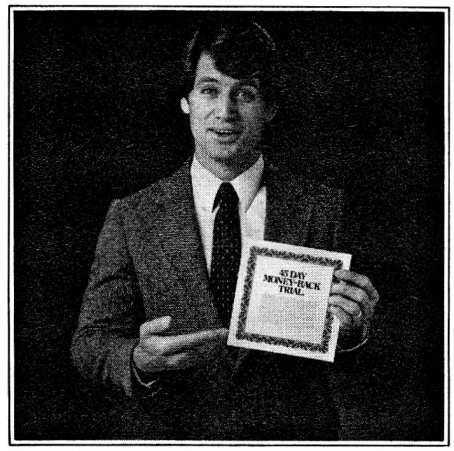

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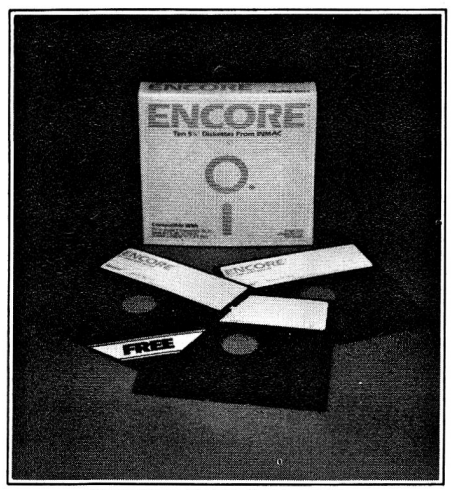

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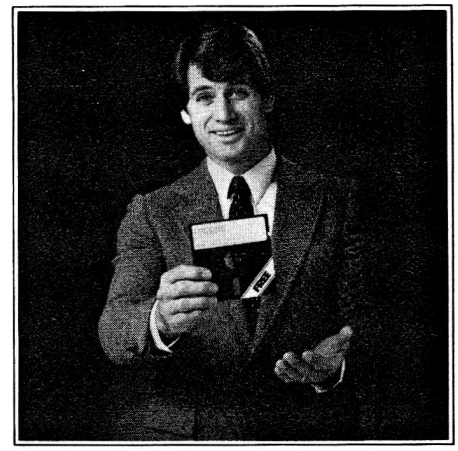

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type in the words at level three" (four words displayed on the screen), said my reviewer, "it sure would be more enjoyable if you knew touch-typing."

The Eye Movement lesson gives you practice using the techniques developed in the warm-up exercises. Groups of words flash alternately on the left and right side of the screen and on down the screen. You are to read the text, following the material with efficient eye movement. After each reading selection, there is an optional comprehension quiz. "The good part about this exercise," said my student reviewer, "is that it won't let you look back over what you've already read. That's essential in speed reading."

The Column Reading lesson displays a column of words down the center of the screen. You select the speed that you want the passage to be displayed. The trick here is to read each line with only one eye fixation, or pause. Again, there is an optional comprehension quiz.

The Reading Passage lesson allows you to pick from 15 entertaining reading selections. You choose the speed (100 to 2000 words per minute), and the window size (the number of lines to appear on the screen at one time from 1 to 12). Once again, there is the optional comprehension quiz. "A lot of thought went into these passages," said my young speedster. "Every one of them is interesting."

The Timed Reading Test computes your reading rate and comprehension level. You select a passage to read. It appears one screenful at a time. After you finish reading each screen you press the space bar to call up each successive paragraph. Finally, you take a quiz to determine your comprehension level.

One of this program's outstanding features is its ease of use. Press D as the program is booting and it enters a nicely done demonstration mode that repeats until you press the escape key. In addition, the documentation is excellent. It is clearly written and well packaged in a small durable three-ring binder.

The program has an editor mode that allows you to enter your own reading material into the exercises. It also allows you to print out your reading material and analyze its level of difficulty with a grade level analyzer. The editor is quite good, similar to the easy-to-use editors of the manufacturer's Math Blaster and Word Attack.

"At $69.95, is it a value or not?" I asked my young colleague.

"It sure is. It covers the exact same principles as my six-week course—drilling you for speed while emphasizing comprehension. I've shelled out $45 for that course twice already and my dad wants me to take it again next summer. This software program is a one-time investment—as long as you own a computer."

Speed Reader II is available from Davidson & Associates, 6069 Groveoak Place, #12, Rancho Palos Verdes, CA 90274. Additional data disks for elementary through college students cost $19.95 each. ■

Mario Pagnoni
Methuen, MA

In Search of the Most Amazing Thing

In Search of the Most Amazing Thing is the adventure game which takes you on an arduous quest within the Darksome Mire for this magical object that reveals the secrets of existence. The first step of your journey is to visit Smoke Bailey deep in the underground city of Metallica. He'll help you raise a financial stake for your adventures by giving you valuables to sell at the Metallica auction. Get as much advice from Smoke as you can. His suggestions will help you trade with the natives for clues leading to the Most Amazing Thing.

Once you've arrived at the auction, test prices for Smoke's treasures on the customers, but be sure you approach them carefully. Sometimes dickering may backfire and drive down the asking price. Never charge more than the audience is willing to pay or they might steal your goods.

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Assuming you have earned "chips," the local currency, visit the Galactic Store to buy the instruments and computer programs you'll need to navigate the B-Liner and to deal with the natives.

Your next chore is to learn how to pilot the B-Liner, which is a cross between a Land Rover and a hot air balloon. The B-Liner's course depends on the direction of the wind. As you might suspect, the winds over the Darksome Mire tend to be turbulent. At various altitudes, the wind blows in different directions. You'll have a hard time at first learning to press the right keys to toggle the burner and hot air release switches in order to keep the balloon at the right altitude to go in the direction you want.

You'll also learn how to maneuver your jet-pack to search for food and fuel. The pack takes you into popberry fruit trees and onto the B-Liner's drilling rig to prospect for oil.



The B-Liner, when equipped with guidance instruments purchased from the Galatic Store, will take you to the natives' huts for trading excursions. Try to get as close as you can by air, then travel the rest of the way by land.

The natives communicate by bending their antennae, so you'll need the computer programs from the Galactic Store to translate. Trade chips, sell Musix (the natives place a high premium on music), and gather clues to find the Most Amazing Thing. Again, exercise caution. It's surprisingly easy to lose your chips without finding anything out.

Supplied with clues and information, you should be able to find the Most Amazing Thing, but it will require many hours of play. Once you complete your quest, the Most Amaz-

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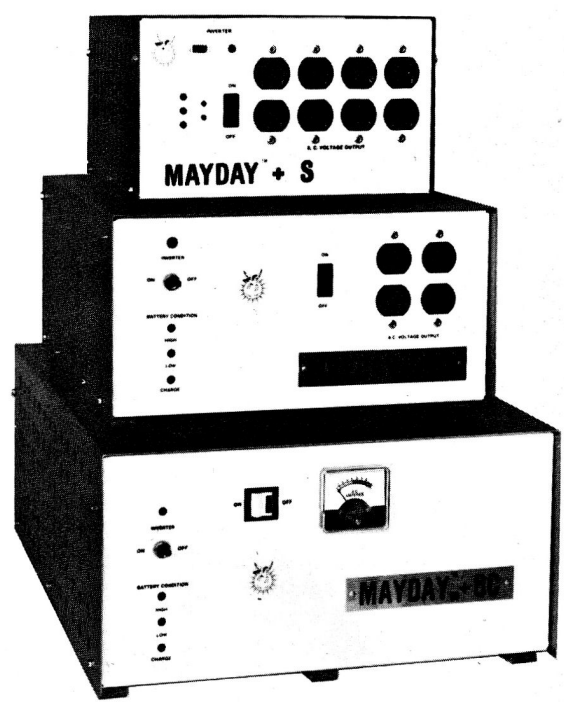
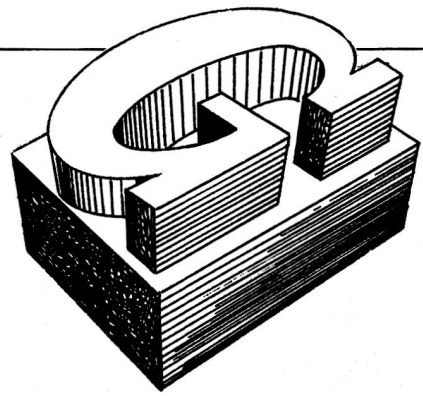


ing Thing will be hidden somewhere else and allow you to enjoy the adventure again with new clues and puzzles.

The game provides challenging entertainment and is several cuts above the usual adventure thanks to the play system. In this game, you move about not by typing commands such as "Go east" or "Pick up rock," but by single keystroke commands that manipulate the ship's controls. The riddles and clues are not too difficult to figure out, though a youngster or an adult without previous gaming experience might find the puzzles perplexing.

In Search of the Most Amazing Thing is manufactured by Spinnaker Software of 215 First St., Cambridge, MA 02142. The software package lists for $39.95, and can be played with any 48K Apple II Plus or



with the IIe in caps lock mode. ■

Brian J. Murphy
Fairfield, CT

Gutenberg

If you are seeking to integrate graphics and typesetting into your word processing operation, you should consider the Gutenberg programs. This review discusses the Junior version. Where appropriate, there are references to the more expensive, Senior, version.

Gutenberg is more than a word processor; it is a typesetter for the Apple Dot Matrix Printer (DMP). While it provides excellent word processing entry and edit of text, including an 80-column display on the Apple IIe, it goes well beyond these functions. The price for this power is complexity. Gutenberg has myriad options, most of which are activated by a seemingly never-ending list of embedded commands. To understand these command functions, you must examine demonstration files and compare them with the printed results.

Gutenberg can switch between various character sets. Alternate sets

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can be loaded into memory and selected by a single key stroke. You may translate one key into its alternate or switch the keyboard over to the entire alternate set for a longer text entry. The program comes with several valuable character sets and includes a utility to create and save your own sets.

With keyboard macros, the Gutenberg makes it possible to use one or two keystrokes to enter up to 33 characters. There are three variations of macros. One choice is for use after a return command (perfect for left-justified formats). The other two require that you strike the macro character once or twice. A set of macros can be saved to disk using a provided utility. The manual indicates that they can be reloaded for later use, but does not relate if this is done automatically or manually.

Most word processing programs allow you to embed special commands, or macros, which cause printing to occur in special ways. The Gutenberg programs come with extensive format options to set the page layout, paragraph form, print style and other functions, such as print controls.

When determining the page layout, you can select from eight macros. The options include simple single column, double-spaced drafts; double column, single-spaced story or newsletter articles; and others. For creativity, you can build your own macros and position titles and page numbers.

The appearance of paragraphs can be individualized by using blocked paragraphs with adjustable left margins, or by having the paragraphs automatically or manually numbered. Some of the options are useful for letters, form letters, and envelopes.

A novel feature of Gutenberg is the ability to move two windows into your text file, or to view two different files simultaneously. With this split screen feature, you can easily copy material from one window to another.

Documentation

The manual is unusual since it comes in machine-readable form, that is, in Gutenberg file format (a non-DOS 3.3 file structure). This no doubt keeps the cost down, but brings up a crucial problem. The Junior version is configured to work with only one printer. The version I used needed an Apple DMP, and without the Apple Dot Matrix Printer, you can't print the manual. I hope Micromation changes its policy and includes a copy of the manual with the program. I also found the manual's writing style awkward at

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times. I had some difficulty understanding certain points of operation.

The documentation doesn't include a summary listing of the edit commands. Other word processing packages, recognizing that the user must memorize the various codes for edit operations, provide a summary list or reference card. The Senior manual, however, includes an alphabetical list of commands for just this purpose.

An extensive list of format and print commands is provided. They are grouped by function, but not listed in any obvious order. If you try to perform one of the formatting functions, such as setting column formats or the method of initializing a page, be prepared to search the entire six-page listing.

The print command list is similar to the format command list. The list is shorter, however, and contains only 36 formats that can be scanned more easily. Apparently, there are more print commands that are not described in the documentation. According to the manual, "It is not in the scope of the Gutenberg Junior Version to list all 115 commands. To obtain the full list of commands and user manual you will have to purchase the Gutenberg Senior Version."

The manual contains 39 pages describing how to use the Junior and an additional 60 pages of example print and format options and their effects. Unfortunately, there is no index.

Hardware Requirements And Limitations

If you own an Apple II Plus, you must make a simple hardware change which permits the shift key to function. This change is not necessary if you own a IIe, since it has a working shift key. Gutenberg Junior users are told on the inside package that they must make the necessary connection to a II Plus, but the manual does not mention that this change must be made. It took me some time to realize how to get capital letters on my II Plus. (The manual for the Senior version tells you that you need the shift key modification and how to make it.)

The second hardware requirement is a printer interface card supported by the package. The Junior can work with any of the following: the Apple PIC, CPS, Dumpling, Epson-Prometheus, Grappler or Grappler Plus, Microbuffer II Plus, Microengineering, Pkaso, or Apple Super Serial. If you do not have one of these cards, you may experience difficulty printing out your text, even in the unformatted DUMP mode.

In the Junior version, only one printer was supported—the Apple

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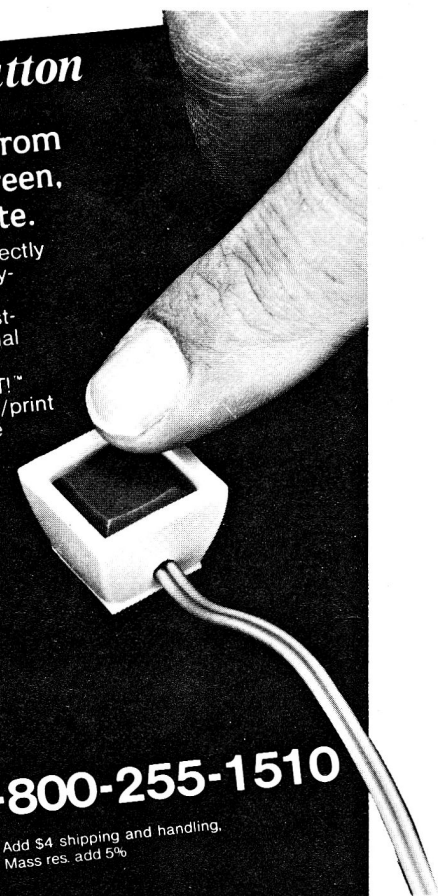

DMP. This is unfortunate since the manual cannot be printed without such a printer. At least the specifications for creating a printer driver could have been included. While new printer drivers may become available (the Senior version supports several including the Centronics 737 and 739, the Epson MX-82FT and 100, and the Qume Sprint 5 and 7 printers), you may not be able to use the package with your printer.

Renovations

Each time the program boots, you must identify your interface card and slot. The request is a serial pass through the list of nine supported cards. While the process is not time consuming, it is annoying. A preferable system, as used by the Senior version, would store this information on the disk and allow the user to modify it.

To get hard copy, while editing issue a control-P command to leave the editor and run a printing program. After printing, you must re-select the file and re-enter the editor. It would be nice if the user could get a rough draft without leaving the editor.

Gutenberg uses its own disk operating system. While a disk can be copied with the standard Apple DOS 3.3 COPYA program, Gutenberg files cannot be read from DOS 3.3. The Senior version comes with a utility, GLOBAL, which exchanges files. Junior users would value such a utility.

The Gutenberg Junior word processor possesses power for formatting graphical text, but is limited by hardware. The manual contains most of the information a user needs, but is a bit difficult to follow. Regardless of its shortcomings, I am not familiar with any other word processing package that provides the Gutenberg's unique capabilities. The potential user may want to compare the Junior version with the Senior before selecting one.

The Gutenberg is produced by Micromation Limited, 1 Yorkdale Road, STE 406, Toronto, Ontario M6A 3A1. The Junior sells for $85, the Senior for $325. ■

David Morganstein
Germantown, MD

DiskQuik

What does the extended memory 80-column card in the Apple IIe have in common with various products called Ramdisks? Not much, unless you have a copy of DiskQuik, a new software utility recently released by Beagle Bros. With DiskQuik, a world of instant disk access becomes available for a fraction of the cost of the typical hardware devices.

DiskQuik is a complete system utility that opens the 64K of RAM on the extended 80-column card for use. In addition to the all-important code that turns the extended card into a RAM disk, or pseudodisk, the system disk contains a variety of utility programs that make using RAM this way very convenient.

DiskQuik looks like a standard disk drive connected to slot 3. All regular DOS commands function with DiskQuik, and they are used in exactly the same way as with a regular disk. The one exception is with the INIT command. DiskQuik needs no formatting, so in place of the INIT command, the authors have provided a new command, WIPE. WIPE clears all programs and data from DiskQuik.

Using DiskQuik is almost exactly the same as using a hardware drive. The authors have provided utility programs on the master disk that make old habits fit right in with the

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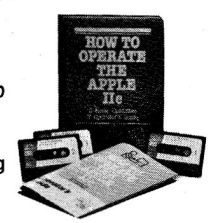

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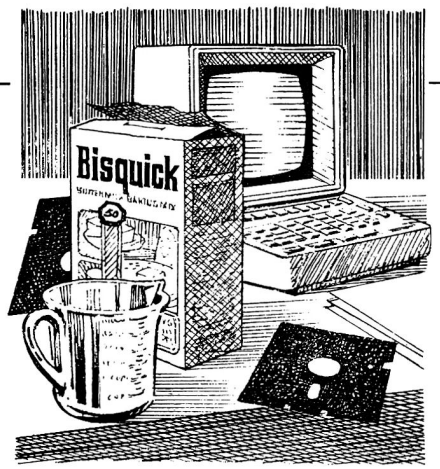
new device. For example, LOCKDQ and UNLOCKDQ are programs that will write-protect DiskQuik (LOCKDQ), or remove write protection (UNLOCKDQ). BRUN either of these to get the desired effect. Another example is CLICKON. This program will click the speaker once for each sector that is read from or written to DiskQuik. BRUN CLICKOFF to silence this effect.

Each of these short machine-language programs can be executed in immediate mode with the BRUN command. If you prefer to use a menu, DQMENU is on the disk. RUN DQMENU and you will be able to choose any of these utility programs by a simple keypress. You must remember, and the manual does a thorough job of reminding you, that running DQMENU will destroy any Applesoft program you might have in memory. If you want to remove write protection from DiskQuik and you do not want to lose your own program, you can BRUN UNLOCKDQ instead of using the DQMENU program.

One of the problems with RAM disks is that they do not provide permanent storage. If the power goes off for any reason, all programs and data will be lost. So, transferring



data from RAM to disk becomes critical if you want to use the information at another time. The DiskQuik disk contains two special copy programs. SAVEDQ will take all of the data in DiskQuik and save it onto an initialized disk in slot 6, drive 1. This is an easy and quick way to save the contents of DiskQuik. When it is time to work again with what has been saved, you use LOADDQ to load the information from the disk in slot 6 into DiskQuik in slot 3.

Four other utilities round out those supplied on the system disk. Two will protect and unprotect the 32 sector portion of the extended memory reserved for hi-res storage. The last two programs will disconnect or reconnect DiskQuik and its modified DOS. With these, you can reconnect the standard DOS and initialize a disk, for example, without losing any of the information stored on DiskQuik. When ready to continue using the RAM storage, you reconnect DiskQuik and its operating system.

Using DiskQuik

DiskQuik comes unprotected, and the manual recommends making several backups. One of these is for archival protection. The others are for use with the system. It is possible to save the contents of DiskQuik to a plain initialized disk, but if you want to make an autoload disk, you need to start with a copy of the master disk.

Using the system is as simple as booting the master disk. In less than 15 seconds, DiskQuik has been activated, and in another 15 seconds, a variety of utility programs have been loaded to slot 3. You can customize your own autoload disk and only load those utilities that you want to use on an on-going basis.

For those who program and use Neil Konzon's GPLE or Mark Simonsen's Double Take, it is possible to install DiskQuik without disturbing these programs. After installing one or both of these, simply

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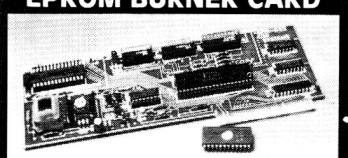

All menu-driven software is provided along with a complete user's manual. All commands are self-prompting, there are no personality modules required and all voltages are on-board card.

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insert the DiskQuik disk and run the DiskQuik HELLO program. During programming, just save your program to DiskQuik. If slot 3 was the last accessed slot, you do not need an S3 appended to the program name. To use a program on DiskQuik, just load it or run it. On this score, DiskQuik is exactly like using your regular drive.

Text files are created on DiskQuik the same way they are created on a standard drive. You open your file on DiskQuik from within a program and write to it. Read the data in the same way. This is the area that DiskQuik's speed is most apparent.

There are two ways to permanently save work to a disk. One method uses Apple's FID program. Beagle Bros thought so much of FID for use with DiskQuik that they licensed it from Apple and include it on the DiskQuik system disk. FID is loaded into DiskQuik along with the other utility programs. To transfer a file to or from DiskQuik from a disk, just BRUN FID and use the commands you've always used. However, FID now operates much faster. The unlock, lock, or verify functions used with a wildcard title and without prompting are completed in only a few seconds.

The second way to permanently save work is to use the SAVEDQ utility. As mentioned above, this program will copy the entire DiskQuik image onto an initialized disk in slot 6. Any files on the disk before using SAVEDQ will be lost. Additional files may be saved on the physical disk by traditional means, and then the entire disk can be "copied" back into DiskQuik using LOADDQ.

Using DiskQuik is as natural as what you've been doing with your regular disk drives. Everything about the system is designed for ease of use with little new to learn.

DiskQuik is a clever, well designed set of machine language utilities that should help you save significant time. If your use of the Apple requires frequent disk accesses, then DiskQuik can increase your productivity. Because it has been designed to act like what you are used to, learning is fast and not many new habits are needed.

There are two obvious ways to benefit from the DiskQuik speed and convenience. First, as a programmer, you probably do a lot of saving of intermediate programs, EXECing subroutines into your programs, etc. DiskQuik will eliminate the time spent waiting for the disk drive, and you can more quickly move on to your next step or operation. Second, DiskQuik can be accessed from within programs, just as you would a regular drive. Programs such as data base managers that make frequent trips to the disk will be speeded up when results are kept in slot 3 instead of slot 6.

As an example of the speed improvements that are possible, I did a few simple timing tests. Activating FID took 1.8 sec from DQ, 8 seconds normally. Unlocking 23 files (using the wildcard, no prompt approach) took 23 seconds normally, 3 seconds with DiskQuik. A BLOAD of a 76-sector file took 6.7 seconds with DQ, 21.5 seconds normally. Saving a full DiskQuik took only 20 seconds.

The biggest trade-off when using DiskQuik is the inability to use DiskQuik from within protected programs. You cannot save VisiCalc or AppleWriter IIe files to DQ. Even if you install DQ, it is disconnected upon loading one of these protected programs.

Another big trade-off is the size of the storage you have available. A standard 5¼" disk has 496 sectors available for user storage. This amounts to 127K characters. The 64K of RAM on the extended card can be turned into 238 usable sectors of storage. Eight sectors are used for



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directory and VTOC information.

When you copy the DiskQuik image to an initialized disk, you create a disk that is somewhat different from standard disks. Because of the space limits in DiskQuik, an image disk is permitted to hold only what will fit back into RAM. The VTOC is adjusted so that only 238 sectors are available. You can use an image disk in the same way as any other disk—you can save to it, load from it, delete, lock, and so on. However, when you reach 238 sectors while saving, you'll get the standard "Disk Full" message.

The other different disk you will use is an autoload disk. This disk performs like the DiskQuik master disk, will initiate DiskQuik, and will load the DiskQuik image upon booting. To make your own autoload disk, you must start with one of those multiple copies of the master disk that you made. You then add or remove different programs (the manual takes you through a step by step procedure for this) until you have the desired set of programs aboard. Upon booting, you get all of these loaded into DiskQuik automatically.

The autoload disk is, in the words of the authors, "a strange beast." A DiskQuik autoload disk has *two* directories, one on track 3 and the normal one on track 17. The track 3 information allows a single disk to contain the autoboot code which installs DiskQuik, including all utilities and saved programs. Track 17 contains a regular directory of the DiskQuik programs, although these are limited to a maximum of 49 files (consistent with the reduced storage

Track	Contents
00-02	DOS (modified to expect VTOC on T 3)
03 S 0,1-2	VTOC and Directory for Autoload Programs
03-04	Autoload Programs (uses T 3 Directory)
05	Directory Extension for Autoload Programs
06-0F	Reserved for User Autoload Programs
10-0F	DiskQuik Image, as SAVEDQed
11	DiskQuik Directory (S 9-F) and VTOC (S 0)
20-22	Reserved for User Autoload Programs

Figure 1. Track assignments—autoload disk.

AUXMEN Range	DiskQuik Usage	Comment
$0000-$01FF	Not Used	
$0200-$02FF	Flags	DiskQuik flags/temps/code
$0300-$03FF	Buffer	DiskQuik working buffer
$0400-$07FF	Not Used	Auxillary Text Page
$0800-$09FF	Code	DiskQuik Routines
$0A00-$0FFF	T 10, S A-F	Normal DiskQuik Storage
$1000-$10FF	T 11, S 0	DiskQuik VTOC
$1100-$17FF	T 11, S 1-8	Normal DiskQuik Storage
$1800-$1FFF	T 11, S 9-F	DiskQuik Directory
$2000-$2FFF	T 12	Auxillary Hi-Res Page
$3000-$3FFF	T 13	" " "
$4000-$4FFF	T 14	Normal DiskQuik Storage
$5000-$5FFF	T 15	" " "
.....	...	.....
.....	...	.....
$B000-$BFFF	T 1B	" " "
$D000-$DFFF-1	T 1C	" " "
$E000-$EFFF	T 1D	" " "
$F000-$FFFF	T 1E	" " "
$D000-$DFFF-2	T 1F	" " "

Figure 2. Memory and DiskQuik usage.

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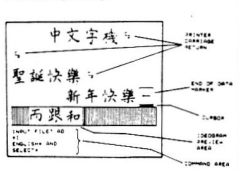

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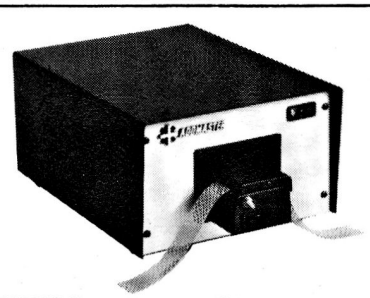

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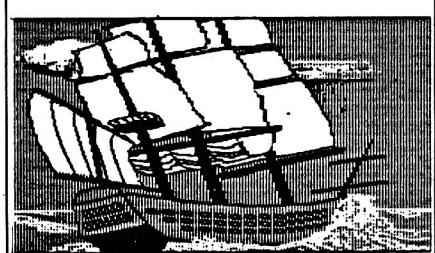

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space). Figure 1 shows exactly what the track and sector assignments are for the autoload disk and Figure 2 shows the memory ranges in the auxiliary memory used by DiskQuik.

The DiskQuik manual is well written and complete. It leads you through the steps of getting started, and gives you a complete description of the utilities on the master disk. Also nice is the authors' anticipation of how you might want to use DiskQuik. There is a complete explanation of programs that are and are not compatible with DQ, as well as a description of how to create an autoboot disk that automatically installs your other favorite utilities before DiskQuik is installed. There is a technical section that gives memory information and identifies main memory locations that are modified by the DQ code.

All in all, this is a very useful, well designed piece of software. You'll be able to enjoy the benefits of a RAM type of disk without the higher expense of some of the hardware devices on the market. Beagle Bros traditionally provides low-priced quality software, and DiskQuik provides the same high value that people are used to from this company.

DiskQuik is made by Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. Price is $29.50. It requires an Apple IIe with an extended 80-column text card. ■

Kenneth S. Close
Cincinnati, OH

Work Force II

Work Force II is a blend of six programs for your home or office. The package comes with a non-protected copy disk and a concise, 15-page manual. The Basic programs are self-prompting and menu driven, so you rarely have to refer back to the instructions.

The most useful of the six is a check balancing program that reconciles not only your outstanding checks and deposits, but also keeps tabs on service charges and earned interest. The system lets you know if your checkbook balances and prints a hard copy of your account's status.

Another program is an on-screen calculator with memory. The Wage Analyzer lets you input salary amounts and calculates your earnings by seven categories (time and a half, yearly, and so on). You can manipulate this data by percentage amounts, to see what effect an increase of, say, five percent has on your wages.

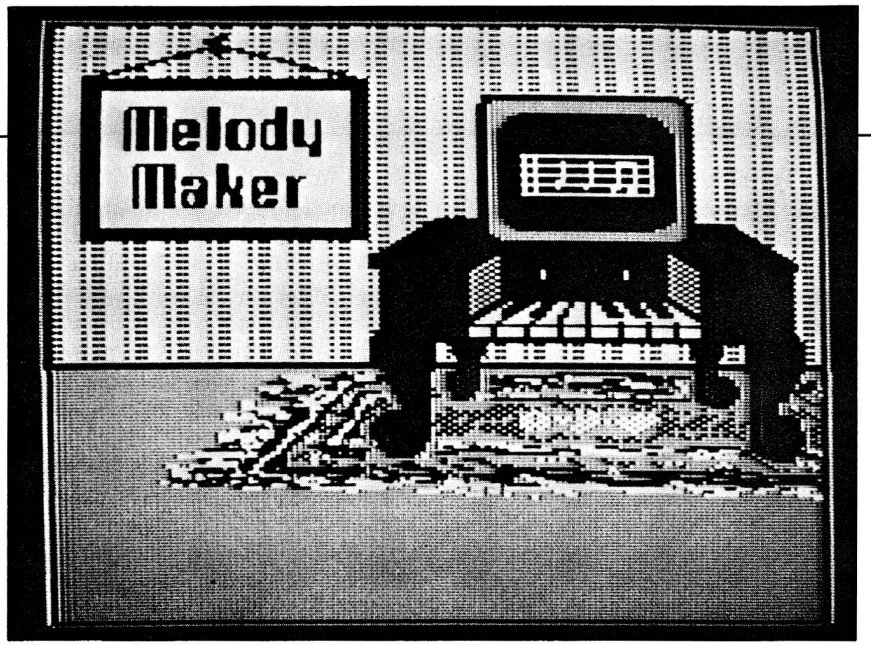
Borrowing money is no problem with the loan analysis section to guide you. The program considers how much money you want to borrow, for how long, at what interest rate, and computes your monthly payment. It offers flexibility, even down to working with weekly amounts. You can print an amortization schedule and head the reports with a date or comment line.

"Borrowing money is no problem with the loan analysis section to guide you."

The Savings Analyzer is similar to its sister program and allows you to enter deposit amounts, the interest rate, and deposit periods. It computes your balance, including interest.

The last part of Work Force II is Line Writer, a line-at-a-time correcting typewriter. While Line Writer can perform simple tasks such as address envelopes, it's more useful for typing practice. It prints in uppercase, unless you have an Apple IIe or an 80-column card in your Apple II Plus. The system won't work properly with all 80-column cards, however. It did most things fine with my Videx, but the on-screen display was a bit ragged.

As with any program, the question here is value. If you'll use Work Force II to balance your checkbook, display or print loan amortization or savings analysis schedules, and practice typ-



Melody Maker is a feature in the second issue of Microzine, *the children's magazine on a disk.*

ing, it is easy to understand and operate. It's an honest value for $29.95. The system is available from Core Concepts, PO Box 24157, Tempe, AZ 85282. ■

Gregory Glau
Prescott, AZ

Microzine

Microzine is the first children's magazine in computer format. It is marketed by the same folks who have been publishing *Scholastic* for the past 60 years. I had a bad disk, but the company quickly and courteously replaced it.

The first program is "Haunted House," an adventure story that lets you change the plot and dictate the outcome. Over 20 courses may be taken with strange twists along the way. You would have a hard time getting bored with all the endings possible. Some of the outcomes include: being in trouble with your parents; beating Nilvail in a joust of strength; Murray the Ghost comes home; or you are a hero.

The next feature, "Ask Me," allowed me to interview Robert Macnaughton, Elliot's older brother in *E.T.* "Ask Me" is conducted like a news conference. A pair of words called "question roots" moves across the screen. I chose "What is?". The computer gave me three endings: "your favorite type of music?", "it like to be famous?", and "your favorite movie?". I selected the second ending and Robert's answer was, "I don't feel different—it's the rest of the world that seems different."

The third program, "Poster," is more challenging. Using a simple yet powerful programming language, I created some gorgeous posters using every color on the computer spectrum. A data disk is included in the package for saving your masterpieces. This program was the most complex and required a little extra time learning the commands that control brush width, screen color, brush noise and speed.

"You would have a hard time getting bored with all the endings possible."

The last feature on *Microzine* is "Secret Files." Students can store information on a topic of particular interest. It was quite simple. My ten-

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year-old made a list of recipes which she could quickly sort. She also created an address file and a phone list of her friends.

I found *Microzine* to be fun as well as intellectually challenging. All of the programs teach something about computer literacy in a subtle way. Kids learn about computers and academics without knowing that they are learning.

Microzine is published by Scholastic Wizware, 730 Broadway, New York, NY 10003. The suggested retail price is $39.95 for each bi-monthly issue, or $149 for a year's subscription. ■

Nancy White Kelly
Stockbridge, GA

TermExec Version 1.2

Telecommunications has come a long way from teletypes and telephone patch cords. Although priced at a modest $79.95, TermExec Version 1.2 is more ambitious than other Apple communications programs. The manual and software offer enough options to transmit text files between an Apple and virtually any other computer. You can save and recall configurations for as many different host systems as you want. To create a new file for each computer, you simply toggle through the options until the right one appears, or type in any special setting.

Getting on Line

Start by making a copy of the unprotected master disk and using the working copy. TermExec includes the usual features, such as sending files between two Apples, setting up a chat mode, and accessing club bulletin boards or commercial databases. But it offers internal features that others don't. You can scroll left, right, up, or down through a 7000-character buffer, and even "unwind" a file to make it wider than the standard 40- or 80-character Apple screen. You can select from the scroll and save the information from the disk. TermExec allows you to transmit and receive standard ASCII text files, or any file, to another computer using the XMODEM error-correcting protocol. If you don't want to use your text editor, the disk includes one and a Convert/Copy routine to capture any Apple file (even binary) in a standard text file.

The Convert/Copy routine needs work, though. Although it successfully copies and converts files with one or two disk drives, its prompting sequence is not as clear as it could be. In one case, where an incorrect file name was entered, the copy program saved itself as a text file and then couldn't find the original file. In most cases, it did catch the correct files.

TermExec makes every attempt to keep you going. The program prompts you and help screens are only a question mark away.

Documentation

The 99-page manual comes in a 10-by-11½-inch looseleaf binder. The tutorial got me online fairly easily, but the manual assumes you know the terms, conventions, and protocol of telecommunications. While some terms become clear as you work through the different operations, many don't. (For more information, read *The Complete Handbook of Personal Computer Communications* by Alfred Glossbrenner.)

The TermExec manual warns that you will need some experience using the other computer—at least the first time you try to send or receive a file. Documentation includes an index to cross-reference text files.

On the positive side, the manual doesn't assume you'll remember all the commands. Each lesson guides you through the command sequence for a particular operation. The software does provide a help screen and checks the syntax of each command before executing it. Error messages appear if you don't follow the rules.

TermExec does a lot for the money. Other programs allow only limited communication without as many options, so they're simpler to use. A limited database with only a few functions is easier to learn than, for example, dBase II. By spending time with the more complex program, you can accomplish better work. TermExec is worth spending the time to learn.

TermExec is a sophisticated communications package that includes a number of options for going online with just about any other computer anyplace in the world. The program is manufactured by Exec Software, 201 Waltham Street, Lexington, MA 02173. Updates, as they are released, are $19.95 each. ■

Ann Baldridge
Bloomingdale, IL

BPI Accounts Receivable

BPI's Accounts Receivable program comes to your business with the expected, standard functions, but with added bonuses. Among these is the queue (pronounced *cue*), a memory bank that lets you store and execute commands. The system provides customers with a regular account that will add finance charges to past-due amounts. But the program also tabulates revolving charge accounts, where the monthly payment is a percentage of the total balance, as well as a fixed amount every month.

The system includes a tutorial disk with data and transactions based on real-life examples. All program disks are non-copy protected. As an option, a password provides security for your files.

Invoice numbers are automatically entered (from 1 to 9999), although you can override the number. You're allowed a 16-character description of each charged item. Numerical entries don't need decimal points; the system adds them automatically. Once the data from each invoice has been entered, you get a chance to reject or change any item. This program doesn't print an invoice for you, but lets you enter its information (num-

ber, amount, breakdown) into your accounts receivable system.

After a sale, the account breakdown is recorded as in the following example. For a $56 customer purchase, $25 is recorded for material sales, $30 is for labor, and $1 is for sales tax. BPI's Accounts Receivable creates default items for those things you normally sell (such as materials, labor, and sales tax) so you don't have to post account numbers, because defaults show up on each posting screen. Of course, you must step through each default you don't have an entry amount for with the return key. You do your posting in batches, letting you enter 10 data sets before anything is saved to disk.

Powerful Capacity

On each data disk, customer information and transactions compete for disk space. A data disk can hold a maximum of 450 customer accounts, but if you have more you can instruct the system to work with multiple data disks. Your customer base can be as large as you need it. If you ever expand to a fixed disk, the system will handle it.

You may use either the balance forward accounts (where payments apply to the total amount due), or the open invoice method (where each invoice remains open until it is paid). The program specifies two different levels of finance charges depending on the outstanding balance. You set the parameters for both the amounts and the percentages. If you have BPI's General Ledger, this accounts receivable program will automatically transfer its data to your G/L files and enter data for up to 120 different G/L accounts. The directions on how to connect accounts receivable to other BPI systems (like its General Ledger) are only fair, however. BPI's Accounts Receivable can provide you with data for more than one company on each data disk.

Reports

The heart of any accounts receivable program is the customer report it creates for you. Monthly statements must be sent to your customers, and you should know who is behind in payments. BPI performs well for you here and has a variety of report formats to choose from, including a standard aging summary, an alphabetical or numerical list of accounts, a summary by type of account, a list of customers who are delinquent in their payments, and even a listing of those customers who aren't assessed finance charges.

You can print mailing labels and past-due notices. When you configure your printer, it can print both upper and lowercase. You also may change the slot location of your printer—an option many programs don't have. You can print a special 50-character message on your statements.

Weaknesses

Unfortunately, the only way BPI's Accounts Receivable lets you know how much disk space is available is by using the FID program on your DOS master disk. Other accounting packages inform you of remaining disk space by a little note on your screen. Not only is that easier for the user, but it doesn't require any "computer talk."

BPI's Accounts Receivable system interfaces with its Inventory program (so invoice data transfers to the A/R part of the system). You cannot effect this automatic transfer if accounts receivable customers are on more than one data disk. The system isn't particularly fast to load (almost a minute), nor does it sprint between new functions. Each aging summary prints accounts with a zero balance, which is a waste of printer time and paper.

Effective Accounting

These imperfections are minor blemishes on an outstanding accounts receivable program for the Apple IIe. There are all sorts of checks and balances—you can't delete a customer who has an account balance, or overwrite an existing account by mistake. Worksheets come with the system to assist you in getting started. You can escape from any menu selection without a hassle. While I can't describe this system and its documentation as amiable, it's certainly effective from an accounting standpoint.

The Accounts Receivable program sells for $395, and is available through BPI Systems, 3423 Guadalupe, Austin, TX 78705. It requires an Apple IIe with 64K memory, two disk drives, Apple's 80-column text card, and 80-character printer. ■

Gregory R. Glau
Prescott, AZ

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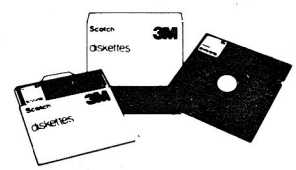

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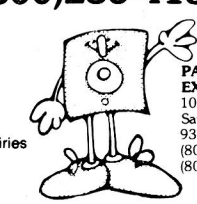

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New Publications

edited by Joan Witham

Help for the Professional

Computers for Professional Practice ($14.95) is a complete guide for dentists, physicians, accountants, lawyers and business people using computers in their offices. It is published by Andent Inc., 1000 North Ave., Waukegan, IL 60085.

Whole Earth Software Review

The Whole Earth Software Review ($16 subscription) is a guide through the chaotic marketplace of software, hardware, books, dial-up services, etc. that add to the usefulness of computers. It offers software and product reviews, suggestions, comments and counsel from users. For further information, contact the Whole Earth Software Catalog & Review, 150 Gate Five Road, Sausalito, CA 94965.

Compare Computer Prices

Computer Price Alert ($48 for 20 issues) is a guide to microcomputers and related products that compares prices on major brand items. It also offers a customized price research service. For more information, contact Computer Price Alert, PO Box 574, Cambridge, MA 02138.

Test Your Computer Law Literacy

Nolo Press, 950 Parker St., Berkeley, CA 94710, has released a book, *Legal Care for Your Software* ($24.95), that will make you more aware of the laws protecting your software products.

Computers for Composition

Computers in Composition Instruction ($6) is available from the International Council for Computers in Education (ICCE), University of Oregon, 1787 Agate St., Eugene, OR 97403. This 88-page booklet addresses specific concerns of educators teaching English composition using computers.

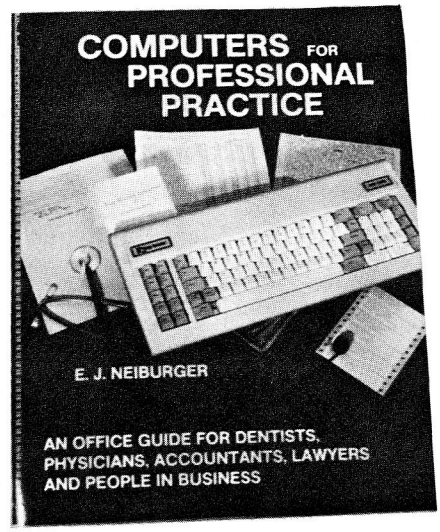
One-Stop Answer Book

The Whole Computer Catalog is a complete desktop reference to the computer world, combining the description of fields and opportunities in the computer industry with the answers to questions that computer users have every day. It can be obtained for $35 from Designs III Publishers, 515 W. Commonwealth, Fullerton, CA 92632.

Software Directory

Volume 7 of the *ICP Software Directory* ($75) lists more than 5000 microcomputer products for business use. It is indexed five ways: by category, product, supplier, hardware product and category/product. Contact ICP World Software Information Center, 9000 Keystone Crossing, PO Box 40946, Indianapolis, IN 46240, for more information.

Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute an endorsement by inCider *of any given product.*





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New Software

edited by Joan Witham

New Games from Sams

Three new games, $29.95 each, are available from Howard W. Sams & Co., 4300 W. 62nd St., Indianapolis, IN 46268. Regatta simulates four different sailing races. One or two players can set sail and control the tiller to maneuver the course in record time.

In Spud, two players try to penetrate each other's protective shields with exploding potatoes. In Mug Shot, each player has a fort and a field of five mugs inside a trap; these mugs must be released and destroyed before they can destroy the player's fort. Reader Service number is 455.

Magic Office System

The Magic Office System, an integrated system for the Apple and Franklin computers, combines three full-function products: a word processor, an electronic spreadsheet and a spelling checker. Parts of documents can be cut and pasted into other documents; this allows the user to copy a spreadsheet into a word processing document or move paragraphs from one file to another. Suggested retail price is $295 from ARTSCI Inc., 5547 Satsuma Ave., North Hollywood, CA 91601. Reader Service number is 450.

What Are the Odds?

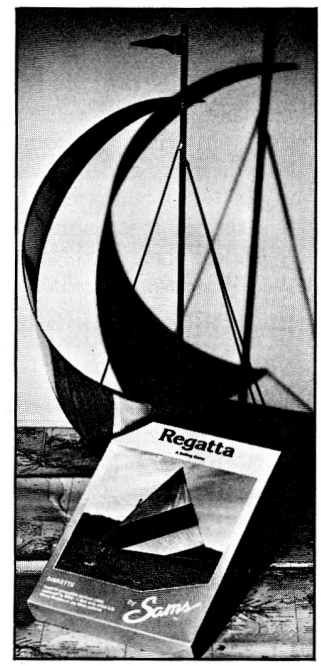
For the sports minded, the Oddsmaker calculates the probabilities of a winner with any given statistics. It will accept wagers, calculate odds, total pools, calculate pay-outs, print tickets and even take a house cut. The program is menu driven and user friendly. Oddsmaker is available for $44.95 from CZ Software, 358 Forest Road, So. Yarmouth, MA 02664. Reader Service number is 458.

Challenging Educational Games

Edu-Cave provides multi-subject learning experiences in a challenging game atmosphere for $29.50. Math Alert! ($19.50) offers a topic tutorial session before each practice session. Contact Micro Program Designs, 5440 Crestline Road, Wilmington, DE 19808, for more information. Reader Service number is 466.

Vocabulary Machine

The Vocabulary Machine contains more than 1000 words and sentences to expand reading vocabulary skills in grades 1–12. Text is displayed in upper- and lowercase and each word can be accompanied by a hi-res graphics picture. The suggested retail price is $59.95 from South-West EdPsych Services, PO Box 1870, Phoenix, AZ 85001. Reader Service number is 454.



Sail computer races with Regatta.



Mash your opponent with Spud.

Bar Mitzvah Tutor

The Bar Mitzvah Compu-Tutor offers a personalized study course to help Jewish young people prepare for a bar or bat mitzvah. The computer incorporates the English and Hebrew names of the student and the specific

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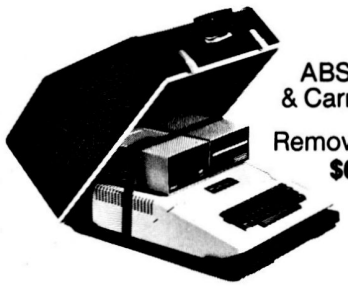

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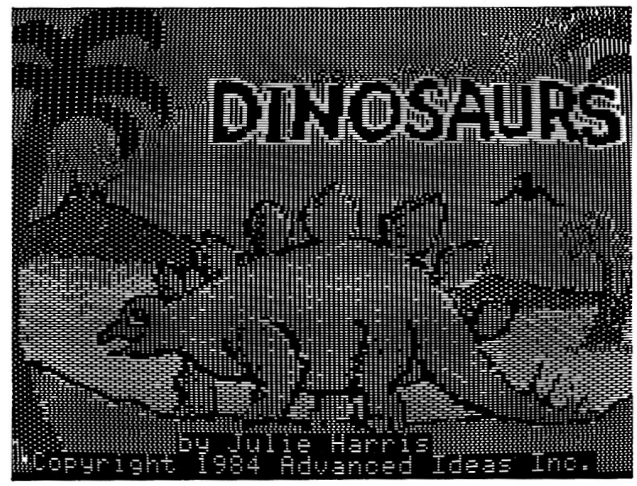

Dinosaurs come to life.

Haftarah to be read. It is available for $49.95 from Davka Corp., 845 N. Michigan Ave., Suite 843, Chicago, IL 60611. Reader Service number is 465.

Educational Options

Dinosaurs, from Advanced Ideas, teaches preschoolers the visual recognition skills necessary for matching, sorting and counting objects. Another program, Lucky's Magic Hat, develops reading comprehension, sequential thinking and memory skills. Each program sells for $39.95 from Advanced Ideas, 2550 Ninth St., Suite 104, Berkeley, CA 94710. Reader Service number is 463.

Electronic Filing

Bluebush Inc. announces Speed File, an entry and retrieval software filing package for $125. It files, sorts, organizes and "remembers" the way people do—by name, phrase, date, address, or anything—even if only partial retrieval requests are made. There are no command structures to learn—all options are selected with cursor movements. Other features include 53K byte storage capacity with language card, optional password protection and automatic double recording of data. For further information, contact Bluebush, 3379 St. Mary's Place, Santa Clara, CA 95051. Reader Service number is 452.

Perplexed?

Based on classic puzzles, Perplexity's three puzzles encourage players to develop and use their logic and problem-solving skills. Each move is graphically shown on the computer screen, so the effect of every decision is immediately apparent. Perplexity is available for $29.95 from Daybreak Software, 1951 Grand Ave.,



A medieval adventure with the Sorcerer of Claymorgue Castle.

Baldwin, NY 11510. Reader Service number is 457.

The 13th Adventure

Adventure International has released Sorcerer of Claymorgue Castle ($24.95), an adventure with a medieval magic theme. The player is encouraged to become Beanwick, faithful apprentice of Solon, the Master Wizard, and search for the 13 Stars of Power. Contact Adventure International, Box 3435, Longwood, FL 32750, for further information. Reader Service number is 462.

Word Games

Three games help students improve their vocabulary and prepare for the SAT and similar examinations. The two vocabulary games use a high resolution baseball format, and the Antonym Game uses an automobile racing format. Both the Antonym Game and the senior level Vocabulary Game are designed for students in grades 10–12; the junior level Vocabulary Game is designed for students in grades 5–8. Each game sells for $29.50 from J & J Software, 140 Reid Ave., Port Washington, NY 11050. Reader Service number is 451.

Pascal for the Apple

This new software/book package, *Pascal for the Apple* ($33), features the Apple Turtlegraphics package, 23 ready-to-run sample and explanatory programs with 200 exercises, an Apple Pascal operating system summary and Pascal procedures, iteration, decision-making and recursion. Contact Prentice-Hall Inc., Englewood Cliffs, NJ 07632 for more information on this Pascal tutorial. Reader Service number is 449.

Three Files in One

The new Transend Version 5.0 data communications package allows users to transfer all three file types—ProDOS, CP/M and Pascal files—in one package. Transend 1 ($89) is data capture terminal communications software for the Apple computer; Transend 2 is the same plus er-

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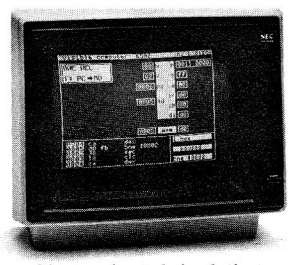

It's an animated simulation of the 6502 micro processor that lets you see with your own eyes how the 6502 works.

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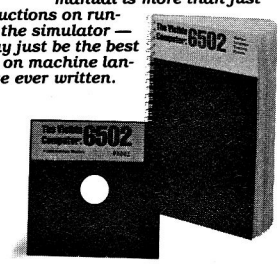

It's 30 demonstration programs you'll work through with the 6502 simulator.

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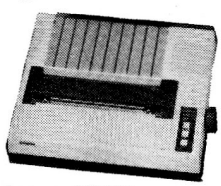

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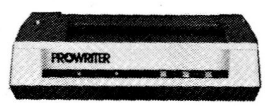

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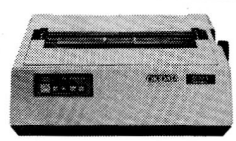

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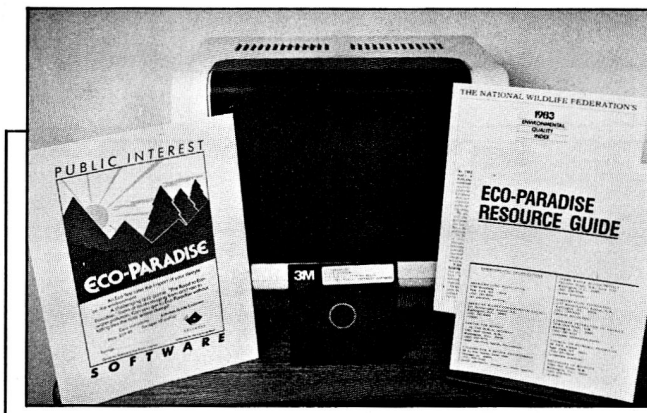


Eco-Paradise challenges your environmental awareness.

ror-free file transfer for $149; Transend 3 includes 1 and 2 plus unattended electronic mail for $275. For further information, contact Transend Corporation, 2190 Paragon Drive, San Jose CA 95131. Reader Service number is 461.

The Secret of Deductive Reasoning

Learn how to form and test hypotheses in Zandar, a software program developed under a contract with the U.S. Department of Education. In the first disk, students are guided through the steps of the hypothesis-testing strategy as they eliminate false clues to discover Zandar's secret. As they progress, players are rewarded with a wizard's robe, cap and wand. In the second disk, students gather information, form hypotheses, test and alter them as needed without the program's assistance. The price for the complete package is $120 from the Society for Visual Education Inc., Dept. 71672, 1345 Diversey Parkway, Chicago, IL 60614. Reader Service number is 460.

Apples and the Environment

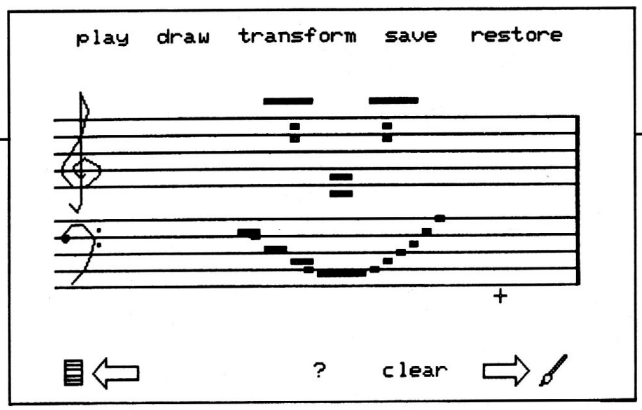
The Center for Science in the Public Interest, a non-profit citizens' group that advocates improved nutrition and environmental policies, has produced Eco-Paradise to educate the general public.

Eco-Paradise ($39.95) consists of two programs that use a quiz-game approach to teaching about the environment and ecology. The Road to Eco-Paradise challenges you to travel from the City of Darkness to Eco-Paradise without falling into the toxic waste dump by answering questions about ecology, pollution, and environmental politics. Eco-Test asks questions about your habits around the house, use of a car, food purchasing, etc., to rate your impact on the environment.

For further information, contact The Center for Science in the Public Interest, 1755 S St. N.W., Washington, DC 20009. Reader Service number is 468.

Educational Activities

Based on Logo philosophy and Piaget's research, 20 computer activities develop mathematical, logical and communication skills in the Early Childhood Learning Program. Discovery and exploration methods teach letter and number recognition, direc-



Musicland uses computer graphics.

tionality, decision making, spelling, and other skills to ages 3–7. The program retails for $34.95 for one disk and $149 for the full program of five disks.

Diascriptive Reading I diagnoses the reading skills of each child, prescribes what is needed for improvement, then evaluates and keeps track of performance at each level. Animated graphics reward or instruct students and reinforce what they've learned. The set of six disks is available for $295 from Educational Activities Inc., PO Box 392, Freeport, NY 11520. Reader Service number is 456.

Unique Plotter Software

Sign-Plot from Centerpoint produces six different letter font styles with typeset quality. Additional fonts or symbols can create custom applications. Sign-Plot is menu driven and requires a CP/M card. Priced at $149, it is available from Centerpoint Computer Applications, 500 N. Michigan Ave., Chicago, IL 60611. Reader Service number is 467.

Musical Adventure

Musicland ($150) is a set of four musical games that integrates the kinesthetic, visual and the aural senses. Presented in game form, Musicland maintains the interest of young students while providing musical challenges for adult musicians. Users can compose, edit and play music, as well as design original sounds. Musicland requires a 64K Apple and the Mountain Computer Music System. Contact Syntauri Corp., 4962 Camino Real, Suite 112, Los Altos, CA 94022, for further information. Reader Service number is 453.

Mainframe Database Power

Aladin is a menu-driven integrated relational data base management system that incorporates calculation, statistics and graphics capabilities and interfaces with programs such as WordStar and VisiCalc. Compatible with Apple Pascal, it requires 64K RAM and two disk drives for Apple II version ($595). The Apple III version ($795) requires a hard disk and 256K RAM. For further information, contact A.D.I. America, 1215 Howe Ave., Sacramento, CA 95825. Reader Service number is 459.

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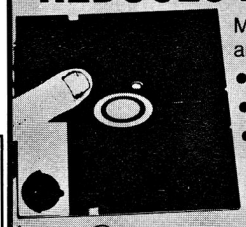

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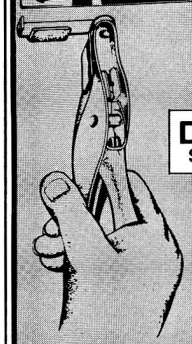

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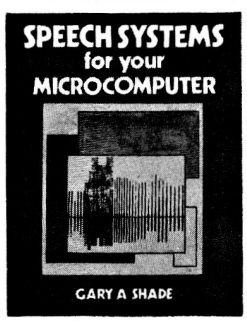
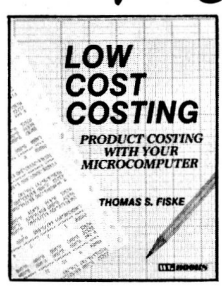


Speech Systems for Your Microcomputer
A solid introduction to voice technology. For industry, education, or home use, this book presents many examples of voice input/output using microcomputer systems. Includes buyer's guide, along with over 100 pages of manufacturer's data sheets, with companies' addresses and phone numbers. ***$14.95, BK7406, 254 pp., NEW.***



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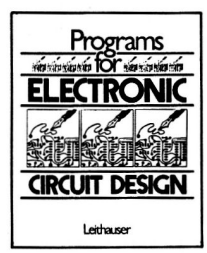

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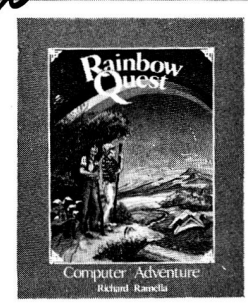
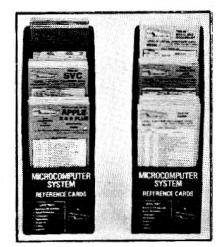


Rainbow Quest
Rainbow Quest combines fiction and computer programs to form one giant fantasy for young readers. On the Rainbow Quest, Molly and Sam must pass a series of tests in order to succeed. The reader gets involved by taking each test on the computer. Included are mazes, number quizzes, logic tests, word puzzles, and arcade-style games. Book and disk for Apple II, II+, and IIe sold together. ***$24.95, CC7407, 120 pp., NEW.***



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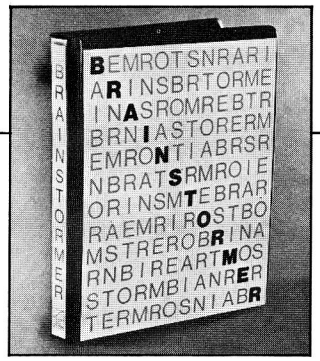

Turn your problems around.

9609 Cypress, Munster, IN 46321, has announced a series of educational software packages for high school math subjects. Each package helps students identify their areas of strength and weakness, then provides practice for a wide variety of problems. The packages are SAT Math ($69.95), and Algebra 1, Algebra 2, Geometry, and Trigonometry and Advanced Topics ($49.95 each). Reader Service number is 469.

Brainstormer

Brainstormer provides both a structure for describing problems and a process for finding solutions. The user goes through a series of steps to produce a structured representation of a problem. Then Brainstormer guides the user through examination and reconsideration of the structure by generating new ways of looking at the problem. The program is available for $60 for an Apple with a CP/M card. For further information, contact Soft Path Systems, Cheshire House, 105 N. Adams, Eugene, OR 97402. Reader Service number is 464.

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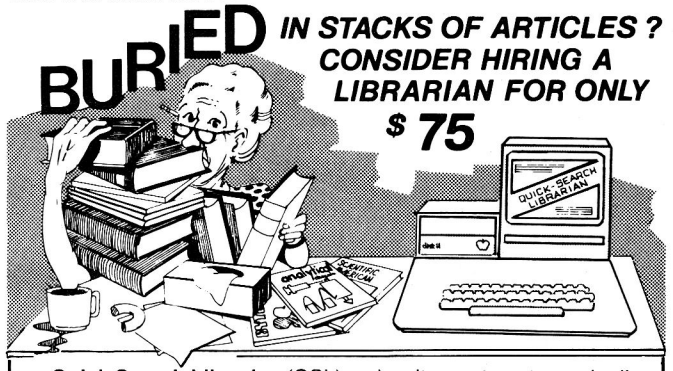

Quick Search Librarian (QSL) makes it easy to enter and edit your journal references, search for articles, and print or sort a list of articles using the 48K APPLE* II + computer. Important QSL features include:

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- Four lines available for listing authors, title and/or comments.
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- Average search speed is 50 articles/second with multiple criteria; average sorting speed is 40 articles/second when sorting on 3 fields.
- Typically, 1000 articles can be stored on a single disk.
- Includes sample data base and tutorial for *Scientific American*, 1981.

VISA or Mastercard orders accepted. QSL manual available separately for $5. (Price of manual deductible later with purchase of QSL software.) Add $1.50 for shipments made in U.S.A.

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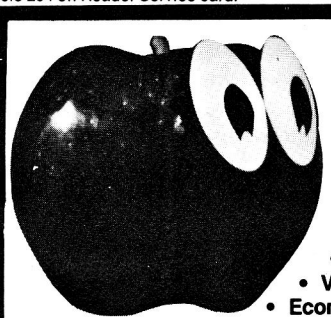

LET YOUR APPLE SEE THE WORLD!

The DS-65 Digisector® opens up a whole new world for your Apple II. Your computer can now be a part of the action, taking pictures to amuse your friends, watching your house while you're away, taking computer portraits . . . the applications abound! The DS-65 is a random access video digitizer. It converts a TV camera's output into digital information your computer can process. The DS-65 features:

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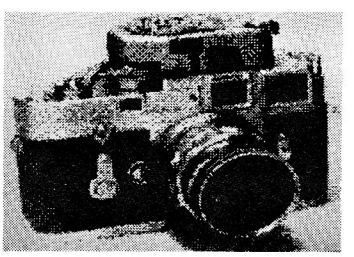

HI-RES PICTURE USING THE DS-65 AND PICTURE SCANNER SOFTWARE

The DS-65 is an intelligent peripheral card with on-board software in 2708 EPROM. Check these software features:

- Full screen scans directly to Apple Hi-Res screen
- Easy random access digitizing by Basic programs
- Line-scan digitizing for reading charts or tracking objects
- Utility functions for clearing and copying the Hi-Res screen

Use the DS-65 for precision security systems; computer portraiture; robotics; fast to slow scan conversion; moving target indicators; reading UPC codes, musical scores and paper tape and more! **GIVE YOUR APPLE THE GIFT OF SIGHT!** DS-65 Price: $349.95 RCA 1500 Series Camera w/6:1 zoom lens Price: $399.90/Combination Price: $729.95

ADDITIONAL SOFTWARE FOR THE DS-65

— Picture Scanner: An applications tool for processing video images for display on the Hi-Res screen. A variety of dithering algorithms are provided, for compressing the digitized image into the Hi-Res screen and simulating grey scales. Price: $39.95

— Superscan: Enables you to enhance the DS-65's Hi-Res pictures with colors! Choose from 21 different colors and assign them to grey scale values, modify pictures, zoom, enhance contrast, etc. Includes print routines for Anadex 9500 or 9501; Epson MX-80GFT and MX-100; and IDS 460 Paper Tiger*. Written for The Micro Works by Magna Soft. Price: $79.95

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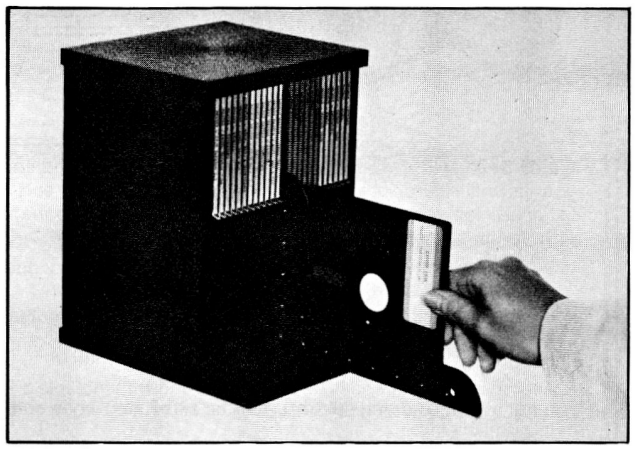


Flexible disk file holds 25 disks.

Flexible Filing

A Flexible Disk File made of antistatic plastic, stores 25 5¼-inch disks, protecting them from becoming warped, scratched, touched or damaged. The file retails for less than $40 from Eddie Goodwin Co., PO Box 470331, Miami, FL 33147. Reader Service number is 482.

Speedy Plotter

A fast (31.5 ips plot speed and 6 g acceleration) plotter has been introduced by Hewlett-Packard Company. The HP 7550A Plotter also features a liquid-crystal display with function keys, 11″ × 17″ surface, cut-sheet paper feed and a REPLOT feature that draws up to 99 copies of an original graph without rerunning the program. It is available for $3900 from Hewlett-Packard Company, 1820 Embarcadero Road, Palo Alto, CA 94303. Reader Service number is 470.

Saybrook II

Saybrook II, a 68000 32/16 bit co-processor for the Apple II/IIe, runs Apple Pascal, Apple Fortran and Apple Basic programs 10–30 times faster with twice the memory on board. The Base System includes 128K RAM, UCSD p-System Runtime Unit Version IV.13, Applesoft-compatible 68000 Basic, Turtlegraphics, a clock and five programmable timers. The board is available in 8 ($895), 12.5 ($1195) or 14 MHz ($1395).

The Advanced System includes the Base System plus one compiler, the EDVANCE Screen Editor, Saygraphics Graphics Package and the Phase-0 Cross Assembler. The Advanced System sells for $995 (8 MHz), $1295 (12.5 MHz) and $1495 (14 MHz). Each additional compiler costs $95. For more information, contact Analytical Engines Inc., 3415 Greystone, Suite 305, Austin, TX 78731. Reader Service number is 474.

Protection Pad for Your Apple

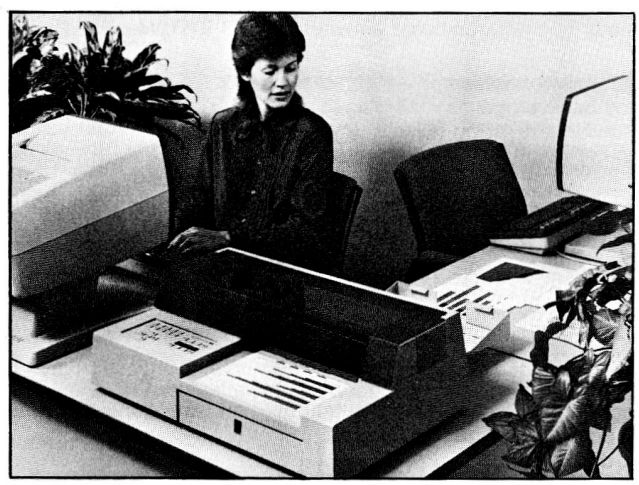
3M Static Control Systems makes a desktop computer protection pad to solve the problems of video interference, memory loss, mechanical malfunction and downtime caused by static discharge. The 24″ × 26″ First Touch Series 9200 Static Control Computer Pad protects by draining static charge from operator to ground in less than half a second. It also resists alcohol, water, coffee and food spills and can be easily cleaned. The suggested retail price is $69.95. Contact 3M, Department DR83-26, Box 33600, St. Paul, MN 55133 for more information. Reader Service number is 471.

The Apple/IBM Connection

Apple Computer now offers a coaxial attachment unit called AppleLine ($1295), connecting Apple computers to an IBM or IBM-compatible network.

Access 3270 ($150) software gives Apple III users access to IBM mainframe and mini computers by emulating IBM 3278 terminals. In most cases the user can simply unplug the terminal and replace it with an Apple computer.

The Apple Cluster Controller can link an Apple computer directly to the network or via a modem. It is available for $4500 for a three-port version and $7000 for a seven-port version. For further information on any of the above products, contact Apple Computer, 20525 Mariana Ave., Cupertino, CA 95014. Reader Service number is 479.



The HP 7550A plotter features cut-sheet media feed.

Cut-Sheet Feeders

Vivitar Computer Products Inc. has introduced a full line of cut-sheet feeders for under $400. Vivitar cut-sheet feeders attach in seconds and feed up to 200 sheets of paper. Variable

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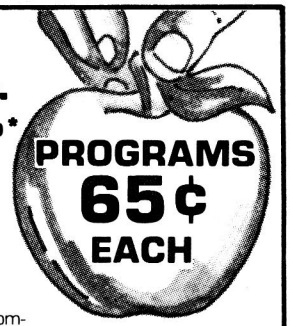

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New DAVID-DOS II™ Compared With Other DOS's

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DAVID-DOS II is a new edition of DAVID-DOS with added speed, commands, and features. New Read, Write and Save routines are high speed. DAVID-DOS II updates full disks like Apple's Master Create. (The programs on your disks are not touched). DAVID-DOS II Inits blank disks with Basic, Binary or Exec HELLO in seconds. Ten new commands operate identical to existing DOS commands. Use them from the keyboard or in Basic programs. They accept A & L parameters.

Ten New DOS Commands

1. **TLOAD speed loads all Text Files, random or sequential, to ram.**
2. **TSAVE speed saves all Text Files, random or sequential, from ram.**
3. **TLIST Lists all Text Files, random or sequential to screen/printer.**
4. **DUMP Memory to screen/printer in Hex with Ascii on right side.**
5. **DISA disassembles Binary to screen or printer.**
6. **AL prints last loaded program Address & Length in decimal & hex.**
7. **HIDOS moves DOS to Language Card & continues operation of program.**
8. **/ is a one keystroke Catalog in addition to the original command.**
9. **DATE prints with any clock. Also File Dating with clock or manual.**
10. **FIND prints address's of hex found in 64k memory. Hidos cmd only.**

Compatible

All DOS entry addresses have been preserved. DOS is original length and compatible with most software. David-Dos II is copyable and creates fully copyable updated disks. DAVID-DOS II is licensed by programmers for inclusion in the software they sell. Init areas were used for David-Dos II. Works with all Apple IIs including IIe 80 Col, Franklin & Hard Disks, such as Corvus & Xebec. Requires 48K. Complete documentation for screen or printing and many utilities are on the disk.

All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DIVERSI DOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO	NO
	TLOAD	6.2	NO	NO	NO
(791 Strings,	WRITE	29.3	28.0	29.4	88.4
32 chars ea)	READ	24.3	16.3	24.3	83.8
	PRINT/READ	44.2	45.9	45.1	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	151.1	1231.2
APPLESOFT (100 Sectors)	*SAVE	7.1	16.4	6.4	33.1
	LOAD	5.0	4.0	5.0	23.5
INTEGER (100 Sectors)	*SAVE	7.3	NO	6.6	33.4
	LOAD	4.9	NO	4.9	23.4
BINARY (100 Sectors)	*BSAVE	7.8	18.4	7.3	28.7
	BLOAD	5.8	4.8	5.8	24.5
48K PROGRAM SPACE	APPLESOFT	36,352	NO	36,352	36,352
(With 3 Bufs avail)	INTEGER	36,352	NO	36,352	36,352
	BINARY	36,352	34,816	36,352	36,352
64K PROGRAM SPACE	APPLESOFT	46,592	31,232	45,658	35,162
(With 5 Bufs avail)	INTEGER	46,592	NO	35,162	35,162
	BINARY	46,592	40,704	45,658	35,162
NUMBER OF DOS COMMANDS		37	29	31	28
CLOCK FILE DATING		YES	YES	NO	NO
MANUAL FILE DATING		YES	NO	NO	NO
ONE KEYSTROKE CATALOG		YES	NO	YES	NO
AUTO USE INTEGER CARD ANY SLOT		YES	NO	NO	NO

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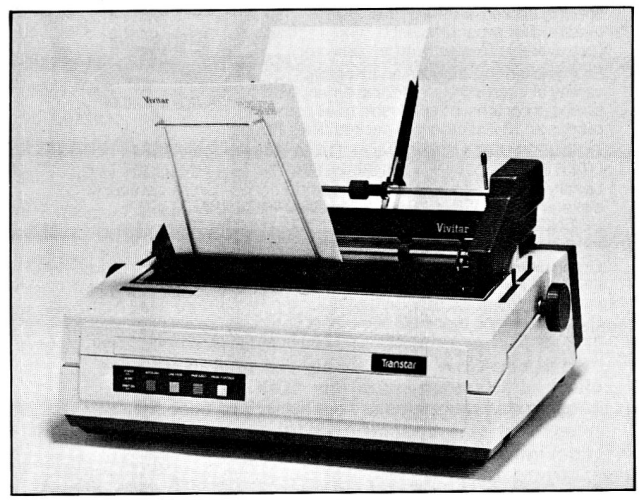


A cut-sheet feeder from Vivitar.

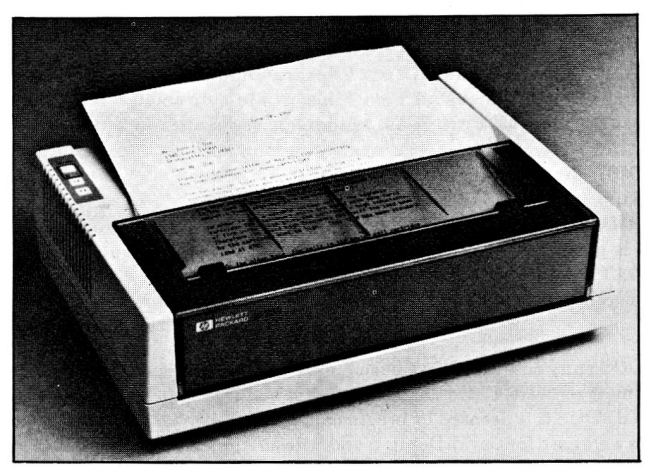
paper positioning from 7–14 inches allows printing in either landscape or portrait mode. Ribbons and printwheels can be changed without removal of the sheet feeder. Contact Vivitar Computer Products Inc., PO Box C-96975, Bellevue, WA 98009, for further information. Reader Service number is 483.

Quiet Printing

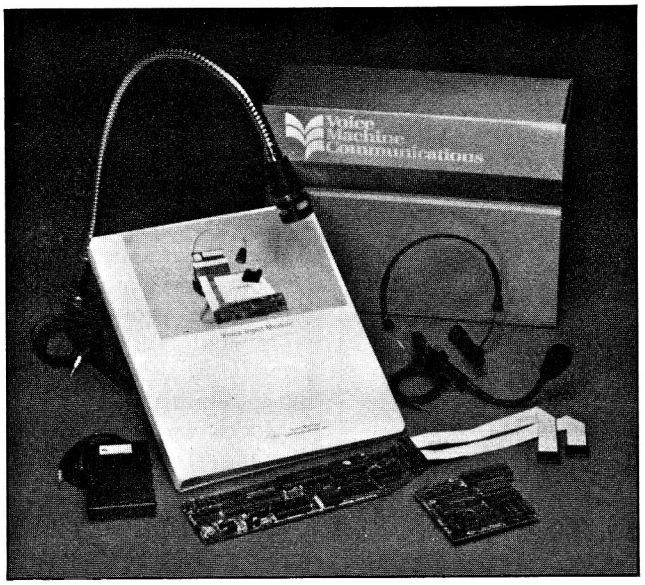
The ThinkJet ink-jet printer operates quietly (below 50 decibels) and is priced at $495. This fully portable printer has 150 cps speed, 11 by 12 dot-matrix characters, multiple print sizes, bold and underline, tractor and friction paper feed, full graphics capability, and support for 11 other languages. Inquiries can be directed to Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, CA 94303. Reader Service number is 484.

Talk to Your Apple

IntroVoice II, a new speech input device, has a



ThinkJet printer operates quietly.

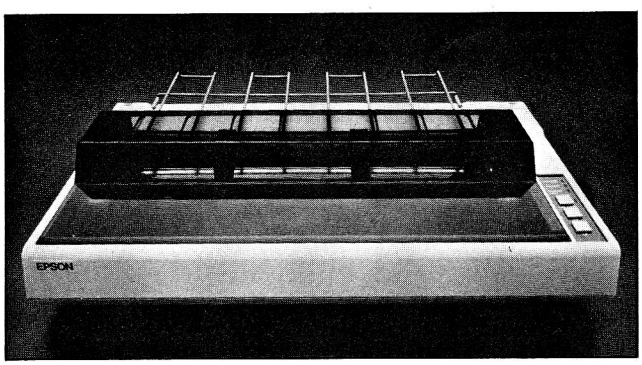


IntroVoice II—speech input device.

plug-in board with microphone and support software. Commands and data are input by voice or in combination with the keyboard. The IntroVoice II hardware and software together ($1195) supports unlimited vocabulary in subsets of 160 words or phrases. The plug-in board contains a 16 channel audio spectrum analyzer, 16K RAM and 8K ROM. Contact Voice Machine Communications Inc., 1000 South Grand Ave., Santa Ana, CA 92705, for further information. Reader Service number is 485.

Epson 136-Column Printer

A low-cost ($699) dot-matrix printer with print speed of 100 cps across 136 columns has been introduced by Epson America, 23844 Hawthorne Blvd., Torrance, CA 90505. The RX-100 features 9 × 9 dot matrix characters with a logic-seeking bi-directional printer, disposable print head, a 96-character standard ASCII character set and an alternative italics set, dot-addressable graphics modes ranging from 60–240 dots per inch and a



Epson's RX-100 dot matrix printer has a speed of 100 cps.

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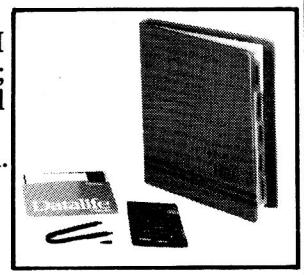

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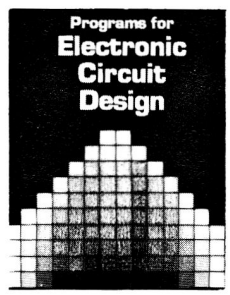

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SuperCable

Cord Ltd. has a SuperCable line with RS-232C and IEEE-488 interfaces and cables for all popular brands of printers ranging from $39.95 to $49.95. The SuperCord II Interface ($369) enables an ordinary electronic typewriter to become a printer for computers. It contains a 4K memory buffer, and can be used with the Adler, Brother, Royal, Smith Corona, Silver-Reed and other electronic typewriters. Contact Cord Ltd. at 1548 Brookhollow Drive, Santa Ana, CA 92705, for further information. Reader Service number is 481.

Put Your Apple Under Lock and Key

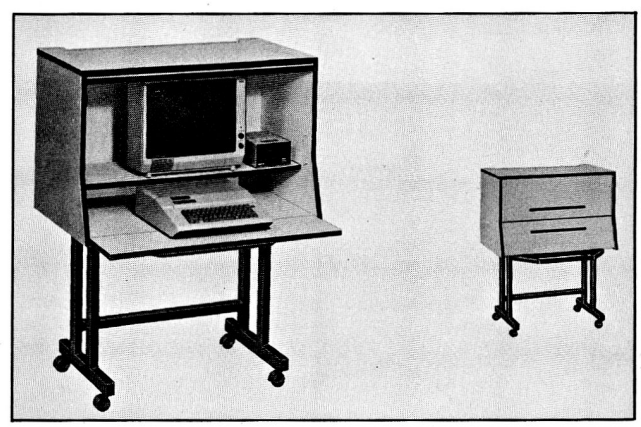
The Maximums, a line of lockable workstations, house and protect hardware and software and provide an efficient working environment.

Models include the Big Max ($475) and Little Max ($375) that secure keyboards, monitors, disk drives and software under lock and key to prevent theft, damage or unauthorized use. Durably built of 3/4-inch wood with wear-resistant work surfaces and tubular steel frame construction, the units are available with or without locking casters for smooth safe transport.

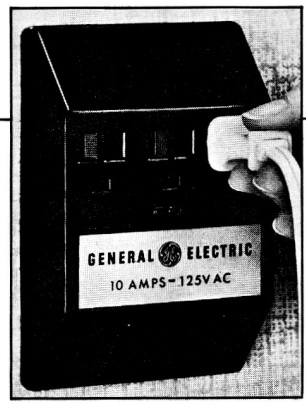
Contact Hubbard Scientific Co., 1946 Raymond Drive, Northbrook, IL 60062, for further information. Reader Service number is 480.

Convenient Terminal Table

The MTT-1 terminal ta-



Big Max computer workstation.



GE's GESP-753 voltage surge suppressor and noise filter.

ble ($172) provides both a stable work table for terminal use and a convenient way of moving computer terminals. The table has a heavy-duty cast-aluminum 5-legged base with locking casters and a chrome pedestal bolted directly to the work surface. For more information, contact Bretford Manufacturing Inc., 9715 Soreng Ave., Schiller Park, IL 60176. Reader Service number is 486.

Spike Protector

A voltage spike protector has been introduced with built-in noise filtering capabilities to protect computers and other electronic equipment. The GESP-753 has a suggested list price of $48.75. For more information, contact the Microwave Products Department, General Electric Co., 316 East 9th St., Owensboro, KY 42301. Reader Service number is 475.

Let Your Apple Do the Talking

Apple Computer announced two modems, a 300-baud model and a 1200-baud model, that are fully compatible with all Apple computers. The new modems are command-compatible with Hayes SmartModems and work with a variety of communi-



MTT-1 terminal table.

Circle 110 on Reader Service card.

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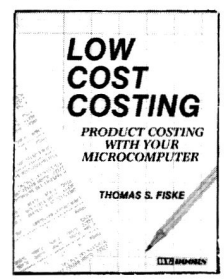

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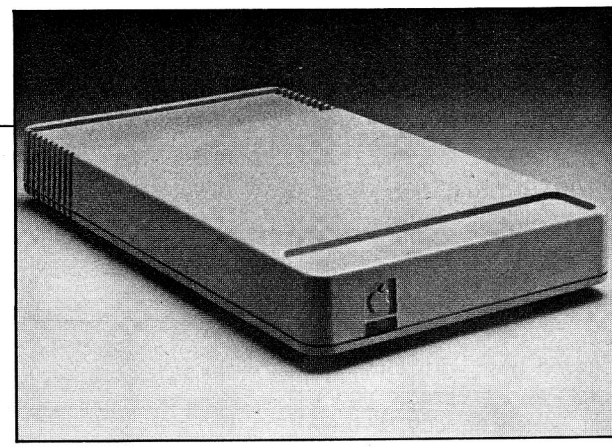


Apple Computer introduces two modems.

cation software packages on the market, including ASCII Express, Data Capture, Access III, VisiTerm, Z-Term and Transcend 1, 2, 3. Both modems provide built-in auto-dial and auto-answer functions to receive messages and to transmit information. An RS-232C serial interface card is required to connect these to an Apple II; the modems plug directly into an Apple III, Lisa, or Macintosh.

The suggested retail price is $225 for the Apple Modem 300 or $299 with the optional accessory kit that includes the serial interface card and terminal program. The cost for the Apple Modem 1200 is $495 or $570 with the optional accessory kit containing the card and terminal program. For further information, contact Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. Reader Service number is 472.

Keyboards for the Handicapped

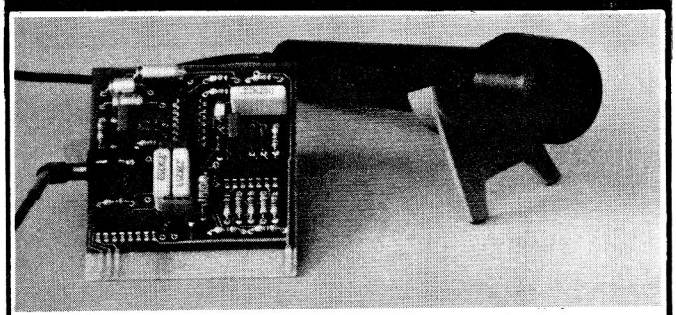
Key Tronic Corp. has introduced handicapped-operable replacement keyboards for Apple II personal computers. Individuals not having the use of two hands can now operate the Apple using the Apple KB200 for $298. With the alternate action switches on shift and control keys, only one key has to be depressed. Key Tronic's mouse ($230) should also help the handicapped eliminate computer-operation barriers. For more information, contact Key Tronic Corp., PO Box 14687, Spokane, WA 99214. Reader Service number is 487.



KB200 keyboard for the handicapped.

Circle 513 on Reader Service card.

NEW! TALK TO YOUR APPLE



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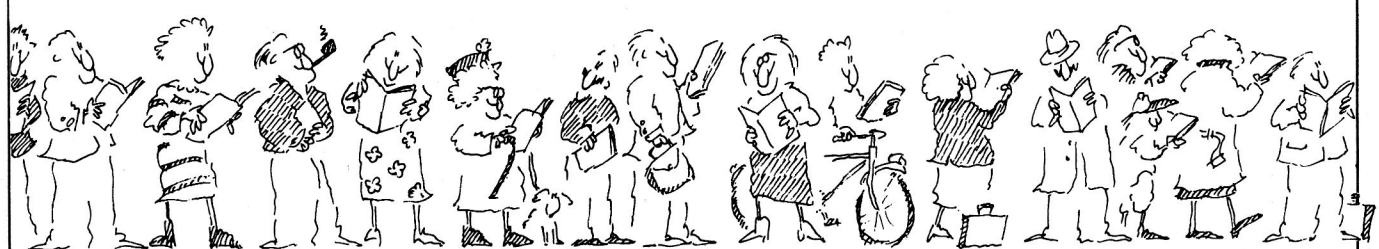

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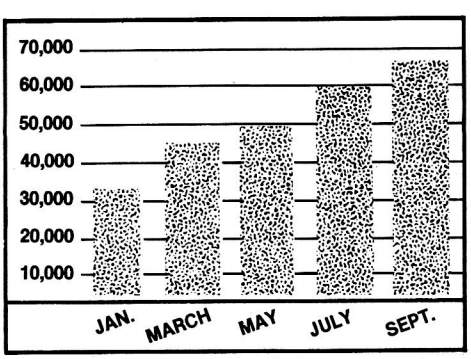

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VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ $99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ $99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ $149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software**.

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

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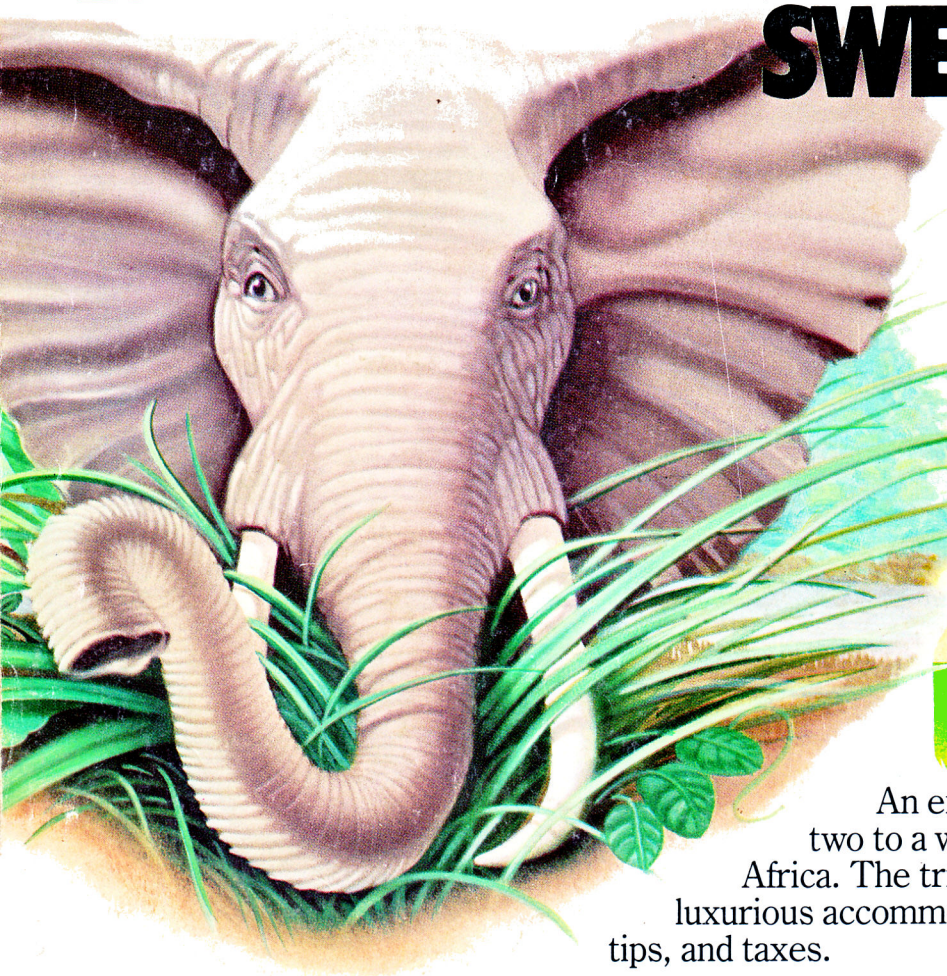

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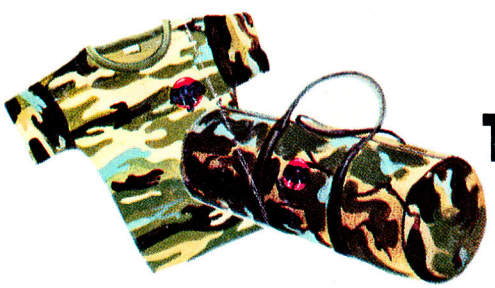

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