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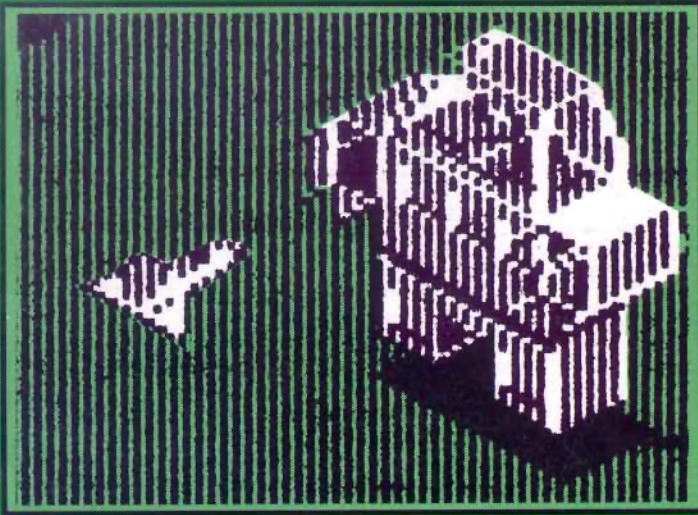
Hardcore

# COMPUTIST

Volume 3

Number 3

\$2.50



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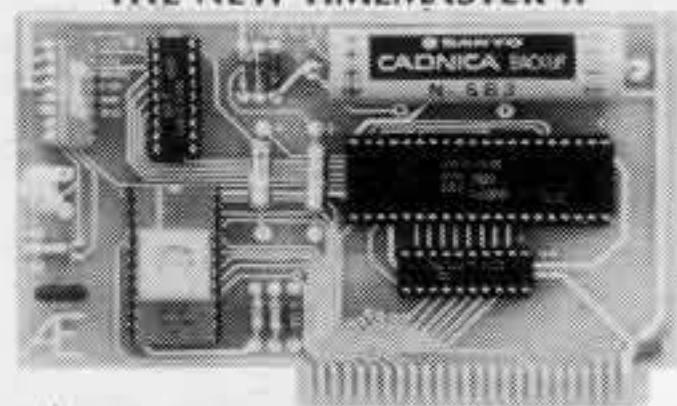
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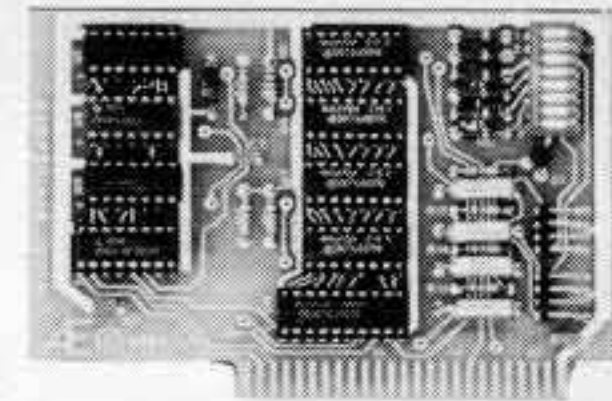
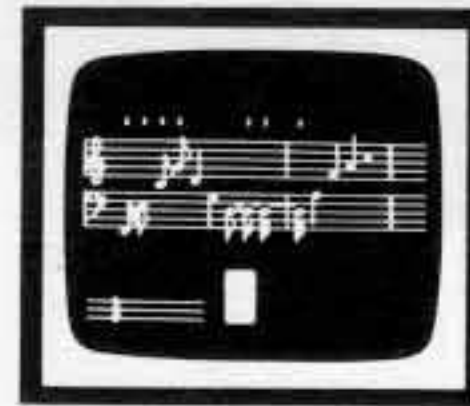
NEW 1984 DESIGN  
An official PRO-DOS Clock

- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
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- Full emulation of most other clocks, including Thunderclock and Appleclock (but you'll like the TIMEMASTER II mode better). We emulate other clocks by merely dropping off features. We can emulate them but they can't emulate us.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
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PRICE \$129.00

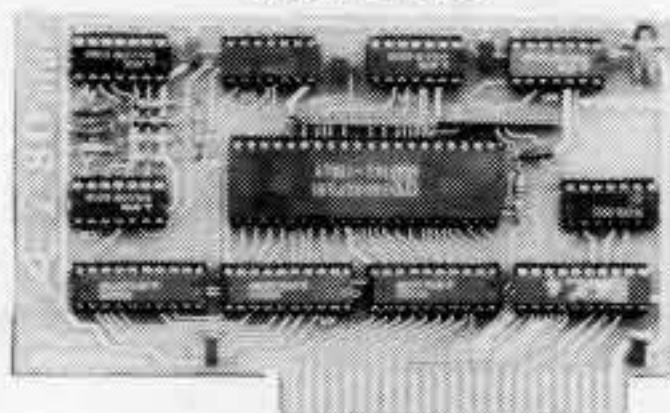
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- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
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- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

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

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- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
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- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7x9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	169	YES	YES	YES	YES	YES	YES	YES	YES
SUPRTERM	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

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE \$179.00

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
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- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.

## MemoryMaster IIe 128K RAM Card

- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

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# COMPUTIST

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**Publisher/Editor**  
Charles Haight

**Business Manager**  
Ken Fields

**Technical Editing**  
Gary Peterson

**Advertising**  
Attn: Valerie Robinson  
Advertising Department  
3710 100th St. SW  
Tacoma, WA 98499

**Programmer**  
Ray Darrah

**Printing**  
Grange Printing, Inc.  
Seattle, WA

**Production & Graphics**  
Lynn Campos-Johnson

**Publishing**  
SoftKey Publishing  
P.O. Box 44549

**Circulation**  
Valerie Robinson

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USA

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We now offer surface rates for our foreign subscribers.  
See pg. 31 for information.

# INPUT INPUT INPUT

## Some Inspiring Words

I am writing for a few reasons. First of all, I want to thank you for publishing so many articles on how to softkey disks. Even though I don't need to backup many of them, I still enjoy learning new tricks about the Apple. I wish there had been more new programs (i.e. more than zero) in no. 5, but I can't complain.

I would like to get one small bit of information from you: the address of A.P.P.L.E. (Apple Pugetsound Program Library Exchange). It was mentioned in a letter by Thomas E. Militello (pg. 4) and I've heard of it before, but can't seem to find the address anywhere. Even though I live in the same town as the inventor of Wizardry, there doesn't seem to be any Apple users group around, which means I'm fairly isolated.

An article I would love to see is one which would list a skeleton library of books on the Apple. Just a list of what books you have found most useful for BASIC, assembler, graphics, etc. I personally like the McGraw-Hill/Osborne book on Apple ][ BASIC, but have no idea what books are good for machine language. What book(s) are good on DOS layout, on the monitor, and on machine architecture would also be wonderful to know. I'd also love to see a simple list of what software tools people have found useful/essential for program development. Through talking with people, I have found out about GPLE now sold Beagle Bros. I wish I had known about this software months ago; it would have saved a lot of painful editing. Right now, I'd like to get a macro assembler, but have no idea where to go to look for a comparison of what's available. A little known book that I'd like to recommend is "Apple Graphics & Arcade Game Design" by Jeffrey Stanton, The Book Company. It's far and away the best book I've seen on the subject; unlike 95% of all other Apple graphics books, which may devote their last chapter to shape tables, this book gets into a lot of techniques mentioned in Hardcore COMPUTIST. After a third of the book, you're past shape tables and getting into machine language coding. Chapters cover hi-res screen architecture, bit-mapping, and arcade techniques

such as page-flipping, steering and firing, collisions, explosions, and scrolling. The whole book centers around making a Defender-like arcade game (which is left unfinished as an "exercise for the reader"). The book is 288 pages with very little space wasted and a lot of usable assembly language routines.

You've probably seen "Enhancing Your Apple ][, Vol. 1", by Don Lancaster. It's pretty interesting, but relies too heavily on hardware changes to get results. The enhancements are clever and cheap, but make software using them great for the hobbyist and that's all. His "Tearing into Machine Code" chapter looks pretty good; interesting methods to figure out how someone else's clever code works. So far, the part I've most enjoyed is the introduction, where he says something that you might quote in Hardcore:

"Undoing copy-protection is fun!"

'Not only is it fun, but cracking the uncopyable is about the most

challenging and rewarding thing that you can possibly do with your Apple. And, the things you learn along the way are exactly the skills that you will need to become a really great programmer."

Inspiring words indeed!

Eric Haines  
Ithaca NY

Mr. Haines: The address of Call A.P.P.L.E. is:

21246 68th Ave. S.  
Kent, WA 98032  
Phone (206) 872-2245

Books we have found useful include:

### Beneath Apple DOS

By Don Worth and Peter Lechner  
Quality Software

### What's Where in the Apple

Micro Ink

### Using 6502 Assembly Language

By Randy Hyde

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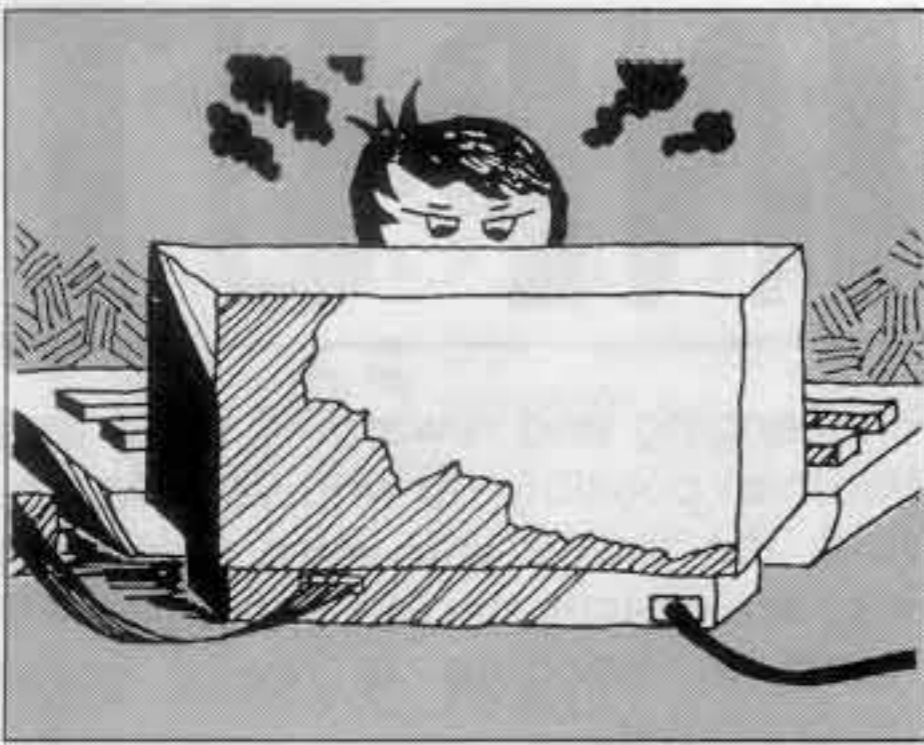
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## Most Wanted List

We were overwhelmed with the number of Softkeys that were recently submitted to us for Sensible Software's "Sensible Speller" and Sir Tech's "Legacy of Llylgamyn." We would like to thank all of the people who responded to the input column of Hardcore COMPUTIST No. 6.

This has prompted us to regularly print a list of the most wanted softkeys. If there is a program that you have just been pulling your hair out over backing it up, let us know about it. Send your vote for the most wanted softkey to:

**Hardcore COMPUTIST  
Wanted List  
P.O. Box 44549  
Tacoma, WA 98444**

Below is the first list. If you know how to deprotect, unlock or modify any of these programs, we encourage you to help other Hardcore COMPUTIST readers and earn some extra money at the same time. Be sure to send the information to us in article form on a DOS 3.3 diskette. For a complete format description, ask for our Writers guide.

1. **Bank Street Writer**  
*Broderbund*
2. **PFS File / PFS Report**  
*Software Publishing Corp.*
3. **Zoom Graphics**  
*Phoenix Software*
4. **Flight Simulator II**  
*Sub Logic*
5. **Type Attack**  
*Sirius Software*
6. **DB Master 4.0**  
*Stoneware, Inc.*
7. **Ultima III**  
*Origin Systems*
8. **One on One**  
*Electronic Arts*
9. **Visiblend**  
*Micro Lab*
10. **The Accountant**  
*Decision Support Software*

Likewise, programs we would hate to be without include:

### Bag of Tricks

Quality Software  
\$39.95

### Copy II + version 4.0 or above

Central Point Software  
\$39.95

### Global Program Line Editor (GPLE)

Beagle Brothers  
\$49.95

### The CIA

Golden Delicious Software  
\$65.00

### The S-C Macro Assembler

S-C Software  
\$92.50

*In addition to your recommendations we might add that all of Don Worth's other books (Micro Cookbook, The Hexadecimal Chronicles, The Incredible Secret Money Machine, etc) are also very good.*

## More on Screenwriter

I have had three different Screenwriter disks crash. A backup was purchased after the first crash. As a result of subsequent changes, I now possess one 2.0 version and one 2.2 version. I was excited when I saw the article ("Screenwriter II Softkey By Daniel Price in Hardcore COMPUTIST #5), and promptly verified the procedure on the 2.0 version. The 2.2 version could not be copied because it does not use the same file names. Furthermore, a portion of the catalog is unlistable.

The latter part of the article made reference to increasing the speed of booting Screenwriter II through the use of "Bag Of Tricks". For what it is worth, the 2.0 version boots from the menu in 14 seconds.

The faster booting rate of the 2.2 version is a distinct advantage and I would be very interested in seeing a comparable article entitled "Screenwriter II, Version 2.2, Softkey By Whoever Knows How".

Neil E. Walter  
Rockville MD

*Mr. Walter: Shortly after the softkey for Screenwriter 2.0 appeared in Hardcore COMPUTIST no. 5, one of our readers called and recommended the following procedure for backing up Screenwriter 2.2*

- 1) Use COPYA to copy the disk.
- 2) Use some sort of disk scan utility

*(The Inspector, ZAP from Bag of Tricks, or The Tracer on The CIA disk) to search for a byte sequence of 20 00 7F.*

*3) This sequence should be found on track \$0F, sector \$07.*

*4) Change these bytes to EA EA EA and write the sector back to the disk.*

*We don't have Screenwriter 2.2 to try this out on, so please let us know whether or not this procedure works for you.*

## Egbugs

Thanks to Dr. Goldstein for his article "Cracking The Egbert II Communications Disk". I have already thanked you by sending more money.

However, there are a few errors (maybe mine). I did not use the information on DeMuffin Plus since I already had it. Between steps 6 and 7 (page 17) you need to add a step, \*8600G. On page 18, check the name of your Combo Program. Mine was 10-83. Also, the value at \*54BC was AB. I changed it to 20 as the article suggested.

On page 19 in the RTTY and ECW program, you should not use the reserved word. Use "A" only. My RTTY program does not receive correctly. It prints at an angle going up the screen. I'm still looking for this. Can anyone help?

Also, can anyone unlock Zoom Graphics?

Jim Willis West  
Monroe LA

*Mr. Willis: Unfortunately you are right; we did manage to introduce some bugs into Dr. Goldstein's softkey. Please see the corrections printed on page 30 of this issue.*

*We have amputated the toes of the person responsible for these bugs.*

## Hit List

Following are some ideas and thoughts regarding your publication:

It seems as though your two magazines are starting to appear on a more regular basis. This would seem to indicate that hopefully, we are over the hump and you are here to stay! Congratulations!

Also, the softkey articles in the latest issue seem to be more tutorial and step-by-step, so that those of us who

*Continued on page 28*

# READERS' SOFTKEY & COPY EXCHANGE

## Backing-Up Crush, Crumble & Chomp By Jeff Rivett

Crush, Crumble, and Chomp  
Automated Simulations (Epyx)  
28035 Dorothy Drive  
Agoura, CA 91301

### Requirements:

Apple II Plus or compatible  
Replay II card and utility disk with  
SOFTMOVE program  
Crush, Crumble, and Chomp (Epyx)  
An initialized DOS 3.3 disk with "HEL-  
LO" as the boot program  
FID program from 3.3 System Master  
disk

Crush, Crumble, and Chomp is  
copy-protected only on areas of the  
disk that contain the two main Ap-  
plesoft programs. The rest of the files,  
and there are a few of them, can be  
transferred to a copy disk using any file  
transfer program.

The main (copy-protected) files are  
called:

C<sup>CTRL</sup>NCCMAIN  
C<sup>CTRL</sup>NCC

Run FID (or any other file transfer  
program) and copy all the files, except  
the two copy-protected ones, from the  
original to the blank initialized disk.

### BRUN FID

After transferring the unprotected  
files to your initialized copy disk, boot  
the original Crush, Crumble and  
Chomp disk

### PR#6

Make a REPLAY copy at the point  
where the set-up program starts and  
asks you the question "DO YOU  
WANT TO CONTINUE A SAVED  
GAME?".

Now, run "SOFTMOVE" from the  
Replay II utility disk. "SOFTMOVE"  
assumes that there was an Applesoft  
program in memory when you pushed  
the Replay button to make the copy.  
This Applesoft program is put back into  
memory intact, with a normal DOS  
resident instead of the copy-protected  
DOS.

You can now save the Applesoft file  
to the disk that contains all the files you

have transferred. Save it with the  
name "C<sup>CTRL</sup>NCC."

### SAVE C<sup>CTRL</sup>NCC

Boot the original again. This time let  
the set-up progress to the point where  
the play actually starts and then make  
another REPLAY copy. Repeat the  
"SOFTMOVE" procedure you used  
previously on the first protected pro-  
gram. Save this file as  
C<sup>CTRL</sup>NCCMAIN.

### SAVE C<sup>CTRL</sup>NCCMAIN

That's all there is to it. These files  
can now be modified at will.

A last note: the "SOFTMOVE" pro-  
gram is a surprisingly useful utility. For  
instance, if you typed in a huge Ap-  
plesoft program and forgot that there  
was no DOS in the machine, you might  
want to shoot yourself. With REPLAY  
II and "SOFTMOVE" you can make a  
REPLAY copy and have the file on disk  
in no time, almost as if DOS was in the  
machine all along.

## Backing-Up Snake Byte By Clay Harrell

Snake Byte  
Sirius Software, Inc.  
10364 Rockingham Drive  
Sacramento, CA 95827

### Requirements:

48K Apple, with old monitor F8 ROM  
One disk drive, with DOS 3.3  
Initialized 48K slave DOS 3.3 disk  
Snake Byte

Snake Byte is a challenging game  
that requires a great deal of eye-hand  
coordination. But it is a lot of fun, and  
so is its deprotection!

In typical Sirius tradition, the disk is  
protected so that nibble copies are  
relatively difficult to make. But, there  
is another way! Snake Byte is not a  
very big program and to confirm this,  
Sirius has helped us out a great deal.

After booting the game and resetting  
into the monitor, the text page is co-  
vered with what appears to be the low-  
res version of the game. The author  
uses the text page for animation  
duties, so we know that we do not have  
to save that portion of memory  
(\$400-800).

If we list memory from \$800 to

\$1800, we find it all zeroes. Obvious-  
ly, we do not have to save this since  
there is no valid code, there. Thanks  
Sirius!

Strolling down memory lane, we  
come to \$8600 and notice the same  
phenomenon again! Sirius has  
blanked out memory from \$8600 up to  
RWTS (which we don't need to save  
since no disk access is ever encoun-  
tered after the game finishes its initial  
load). It is now obvious that we need  
to save \$1800 to \$85FF.

The question of the day then, is: why  
did Sirius/the author do this?

Anyway, figuring out what code to  
save was easy.

Now, where does the game start?  
Checking all the standard starting lo-  
cations (\$1800, \$6000, etc.), nothing  
comes up. But if you are cunning  
and/or lucky, like me, you will find that  
\$7697 seems to be the start of the  
game.

We now have all the information we  
need to deprotect Snake Byte.

Note that we really do not have to

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save hi-res page one, since it is drawn on. For convenience' sake, however, we will.

Here's the exact procedure for the deprotection of Snake Byte:

1) Boot the Snake Byte disk

**PR#6**

2) After the drive stops, reset into the monitor.

3) Boot a 48K slave disk

**PR#6**

4) Enter the monitor

**CALL-151**

5) Enter the following code which turns on hi-res page two and waits for a keypress

**17E9:AD 50 C0 AD 52 C0 AD 57 C0  
AD 55 C0 AD 10 C0 AD 00 C0 10 FB  
4C 97 76**

6) Save the program

**BSAVE SNAKE BYTE,  
A\$17E9,L\$6E19**

## Snake Byte Modifications

If you become totally frustrated with Snake Byte, here are some ways to beat the system.

Create this Applesoft program that runs the game:

```
5 POKE 1010,102: POKE 1011,213: POKE
  1012,112
10 IF A <> 0 THEN 40
20 HOME: PRINT "AFTER SNAKE BYT
  E IS RUNNING PRESS RESET FOR
  MORE SNAKES OR FOR A DIFFE
  RENT STARTING LEVEL"
30 A = 1: PRINT CHR$(4); "BRUN SNAKE BYTE"
40 HOME: VTAB 8: INPUT "HOW MAN
  Y SNAKES WOULD YOU LIKE?"; SN$: SN
  = VAL(SN$): IF SN > 2
  54 OR SN < 1 THEN 40
50 VTAB 10: INPUT "WHAT STARTING
  LEVEL?"; SL$: SL = VAL(SL$)
  : IF SL > 21 OR SL < 1 THEN
  50
60 POKE 30382,SN
70 POKE 30360,SL
80 CALL 30359
```

## Undocumented Feature

One last note on Snake Byte: Whenever the game asks: "HOW MANY PLUMBS?" you can touch the "C" key to change the keys used to direct the snake. Have fun!

## Softkey For DB Master By Dan Lui

**DB Master  
Stoneware, Inc.  
50 Belvedere St.  
San Rafael, CA 94901**

### Requirements:

Apple II, with 48K  
One disk drive  
DB Master (old version)  
COPYA  
The Inspector, or similar program  
One blank disk

The old version of DB (Data Base) Master is protected very well. The disk contains three different protection schemes.

First, it uses half tracks from \$6.5-\$22.5. Second, the closing address and data marks have been changed from the normal DOS 3.3 \$DE/\$AA to \$DF/\$AA. Third, there is a nibble-like checking routine to check track 0.

Breaking the nibble-count scheme is the most difficult task of all.

The following procedure will unlock this program. It also works for DB's Utilities disk:

1) Put in the System Master and type:  
**LOAD COPYA**

2) Add the following lines to COPYA:

```
199 GOSUB 400
248 GOSUB 420
259 GOSUB 420
400 POKE 47413,223: POKE 47423,1
  71: POKE 47505,223: POKE 475
  15,171
405 POKE 48351,201: POKE 48352,1
  2: POKE 48353,105: POKE 4835
  4,0: POKE 48355,24: POKE 483
  56,76: POKE 48357,107: POKE
  48358,190
410 POKE 48741,223: POKE 48742,1
  88: RETURN
420 POKE 48741,107: POKE 48742,1
  90: POKE 47413,222: POKE 474
  23,170: POKE 47505,222: POKE
  47515,170
425 POKE 48741,107: POKE 48742,1
  90: RETURN
```

3) Save the new COPYA in case of errors.

### SAVE COPYADB

4) Execute the program  
**RUN**

5) After the disk has been copied, use the Inspector, or some other sector editor to read and modify the following sectors:

Trk	Sct	Byte	From	To
0	3	\$35	DF	DE
0	3	\$3F	AB	AA
0	3	\$91	DF	DE
0	3	\$9B	AB	AA
0	E	\$0A	A2	D0
0	E	\$0B	00	12
1	F	\$C7	A9	60
3	1	\$3E	20	60

6) Write-protect disk before running.

The above procedure eliminates all three of the protection schemes Stoneware provided on the older version of the excellent DB Master.

## Backing-Up Mouskattack By Clay Harrell

**Mouskattack  
On Line Systems  
36575 Mudge Ranch Rd  
Coarsegoald, CA 93614**

### Requirements:

48K Apple  
One disk drive, with DOS 3.3  
DOS 3.3 System Master  
Mouskattack  
One blank, initialized 48K slave disk

Although Mouskattack is a rather old and not so thrilling maze game, it warrants discussion on deprotection methods and the use of DOS from protected programs.

Upon booting the Mouskattack disk, the prompt appears on the lower left side of the screen, indicating that a somewhat normal DOS is used by the program.

If you boot a normal DOS 3.3 disk, then put your Mouskattack disk in the drive and type CATALOG, a director does appear. You will not see any files, just copyright notices and names of the authors involved.

These, however, are files in the directory.

The disk seems almost unprotected and to confirm this, I made a copy with COPYA from the DOS 3.3 System Master. It reads the non-DOS tracks slowly. This is due to the sector skewing used by On-Line in hopes of a faster loading game and not due to the protection. However, the people at On-Line were not too successful in carrying out their intention and we shall see why, in a moment.

The first three tracks (the DOS tracks) read at the normal speed because they are normal DOS, just like those in your DOS 3.3 System Master.

After making my COPYA copy, I



used a Disk Editor to read in track 11, sector F, of the disk. This is the first sector of the catalog track.

On-Line was able to make the directory appear without file types and sector lengths using a simple technique. The first seven (or six) characters in the directory name are back spaces. Starting with byte \$0E, change the first seven characters to anything but control characters, numbers or spaces, and you can load and examine the files like any other DOS 3.3 files.

Don't bother with the other file names, though. They are all blank files. The only one we are interested in is the first directory entry, MOUSKATTACK.

### Snooping Through

Now, get back into BASIC and catalog the copy of Mouskattack. The first entry of your catalog should have a binary file, four sectors in length, called `CTRLHCTRLHCTRLHCTRLHMOUSKATTACK`. You can now BLOAD this file and snoop through it.

At this point you might ask how I knew to do this. Since Mouskattack has a normal DOS on it, by loading in track one, sector 9, with a sector editor, you can see which file is the boot file or Hello program.

Sure enough, Mouskattack is preceded by seven `CTRLH`'s (i.e., backspaces). Therefore, you know that Mouskattack is the first file you should snoop through.

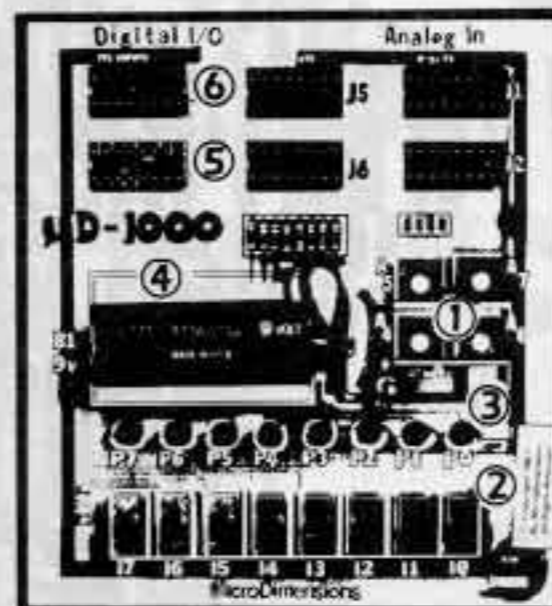
Now, to find out where this file is loaded, BLOAD the file `CTRLHCTRLHCTRLHCTRLHCTRLHCTRLHCTRLHMOUSKATTACK`, enter the monitor and examine locations AA72-AA73.

*Continued on page 30*

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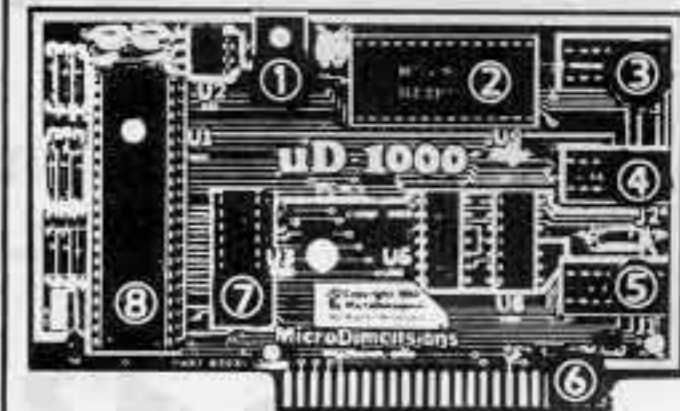
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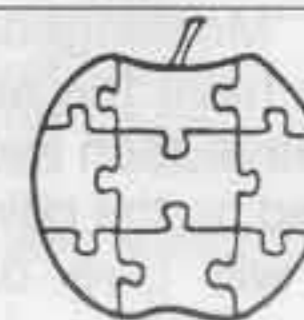
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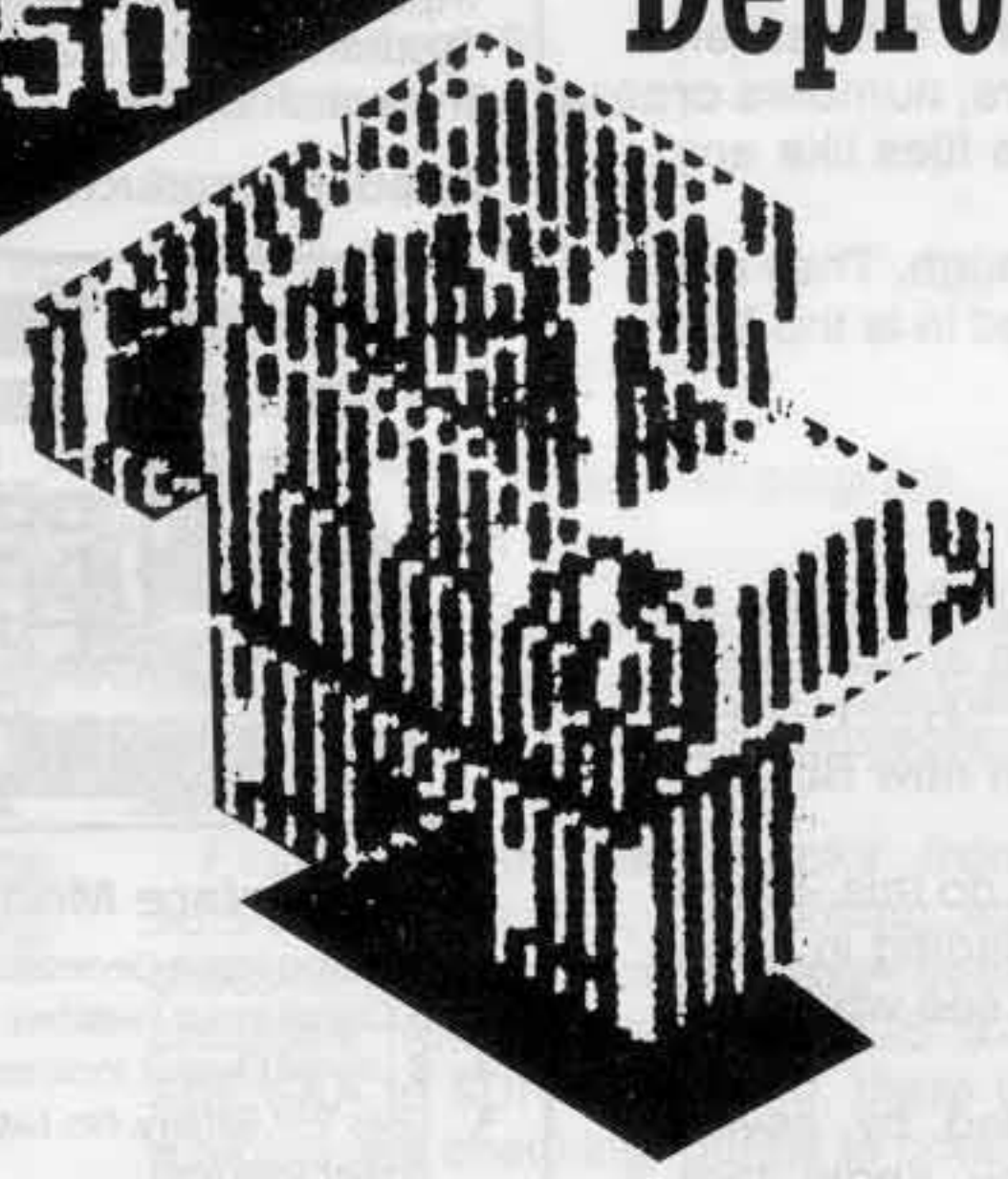
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1UP 008400  
 1UP 008550  
 2UP 022350

# Deprotecting Zaxxon



By Clay Harrell

**Zaxxon**  
**Datasoft, Inc.**  
 16606 Schoenborn Street  
 Sepulveda, CA 91348  
 \$39.95

**Requirements:**  
 48K Apple or Apple II Plus  
 One disk drive and DOS 3.3  
 COPYA from 3.3 System Master  
 A sector editor such as Zap  
 Two blank disks  
 Original Zaxxon disk

One of my favorite arcade games of all time is Zaxxon. The game was the first to use "true" three-dimensional graphic effects that played well. I've spent a great deal of time (and tokens) playing the game so naturally, when it was available for the Apple, I bought it.

The only complaint I have about Zaxxon is that there are only three planes given for each game. The arcade Zaxxon I had always played had five. I felt cheated! With this in mind, I decided to dig into the code that made Zaxxon fly.

(Please note that there has been a new release of Zaxxon from Datasoft. This is the one I will be primarily discussing, although the same protection was used on both versions. You can tell if you have the new version because it has an option to use the Mockingboard with it. If your Zaxxon boots and asks "Mockingboard in slot 4 Y/N?," you have the new version. In addition, I have seen two different protections used on the newer versions of Zaxxon. I will give details on the deprotection of all versions, including the older version of the game).

The first thing to notice is the boot of Zaxxon. Listen to your disk drive as the game boots and you can hear the drive arm swing out to an outside track and then swing back in and read the game in. This is what is loosely known as a "nibble count" or a "checksum" routine.

If a byte doesn't match the benchmark like it should when the outside track is read, the game will clear memory and reboot. Usually, the only thing involved in deprotecting a program that isn't a single load and that has a "nibble count" is to find the routine that does the check and jump around it. Usually, too, about the only way to find this routine is to (yech!) trace the boot.

## Boot Code Tracing

Boot code tracing is a method of tracing how a program gets from your disk to memory. It does not magically happen all at once but in stages which we can trace and examine and, hopefully, understand. Hence, the name "boot code tracing."

The theory of boot code tracing suggests that you should follow the boot process one step at a time to see where it takes you, by altering the code to prevent it from running away from you. Yes, it is advisable that you understand assembly language, since the code that boots the disk is, in many cases, intentionally misleading.

This process is based upon the law that track zero, sector zero, must always be read by the disk controller

card into page 8 (\$800-8FF) of memory. After this, depending on the complexity of the protection, it is sometimes difficult to understand what goes on in the rest of the load.

In a normal slave disk boot, there are three stages of a boot, starting with the code at \$C600-C6FF in the disk controller card. This controller card code loads in track \$0, sector \$0, into \$800-\$8FF, which, in turn, loads in track \$0, sector \$0 through sector \$9, into \$B600-BFFF. This new code loads in track \$0, sector \$C through track \$2, sector \$4, into \$9D00-\$B5FF and finally your Hello program is run. In summary:

Stage #	Code location	Final location	Jumps to
0	\$C600-C6FF	\$0800-08FF	\$0801
1	\$0801-08FF	\$B600-BFFF	\$B700
2	\$B600-BFFF	\$9D00-B5FF	RUN

Now, in order to change the code in

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the boot so that it doesn't run away from us, we can either alter memory or alter (a copy of) the disk.

### Check Routines

If you defeat the DOS (Disk Operating System) error-checking routines, you can copy the Zaxxon disk with COPYA. Of course, it won't run because of the "check" routine and because of some of the other incompatibilities with normal DOS 3.3, but you can read and write to the copy easily.

To defeat the error-checking, enter the monitor

**CALL-151**

and type:

**B942:18**

Whenever DOS encounters an error, it jumps to a routine at \$B942 which sets the carry bit and returns. The carry bit is a flag to DOS that there was an error and directs it to stop whatever it was doing. It then prints out a worthless message to the user.

If you defeat this routine, you can fool DOS and read the entire Zaxxon disk. Then copy the disk and examine the data on it. So, put your DOS 3.3 System Master in the drive and

**RUN COPYA**

When the prompt for source drive is asked, hit **CTRLC**. This will break you into BASIC. Now, type the following:

**CALL-151**

**3A1:18**

**302:17**

**35F:17**

**3D0G**

**70**

**RUN**

This will make some changes to

COPYA.OBJ0 so that it ignores errors and only copies tracks \$0-\$16. Line 70 of the Applesoft part of COPYA is also deleted to prevent loading in COPYA.OBJ0 and writing over the change just made. Now, select the desired drives and copy Zaxxon.

*Note: Zaxxon only lives from track \$0 to track \$16 (tracks \$0-\$13 on some versions). If COPYA tries to read an unformatted track your drive will recalibrate ("grind") for every sector that the program tries to read. Do not interrupt this process. After the copy is made, make another copy of the duplicate of Zaxxon, which you had just made. Label the first copy WORK ZAX and the second copy COPYA ZAX.*

Put these two copies aside for a moment. The next step is to trace the boot. First, enter the monitor

**CALL-151**

and clear out memory with this command:

**800:0 N 801 < 800.95FFM**

To start the boot you need to run the code in the disk controller card, but we stop it before it runs away. You cannot change the code in ROM (Read Only Memory), but you can copy it down to RAM (Random Access Memory) and change it. Use the following command from monitor to do this:

**9600 < C600.C6FFM**

Having done this, you can change the boot code so that it loads in track \$0, sector \$0, but does not execute it. At location \$96F8 you will see a JMP \$801. This starts the next boot process (refer to table).

Next, change this to JMP \$FF59, which will jump to the monitor. From

the monitor, type:

**96F8:4C 59 FF**

Now, put the WORK ZAX disk in drive one and execute the code with:

**9600G**

The drive will spin, the Apple will beep and you will see the "\*" prompt.

From the table, you can see that this code is loaded into \$801. (To stop the drive from spinning, enter **C0E8** from the monitor. Also, to turn off the hi-res page, enter **C054** and **C051**). Now, examine the code at \$801 with the command:

**801L**

Upon examining the code, you will find that it is fairly normal, with some exceptions:

0801-	A5 27	LDA	\$27	-----
0803-	C9 09	CMP	#S09	
0805-	D0 18	BNE	\$081F	
0807-	A5 2B	LDA	\$2B	N
0809-	4A	LSR		
080A-	4A	LSR		O
080B-	4A	LSR		
080C-	4A	LSR		R
080D-	09 C0	ORA	#SC0	
080F-	85 3F	STA	\$3F	M
0811-	A9 5C	LDA	#S5C	
0813-	85 3E	STA	\$3E	A
0815-	18	CLC		
0816-	AD FE 08	LDA	\$08FE	L
0819-	6D FF 08	ADC	\$08FF	
081C-	8D FE 08	STA	\$08FE	
081F-	AE FF 08	LDX	\$08FF	
0822-	30 15	BMI	\$0839	D
0824-	BD 4D 08	LDA	\$084D,X	
0827-	85 3D	STA	\$3D	O
0829-	CE FF 08	DEC	\$08FF	
082C-	AD FE 08	LDA	\$08FE	S
082F-	85 27	STA	\$27	
0831-	CE FE 08	DEC	\$08FE	
0834-	A6 2B	LDX	\$2B	
0836-	6C 3E 00	JMP	(\$003E)	
0839-	EE FE 08	INC	\$08FE	-----
083C-	AD 55 C0	LDA	\$C055	TURN ON
083F-	AD 50 C0	LDA	\$C050	HI-RES2
0842-	AD 57 C0	LDA	\$C057	-----
0845-	A2 7D	LDX	#S7D	???????
0847-	9A	TXS		???????
0848-	4C B4 08	JMP	\$08B4	-----

```

08B4- A9 20      LDA  #S20      |
08B6- 85 1B      STA  $1B        |
08B8- AD 52 C0   LDA  $C052     |
08BB- A9 60      LDA  #S60      |
08BD- 8D 06 07   STA  $706      |-----
08C0- 6C F8 08   JMP  ($08FD)   |JUMP TO
                                     |$8000
                                     |-----

```

## How it Works

The first part of the code, from \$801 to \$83B, is lifted verbatim from a DOS 3.3 Slave disk. This code loads in track \$0, sector \$0, through track \$0, sector \$09, into \$7F00-\$88FF. This is revealed from location \$8FE, which is one higher than the first page loaded into. The byte at \$8FF is one less than the number of sectors to be loaded.

The next piece of code turns on the hi-res screen. The last part of code, before the jump to \$8B4, looks innocent, but really isn't. It loads the X-register with \$7D and transfers it to the stack pointer.

To understand the implications of this, you must understand how the computer keeps track of its return position after an RTS (Return from Sub-routine).

When the 6502 encounters a JSR (Jump to Sub-Routine), it stores the present address on the stack so it knows where to return when an RTS is encountered.

This can be used to obscure code from unwanted eyes. For example, say we want to go to \$9600. You can load the stack with \$95 and then \$FF, by using the PHA op-code (Push Accumulator on Stack). When an RTS is encountered, the two last bytes are pulled from the stack, incremented by one (to \$9600), and jumped to.

Alternatively, you can change where the pointer on the stack is pointing to and make it point to the desired location. Keep this in mind when you find an RTS.

At \$8B4, a few zero page locations are loaded and then there is an indirect jump to \$8000 (through \$8FD). To see the code at \$8000 load the next stage of the boot but stop it before it can execute. To do this, run your sector editor and change track \$0, sector \$0, byte \$C0, to 4C 59 FF on the disk labeled WORK ZAX.

This will jump you to the monitor before it can execute the code at \$8000. Now, write the sector back out to the disk and boot the disk. After a moment the computer will beep and stop in the monitor. You can now examine the code at \$8000. Do this with the command:

**8000L**

and the code will look like this:

```

8000- A0 09      LDY  #S09      |-----
8002- A2 00      LDX  #S00      |
8004- 8A         TXA         | M
8005- EE 0D 80   INC  $800D     | E M
8008- EE 10 80   INC  $8010     | M O
800B- BD 18 7F   LDA  $7F18,X   | O V
800E- 9D 7E 00   STA  $007E,X   | R E
8011- CA         DEX         | Y
8012- D0 F9      BNE  $800B     |
8014- 88         DEY         |
8015- D0 EE      BNE  $8005     |-----
8017- 60         RTS         |JUMP
                                     |THRU
                                     |STACK
                                     |-----

```

Notice the RTS at \$8017. Remember: you jumped (JMP), not jumped sub-routine (JSR) to all the routines, so there is nothing on the stack to return to!

Well, yes there is! The memory move relocates the memory at \$7F19 through \$8718, down to \$7F through \$087E. This moves memory across page \$1, which is the stack!

Remember too, that the stack pointer is set to \$7D in Boot1. After the memory move, an RTS is executed. The stack is pointing at \$17D, which is now \$07 and \$65 after the memory move. This will be the next jump (plus one) for the final stage of the boot!

The manufacturer, Datasoft, has added a final bit of protection in that the next jump is across the text page which, of course, changes when you exit the program in any manner. But you can simply move memory to, say, \$107E and examine it to see what the next load does.

To do this, change \$8010 to 10 and execute the memory move. Do this as follows:

**8010:10 N 8000G**

Now, \$1766 is equivalent to \$766. So type:

**1766L**

and examine the code. It should look as follows:

```

1766- A5 2B      LDA  $2B        |
1768- 8D 0E 02   STA  $020E     | G C
176B- A9 20      LDA  #S20      | O O
176D- EA         NOP         | O D
176E- A6 2B      LDX  $2B        | D E
1770- 20 1F 02   JSR  $021F     |-----
1773- A0 20      LDY  #S20      |
                                     |NIBBLE
                                     |COUNT/
                                     |CHECK
                                     |-----
17D4- A9 16      LDA  #S16      | G C
17D6- 8D 11 02   STA  $0211     | O O
17D9- A9 D0      LDA  #SD0      | O D
17DB- 8D 16 02   STA  $0216     | D E
17DE- 4C 9A 01   JMP  $019A     |
                                     |-----

```

If you take time to look at this code you will find that the offending "nibble count" or "checksum" starts at \$1773

and goes to \$17D3! This is all you need to know to defeat it.

What you have to do, next, is jump around this. Do it by typing:

**1773:4C D4 07**

The other loads and stores of the accumulator are parameters for their loader. For further understanding, here are the parameters:

**\$211**-high track # to start from.

**\$212**-high sector # to start from.

**\$21E**-# of pages (sectors) to load.

**\$21B**-starting page to load at.

**JSR \$1E9**-start the load.

The last thing to do is to find the "nibble count" code on the disk code and change it. Most good sector editors (like The Inspector) have LOCATE routines enabling you to find a pattern of bytes on a disk.

One final note: Now that you know where the check routine lives, we can defeat it. But you also must change the epilog bytes to normal DOS 3.3.

Datasoft uses \$CC for their epilog bytes where normal DOS uses \$DE. If you are familiar with loaders and RWTS, you can find it in their loader. The table is on page \$4 (page \$14).

## Stepwise

With this information in hand, here is a step-by-step procedure for the deprotection of Zaxxon (Mockingboard version only):

1) Get out your DOS 3.3 System Master disk and run it

**RUN COPYA**

2) When COPYA asks for the slot number of the original disk, stop the program

**CTRL C**

3) Enter the monitor

**CALL 151**

4) Patch DOS and COPY.OBJ0 so that they ignore read errors and only tracks \$0-\$16 are copied

**B942:18**

**3A1:18**

**302:17**

**35F:17**

5) Re-enter Applesoft and delete line 70 of COPYA so that COPY.OBJ0 is not reloaded

**3D0G**

**70**

6) Run COPYA to copy Zaxxon

**RUN**

7) If you have two disk drives you can leave the room during the copy

process; otherwise, you may have to put up with your drive making some horrible grinding noises. *Don't worry. This will not harm the disks or your drives.*

8) Run your sector editor and make the following changes depending on which version of Zaxxon you have. (Note: you may have to try all of these changes, depending on the release date of your Zaxxon. One of them should work, though):

**For Mockingboard Versions of Zaxxon**

Trk	Sect	Byte	From	To
\$00	\$04	\$4F	\$CC	\$DE
\$00	\$04	\$50	\$D0	\$EA
\$00	\$04	\$51	\$AE	\$EA
\$00	\$07	\$0D	\$A0	\$4C
\$00	\$07	\$0E	\$20	\$D4
\$00	\$07	\$0F	\$84	\$07

**For Mockingboard Versions of Zaxxon, for which the above method does not work**

Trk	Sect	Byte	From	To
\$00	\$07	\$00	\$A9	\$4C
\$00	\$07	\$01	\$01	\$C0
\$00	\$07	\$02	\$48	\$08
\$00	\$04	\$4F	\$CC	\$DE

**For the older non-Mockingboard Versions of Zaxxon**

Trk	Sect	Byte	From	To
\$00	\$07	\$00	\$A9	\$4C
\$00	\$07	\$01	\$01	\$C0
\$00	\$07	\$02	\$48	\$08
\$00	\$04	\$4F	\$CC	\$DE

9) Don't forget to write the sectors you have altered back to the deprotected Zaxxon disk.

**APT for Zaxxon**

As I said earlier, the Zaxxon in the arcades gives you five planes and our Zaxxon only three! If you want more planes, change byte \$17 on track \$09, sector \$08 with your sector editor to the number of planes you want (between \$00 and \$FF). I chose to change this byte to \$03. This gave me four planes, which is a nice compromise. This modification applies to all versions of Zaxxon.



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The following is a reasonably efficient procedure for backing-up certain protected disks that are not easily copied by either Locksmith 4.1 or Locksmith 5.0. The "rub" is that you must retain a certain portion of the copy protection. That is, your copies can't be duplicated by Locksmith or other bit copy programs. However, it does provide a procedure for backing-up the disks as well as "liberating" them for study.

### Freeing the Disks

**STEP(1)** First, you must have an APPLE II with 48K. It is especially convenient if you have an old INTEGER card living in your APPLE, but if you don't, this procedure will still work on a number of protected commercial software programs. Let us assume that you have an old INTEGER card. I'll get back to APPLESOFT later. The switch on the INTEGER card should be down so that APPLESOFT is the boot-up language. What's this? You say that you don't use your INTEGER card anymore because you have an expansion card in slot 0? Well, clean that old INTEGER card off because, for our purposes, it will work in any slot which allows the switch to stick out of the back of the APPLE (slot 0, 2 or 4).

**STEP(2)** Now, pull out the old DOS 3.3 System Master and boot up your APPLE

**PR#6.**

Place a blank disk into the drive and INITIALize it.

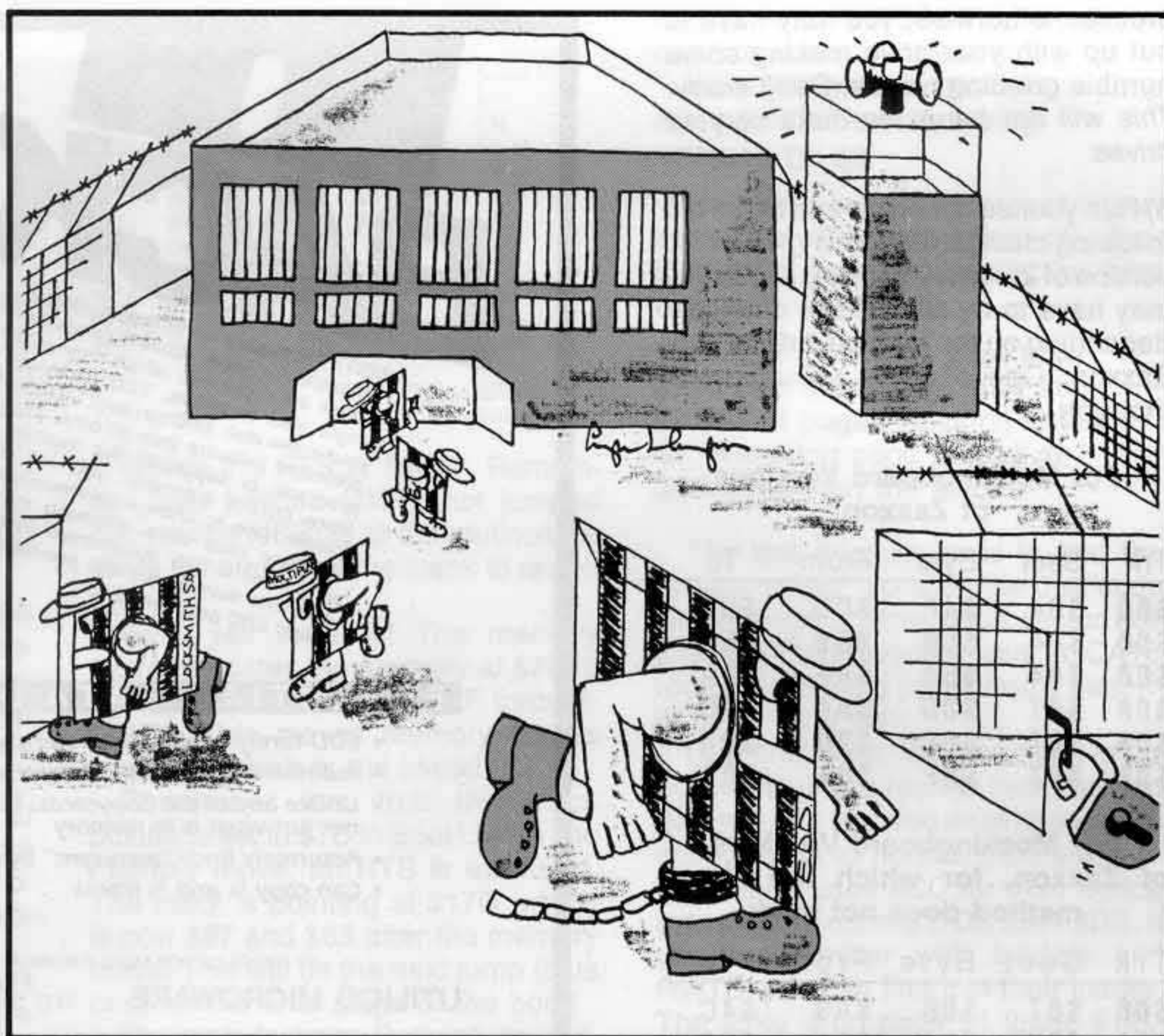
#### INIT HELLO

DELETE the "HELLO" program after you have INITIALized the disk.

#### DELETE HELLO

This slave disk will serve a very special purpose. Later, we will want to boot the system with it. Unlike a system master, when booting with a slave disk, much of the APPLE memory (\$4000-\$9600) is left undisturbed.

**STEP(3-a)** Boot the protected disk and watch the screen very carefully during the boot process. If you see the APPLESOFT cursor for even a fraction of a second the chances are very good that this procedure will liberate the disk. Flip the INTEGER switch up after the boot process is complete. Press RESET and you are instantly into the



## Making Liberated Backups That Retain Their Copy-Protection

By Thomas Dragon

monitor. Note that you will always jump into the monitor no matter where the INTEGER card is located. This is another well kept APPLE secret.

**STEP(3-b)** If you don't have an INTEGER card, make like Woody Woodpecker on the RESET key until the disk drive stops. Then enter CALL -151, and you should be in the monitor. If the drive doesn't stop after 10 or 20 rapid RESETs, then this procedure won't work on your APPLE. You might want to see if there is some old-timer who might be willing to sell his useless old INTEGER card for \$15 or \$25. There are a number of old INTEGER cards around that appear not to work. Surprisingly, many of these old cards will still work in terms of forcing a jump to the monitor. If the old timer has one that doesn't work, just ask him if you can have it to study.

**STEP(4)** Now that you are in the monitor, type **A56EG**. This will activate

the CATALOG function if the protected disk has a reasonably intact DOS. You should then see a CATALOG of the disk contents. If you only get a "honking", then this procedure won't work. Don't despair. You will very seldom get a honking if you see the APPLESOFT prompt when you boot.

**STEP(5)** Next, we will move part of the protected RWTS into an area of the APPLE memory that will remain intact during the boot process. In order to accomplish this, we will use the monitor memory move. Enter

**4800 < B800.BFFF**

This will move the special DOS routines to \$4800.

**STEP(6)** Remove the protected disk from the drive and replace it with the slave disk that you previously initialized.

Flip the INTEGER card switch down if you are using an INTEGER card and boot the slave disk by typing **6<sup>CTRL</sup>P** (assuming slot 6 is the boot slot). Don't worry about the "FILE NOT FOUND" error. At this point, I am always extra cautious because I don't want to accidentally lose the protected DOS information. Take out any disk with a bit of space on it and enter the following command from the keyboard  
**BSAVE PROTECTED DOS,  
 A\$4800,L\$800**

**STEP(7)** Place the System Master into the drive and enter **BLOAD FID**. Everyone reading this little note must know about FID. If you don't, let me just say that it is a DOS-less copy program. It does not carry its own DOS like most other variations of APPLE copy routines, but "sucks" up the DOS that is living in memory when it is activated. However, we have not activated FID. We have only loaded it into memory.

**STEP(8)** It is now time to move the protected DOS back into the regular DOS 3.3 memory area. Enter **CALL -151** to get into the monitor. Then enter  
**B800 < 4800.4FFFM**

Now you have modified DOS 3.3. The modified DOS is neither regular DOS 3.3 nor the true protected DOS. It is a hybrid of regular DOS 3.3 that employs the protection scheme that is on the protected disk.

**STEP(9-a)** Return to Applesoft by typing **CTRL C**. Now INITIALize a slave disk by typing **INIT HELLO**. If all has gone well, the slave disk will now become a slave disk that retains the copy-protection of the original protected disk. Be sure to **DELETE HELLO** after the drive stops.

**STEP(9-b)** If you have made an error in moving DOS, just re-boot the slave disk and then go back to STEP (7). If you have somehow managed to destroy the memory image, re-boot the system and **BLOAD PROTECTED DOS** as saved in STEP (6) and then go to STEP (7).

**STEP(10)** The final step is to activate FID. You have the protected disk and you have a blank disk with the same DOS. Either enter **CALL 2051** or **CALL -151 803G**. Either CALL will essentially activate FID and allow it to use the protected DOS.

**STEP(11)** From this point, you should be able to transfer the files from the protected disk to your special slave with the use of FID.

The programs are now essentially liberated from the point of view that they can be listed, modified and saved. It may be that the protected "HELLO" program sets the RESET vector when it is run. If you wish to study the programs, simply load and look at them. To be sure, you should place a write-protect notch on your copied disk if the original copy was write-protected. The disks are still protected in the sense that any copy procedures that failed with the original disk will also fail with the liberated disk.

This procedure works well with the Microzine disks, the Videx pre-boot disks, Micro Power and Light disks, HIREs Secrets from Avant Garde, and an incredible collection of other disks that have either binary or APPLESOFT programs on them. Disks on which the procedure doesn't work include the Human Systems Dynamics (HSD) disks and E-Z Draw. It doesn't work for E-Z Draw because the E-Z Draw disk uses a 32K DOS and this discussion deals with a 48K DOS. It doesn't work for the HSD disks because they have an incredibly complex protection system.

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# S-C ASSEMBLER

## REVIEW:

Whether you are a beginning BASIC programmer or an experienced assembly language programmer, sooner or later you'll need an assembler in your Apple programming toolchest. S-C Software's Macro Assembler version 1.1 is one of the most versatile and easiest to use.

### System Requirements

The S-C Macro Assembler requires an Apple II, II+, or IIE; at least 32K RAM; and a single disk drive. It will work with the Apple's standard 40-column display, as well as the IIE, STB and Videx 80-column boards. The assembler may be loaded into a language card, substantially increasing room for assembly language programs.

Supplied on an un-protected DOS 3.3 formatted diskette, the S-C Assembler can be backed up easily. The source code for the assembler is also provided, so experienced programmers can modify the assembler to their liking (or their highly kludged machines). Purchases may be made directly from S-C Software Corporation, 2331 Gus Thomasson Road, Suite 125, P.O. Box 280300, Dallas, TX, 75228 (214) 324-2050. The cost is \$92.50. An excellent by-subscription newsletter for assembly language

programmers, "Apple Assembly Line" is also offered by S-C Software. Subscriptions are \$18 annually in the U.S.

### What Is An Assembler?

High level languages such as BASIC and Pascal aren't a computer's "native" language. When executing a high level language, the computer must convert the program's IF THENs and FOR NEXTs into something it can understand. Conversion into the machine's native language takes time; the high level language statements occupy large amounts of the computer's memory and can only do a limited number of things. (How, for example, can you play music from BASIC?).

**" Whether you are a beginning BASIC programmer or an experienced assembly language programmer, sooner or later you'll need an assembler in your Apple programming toolchest."**

You know, however, that the Apple can make sounds; you've games that beep, zip, bang and chirp. Music, fan-

cy screen scrolling, faster DOS, and many other things are all made possible through the use of the Apple's machine language.

Unfortunately, Apple machine language is a bunch of hexadecimal bytes (base 16 numbers between 0 and 255).

To most people "20 9C FD 20 A3 FC 60" doesn't even vaguely resemble a program which will print a line of dashes across the screen, but that is what it will do. Assembly language takes commands only humans can understand, called mnemonics (neh-monics), and converts them into the hex bytes of machine language.

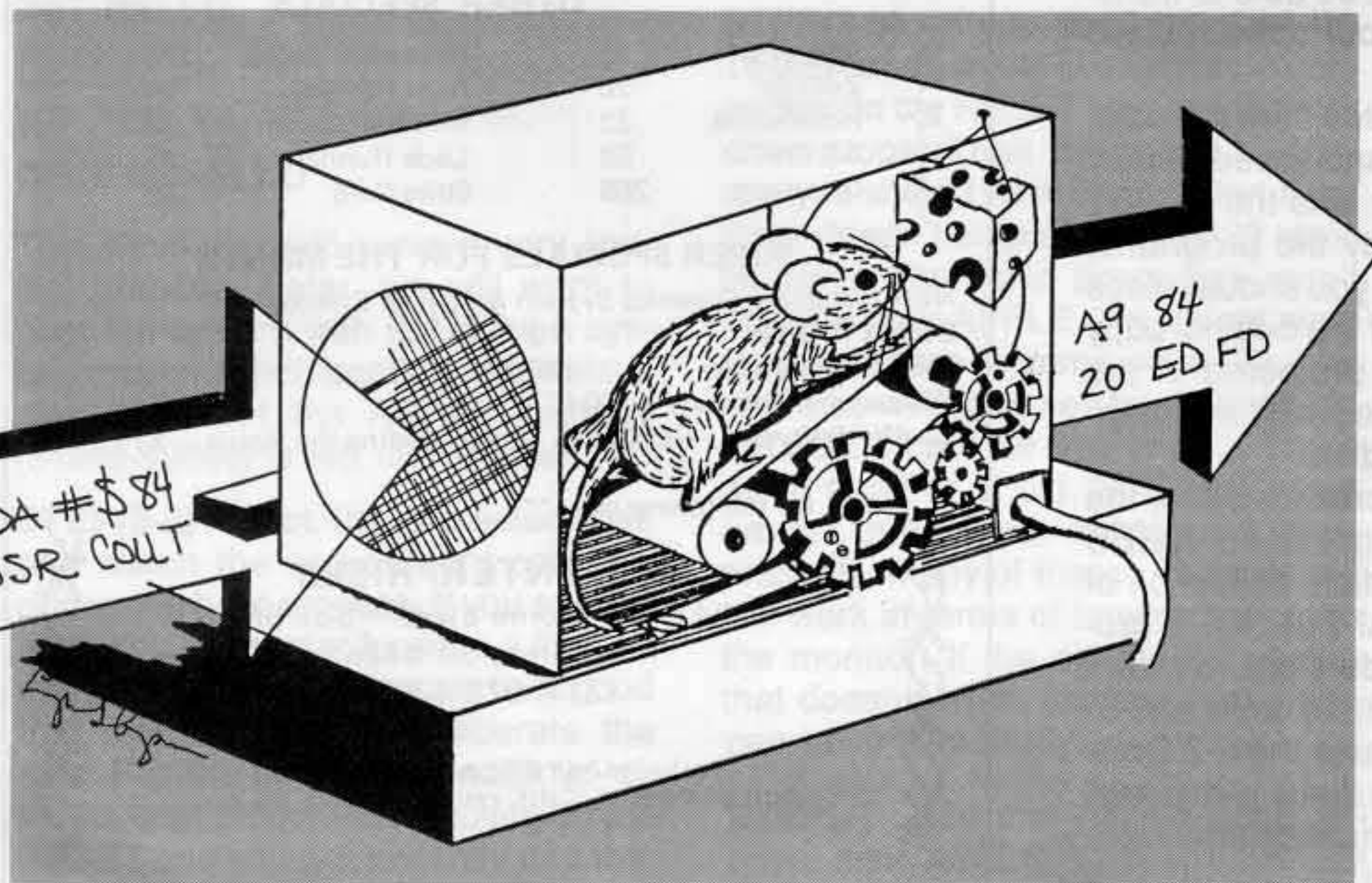
Creating machine executable programs in assembly language is a two step process. First, you type in the source program. Then, the assembler converts it into the hexadecimal bytes of machine language called the object code or object program.

### Editing Features

The S-C Macro Assembler uses a line based text editor, as opposed to some word processors which are screen based. One feature inherent in the S-C Macro Assembler which I find particularly convenient is that all the standard ESC codes are preserved. These commands for moving the cursor and clearing the screen should already be familiar to you from BASIC or Monitor programming. Because the source code for the S-C Macro Assembler is provided, these ESC functions can be modified and customized (ala GPLE) by reasonably experienced programmers. In addition, all DOS commands may be entered normally. A lead-in character such as `CTRLD` is required with some other assemblers.

Twenty-nine commands, including global search and replace, are available during program editing (see fig. 1). All of the commands may be abbreviated as short as their first three letters. Sufficient parameters are available to make these commands very flexible.

Implementations of the commands are in many cases the same as in BASIC. For example, line ranges for commands may be written with a leading





or trailing comma. The command **DEL 2000**, deletes all lines of source code beginning with line 2000; **LIST ,1500** lists all lines through line number 1500.

Whenever the assembler is sending output (such as listing or assembling programs) you can temporarily halt it by pressing any key. Pressing RETURN aborts the listing.

If you load the assembler into a language card, it will look like Integer BASIC to DOS. You can temporarily exit from the assembler and run a program in Applesoft or machine language. By typing INT you can return to assembly language. However, before you leave the assembler, you should save your source program or it will be deleted when you try to return.

One problem is that source programs will be stored to disk as type "I" files. DOS cannot distinguish these from genuine Integer BASIC programs. Trying to load an integer BASIC program while in the S-C Macro Assembler will be confusing to both you and your computer. This is a minor problem which can be overcome by any reasonably crafty person. Two solutions have occurred to me. One, is the addition of filename extensions (as in CP/M) to my source files. The extension .ASM is short, descriptive, and consistent with CP/M's conventions. The other solution is to keep source code files and Integer BASIC programs on separate disks.

You may also opt to have your source code stored as a standard DOS text file. The S-C Macro Assembler's text file capability allows compatibility with other assemblers, disassemblers, and text editors. To read a standard text file into the S-C Assembler you simply turn on the assembler AUTO numbering feature and then EXEC the desired text file into the editor.

## Assembler Directives

When first learning assembly language, I found the distinction between the standard 6502 mnemonics and the assembler directives, or pseudo-ops, terribly confusing. It has always puzzled me why the writers of assemblers try to make their assembler's directives look like the 6502 mnemonics. After all, assembler directives only tell the assembler what to do and aren't really part of your program.

All of the S-C directives consist of two or more letters preceded by a period. This makes them stand out in a listing and in the programmer's mind. There are 25 assembler directives available from the S-C Macro Assembler (see fig.2).

When taken together, the S-C directives allow many advanced options. Included are conditional assembly, assembly direct to and from disk, multi disk operation, and the titling of assembly listings.

## Program Documentation

S-C Software provides a handy reference card and 100 pages of documentation in a three-ring binder for their assembler. I found the documentation a bit too technical for those totally unfamiliar with assembly language programming. It will not teach you assembly language, but will teach you how to use the assembler.

The manual, which is indexed and has a table of contents, starts with a brief introduction. Next, is a four page tutorial to get you started. The largest part of the manual is occupied by sections on use of the assembler, in reference form. Also included are examinations of memory usage and customizing of the assembler, 6502 programming, and Sweet-16.

**BEEP!**

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## Special Features

Besides all of the usual features found in assemblers, the S-C Macro Assembler provides many special enhancements.

If you've ever looked at a listing of an assembly language program you'll see that there are five columns of information. From left to right are the line number, label, mnemonic, operand, and comment fields. The S-C Assembler lets you automatically tab between fields by using control-I (the TAB key on the ][e).

The line numbers are used exclusively by the assembler. If you wish to see a range of lines or delete a line, use the lines' numbers. You may not branch from within assembly language by using line numbers, as is the case in BASIC. Instead, branches are made to labels which are stored in the label field. To print a character, you would not GOSUB 1000, but JSR (the mnemonic for jump to subroutine) COUT.

If you have even programmed in assembly language using another assembler you may have encountered the problem of coming up with a unique name for each label. Within a single subroutine you may need to take several internal branches, each of which must be defined by its own label. For instance, not only is the label COUT used, but also COUT1, COUT2, etc. This is avoided by the S-C Macro Assembler through the use of local labels. Local labels are only defined relative to the preceding normal label. A local label is a number between 0 and 99 preceded by a period. Thus, a label named .1 could be defined several

times within a single program.

A comment in assembly language is like a remark in BASIC. The S-C Macro assembler doesn't require a semi-colon or anything else before a comment if you put it in the comment field. Full line comments are available if you precede them with an asterisk or semi-colon.

Macros are single instructions which, when assembled, are replaced by a series of instructions you have defined. They can replace commonly used sequences of instructions, can be used as alternate mnemonics for 6502 instructions, etc. As you may have guessed, the S-C Macro Assembler also supports macros.

The S-C Macro Assembler's use is not confined to the assembly of standard 6502 Mnemonics. Besides its capability to modify mnemonics using macros, it can assemble Steve Wozniak's Sweet-16. S-C Software also offers a line of cross assemblers which use the S-C Macro Assembler standard source editing features. When used with the Macro assembler these allow you and your Apple to write code for other microprocessors, from the 65C02 to the 68000. The cross assemblers range in price from \$20 to \$50.

Additionally, there are several other products available through S-C Software which include a full-screen editor and a disassembler which are compatible with the S-C Macro Assembler.

## Conclusions

The S-C Macro Assembler is a state of the art assembler which is easy to use, versatile, and appropriate for persons with all levels of programming knowledge. Of the assemblers I have used, I found the S-C Macro Assembler to be the best assembler for the Apple. S-C Software provides adequate support, and their policy of not copy-protecting their products is admirable.

### FIGURE 1

**NEW-** Deletes current source program and restarts S-C Macro Assembler.

**LOAD-** Loads a source program from cassette or disk.

**SAVE-** Saves current source program to cassette or disk.

**TEXT-** Saves current source program to disk as a normal sequential text file.

**HIDE-** Hides source program in memory so that it can be MERGED with another source file.

**MERGE-** Joins a source program with one which has been hidden by HIDE command.

**RESTORE-** Recovers a source program if assembly is aborted while inside of an .IN module (see Figure 2).

## Editing Commands

**LIST-** Displays source program lines within a specified range or those containing a search string.

**FIND-** Same as LIST.

**EDIT-** Allows editing of source program lines. Edit displays the line to be edited and allows 15 control commands for moving the cursor, deleting and inserting text.

**REPLACE-** Universal search and replace, verify or automatic replacement. Wildcards are allowed.

**DELETE-** Deletes a range of program lines.

**RENUMBER-** Renumbers source program.

**COPY-** Copies one or more lines from one place to another.

## Listing Commands

**FAST-** Sets listing speed to normal rate.

**SLOW-** Sets listing speed slow enough to read.

**PRT-** Jumps to a printer driver routine at \$10009 which must be written by the user.

**'-** Sends a specified string to the current output device.

## Object Commands

**ASM-** Assembles current source program into object code.

**MGO-** Jumps to a memory location specified by a label or number.

**VAL-** Evaluates an expression and prints its value in hexadecimal.

**SYMBOLS-** Displays the assembler's symbol table (all of the labels your program uses).

## Miscellaneous Commands

**AUTO-** Turns on automatic line numbering.

**MANUAL-** Turns off automatic line numbering.

**INCREMENT-** Sets the increment used by automatic line numbering.

**MEMORY-** Displays your program's current location in memory.

**MNTR-** Puts you in the Apple's system monitor.

**RST-** Lets you specify the address to which the Apple will jump when the RESET key is pressed.

**USR-** Jumps to \$1006, where you can place a machine language program or subroutine.

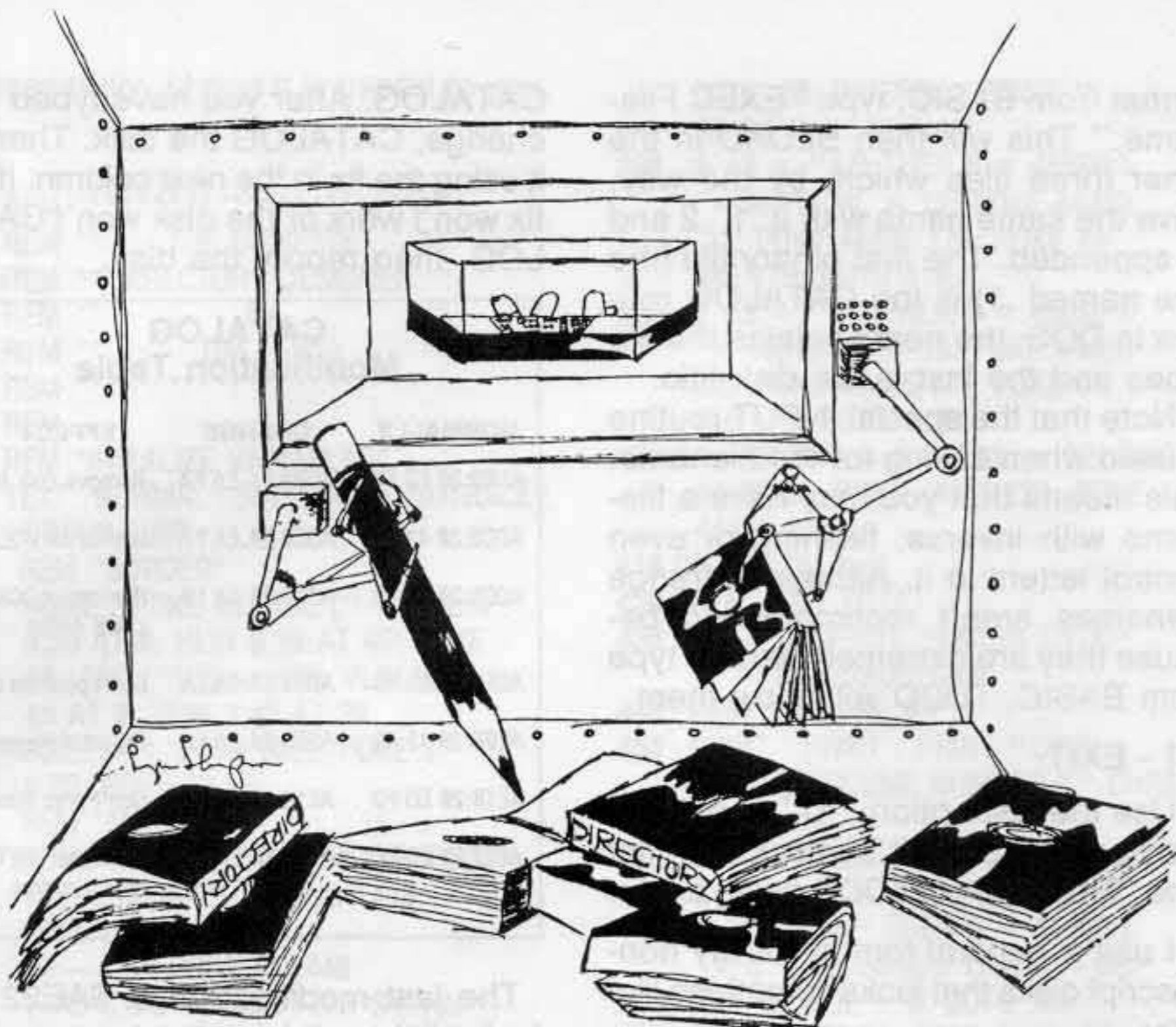
### FIGURE 2

## S-C Assembler Directives

.OR	Origin
.TA	Target address
.TF	Target file
.IN	Include file in assembly
.EN	End of program
.EQ	Equate
.SE	Re-definable symbols
.HS	Hex string
.DA	Data
.AS	ASCII string
.AT	ASCII terminated string
.BS	Block storage
.LIST	Controls assembly listing (ON or OFF)
.TI	Title
.US	User defined
.PG	Page eject
.DO	Conditional assembly
.ELSE	Conditional assembly
.FIN	Conditional assembly
.DUMMY	Begin a dummy section
.ED	End dummy section
.PH	Start phase
.EP	End phase
.MA	Macro definition
.EM	End macro

Reviewed by Jeff Thomas





# The Disk Directory Designer

By Tim Lewis

## Requirements:

48K Apple ][ plus or ][e  
DOS 3.3

The Disk Directory Designer (TDDD) is a utility designed to aid you in the creation of a new format for your CATALOG. Using this utility, you can change the message "DISK VOLUME" to any title you want up to 32 characters long, with normal, inverse and flashing letters in it. You can also redefine the standard file type codes (T, I, A, and B) to any character you want, and do the same for the lock and unlock characters. Then you can have your CATALOG displayed in 1, 2, 4, or 5 columns. Your work may then be stored on disk for later use. This program can be used to format each disk in the way that is most useful for you.

## Entering TDDD

1) Type in the program as listed on page 20 making sure that the checksums that you have, using the program Checksoft, match the ones listed on page 22.

2) Save the program to disk.

**SAVE DIRECTORY DESIGNER**

3) Start the program RUNning.

**RUN**

## How to use the Directory Designer

When the menu appears with the cursor waiting patiently at the bottom of the screen, press one of the letters in brackets (A-E) to select that option. Should you select the incorrect letter, press "ESC" or "RETURN" to exit the function.

Here is a description of each option.

### [A] - CHANGE DIRECTORY TITLE

Press the letter "A" to cause a second menu to appear. This menu allows you to select the length of the title you wish to use. There are three lengths available: (A) 12 characters, (B) 16 characters, and (C) 32 characters. By pressing A, B or C, you select the maximum number of characters allowed in your title and how far the volume number (if displayed) will be from this title.

### Specialized Input

This brings us to the specialized INPUT routine I developed for this program. Here is how to use it:

First notice the compression for the word normal (NRML) on the left of the greater than sign (>). As long as NRML is in effect, the characters you

type are regular ones. Five control codes change the status of the characters you type. They are:

**CTRL N** -Return to the default mode of NoRMAL.

**CTRL I** -Characters that follow are INVerSe.

**CTRL F** -Subsequent characters are converted to FLASHing.

**CTRL C** -Convert letters that follow to ConTRoL codes (displayed during the INPUT as inverse.)

**CTRL L** - Following this, characters are converted to lowercase. If you do not have a computer equipped with lowercase, you probably shouldn't use this because it will display meaningless symbols.

You may use the left arrow key (←) and "RETURN" just like in a normal INPUT. In addition to this, characters that are usually not accessible through the Apple keyboard may be keyed in by pressing the following control codes:

**CTRL ^** - Converted to an underline ("\_")

**CTRL @** - Translated to a backslash ("/")

**CTRL SHIFT M** - Produces a beginning bracket ("[")

This INPUT routine allows virtually every character generated by your Apple to be part of the input string.

After typing the title, the program will ask if you want the VOLUME number to be printed next to the directory title.

Once you type "Y" or "N" depending upon whether you want the volume number displayed, the program will show you the title in the form that it will appear in the directory. You can now: Return to the menu without changing the heading in memory, redo the title, or put the title you just created in memory and go to the main menu.

### [B] - CHANGE DIRECTORY FORMAT

From the main menu, if you hit "B", you will be ready to change the actual directory format. As soon as you do, a secondary menu will appear and the maximum number of characters allowed in a filename will be printed at the bottom of the screen. To return to the main menu, simply press "ESC." Here is a description of the features of this secondary menu:

Option A will allow you to change the

lock and unlock codes. If you answer "N" to the question "DISPLAY LOCK/UNLOCK CODES?" then the codes that are currently in memory won't even be shown in the directory. As in option A of the main menu, the previously mentioned special INPUT routine is used. Therefore a wide array of characters are available for this and the other format alterations.

By pressing "B", you enter the file type alteration subroutine which allows you to change the codes for the four standard (B, A, I, and T) file types in much the same way as the above LOCK/UNLOCK subroutine does. Note that a modification to the "R" type of file is not provided for.

The subroutine connected with the pressing of "C" merely asks you if you want the file lengths displayed in the directory. The file lengths (sometimes called sector numbers) are the three digit numbers between the file type and the filename.

Next come what I call the "funny characters." Press "D" to change the characters (usually they are spaces) to the left and right of the file lengths.

Last, by typing "E", another menu appears asking into how many columns you wish to divide the directory. Press the letter corresponding to the number of columns you wish. For those of you with long filenames such as mine, you will notice that the last characters are cut off when more than one column is selected. After every format alteration, the maximum number of characters is updated and displayed at the bottom of the format alteration menu. Note that in order to access files with names longer than the limit, you must still use the full filename.

Those of you with 80-column cards (this includes most Apple IIe users) will notice that when in 80-column mode, the number of columns will be twice as many as selected (unless you choose one column). This is a result of using multiple columns. Also, for those of you with title names which use the backspace character to cover up the file length, file type, etc., this method may severely distort the appearance of your directory. This is also relative to the method used.

### [C] - LOAD/SAVE FORMAT AND TITLE

If you type "C" from the main menu, the current directory format may be stored for later use or retrieved for modification. TDDD stores a format on a disk as four files- three binary and one text. To install a previously saved

format from BASIC, type "EXEC Filename." This will then BLOAD in the other three files which, by the way, have the same name with a .1, .2 and .3 appended. The first binary file (the one named .1) is the CATALOG routine in DOS, the next contains the file types and the last is the disk title.

Note that the special INPUT routine is used when asking for the filename. This means that you may have a filename with inverse, flashing or even control letters in it. Although strange filenames aren't recommended because they are extremely hard to type from BASIC, TDDD will allow them.

### [E] - EXIT

Use the last option, "D" to exit the program. If you exit by accident, just type "RUN" to get TDDD going again.

I use a general format for my non-descript disks that looks something like this:

```
APPLE SYSTEM ][ +
```

```
] TDDD          * SEARCH
* SPEED.SORT    ] BLACK JACK
] SCREEN MAKER  * SCREEN.HELPER
* SCREEN.ROUTINES * SCREEN.PIC
" AS->TEXT      > FLY
```

I replaced A for Applesoft with an ending bracket, I for Integer with a greater than sign, B for binary with an asterisk, and T for text file with a quote.

For experienced programmers, I have included a description of the program and how it works. For those of you who are not so interested, you can skip to the WARNINGS section for some precautions about this programs use.

Still with me? Good. Let's take a trip into the monitor and play around with DOS a bit.

1. Boot up on a disk with fresh, clean DOS on it such as the SYSTEM MASTER

**PR#6**

2. Enter the monitor

**CALL-151**

3. Examine the DOS CATALOG routine (it extends from AD98 through AE69)

**AD98L**

4. As you cruise around this portion of memory, you will notice many JSRs to \$FDED and a few JSRs to \$AE42 and \$AE2F. Try replacing some of these with NOP's (code EA). Below are a few examples of what may happen to your

CATALOG. After you have typed in a change, CATALOG the disk. Then fix it using the fix in the next column. If the fix won't work or the disk won't CATALOG, then reboot the disk.

### CATALOG Modification Table

NORMALLY	CHANGE	EFFECT
ADB3:20 ED FD	ADB3:EA EA EA	Remove disk title
ADC0:20 42 AE	ADC0:EA EA EA	Get rid of VOL #
ADE5:20 ED FD	ADE5:EA EA EA	Remove LOCK/UNLOCK codes
ADF9:20 ED FD	ADF9:EA EA EA	Don't print file types
AE0B:20 42 AE	AE0B:EA EA EA	Get rid of file lengths
AE1B:20 ED FD	AE1B:EA EA EA	Don't print filename
AE22:20 2F AE	AE22:EA EA EA	Removes RETURN after filename.

The last modification at \$AE22 will look a little weird, but by shortening the number of characters printed in Filename (AE16-AE17), you can get multiple columns.

Basically, my program manipulates the pointers and data tables used by DOS's CATALOG to change the directory's appearance.

### Possible Modifications

When I first wrote the program, I was going to include options to switch or sort filenames. If anyone decides to make this modification, I would be interested in seeing it.

Another modification that would be nice is to have the program store the new directory format on the DOS tracks rather than as files.

### Warnings

This program uses the area between \$BCDF \$BCFF to store the 32 character title. Some fast DOSs use this area and therefore, using my program could cause a crash. My customized DOS was engineered around this area.

TDDD uses the memory location used by the "R" file type for the 16 character title. For those of you using these relocatable files, a different format for these disks is advisable.

This program may interfere with modifications made using DOS BOSS and other DOS customizers.

### Final comments

The Disk Directory Designer was written over the summer while I borrowed my high school teacher's computer to do some typing for her. It is a very useful utility and I have used it

successfully. I hope it is useful to you, too.

```
10 REM *****
20 REM ** THE DISKETTE **
30 REM ** DIRECTORY DESIGNER **
40 REM ** BY **
50 REM ** TIM LEWIS **
60 REM *****
70 REM
80 REM *INITIALIZE VARIABLES*
90 TEXT : NORMAL : SPEED=255: NOTRACE :
  GOSUB 1380
100 REM *BORDER*
110 HOME : POKE 48, ASC (" -"): HLIN
  0,39 AT 0: HLIN 0,39 AT 46: POKE
  48, ASC ("!") + 128: VLIN 2,
  45 AT 0: VLIN 2,45 AT 39
120 POKE 34,1: POKE 32,1: POKE 3
  5,23: POKE 33,38
130 REM *MENU*
140 HOME :M$ = "THE DISK DIRECTO
  RY DESIGNER": GOSUB 1440
150 VTAB 3:M$ = "-----
  -----": GOSUB 1440
160 VTAB 5:M$ = "WRITTEN BY TIM
  LEWIS": GOSUB 1440
170 VTAB 8: HTAB 10: PRINT CHR$
  (91)"A] CHANGE DIRECTORY TIT
  LE"
180 VTAB 11: HTAB 10: PRINT CHR$
  (91)"B] CHANGE DIRECTORY FOR
  MAT"
190 VTAB 14: HTAB 10: PRINT CHR$
  (91)"C] LOAD/SAVE FORMAT & T
  ITLE"
200 VTAB 17: HTAB 10: PRINT CHR$
  (91)"D] SEE DIRECTORY"
210 VTAB 20: HTAB 10: PRINT CHR$
  (91)"E] EXIT PROGRAM"
220 REM *YOUR CHOICE?*
230 VTAB 23: HTAB 10: PRINT "YOU
  R CHOICE " CHR$ (91)" ]" CHR$
  (8) CHR$ (8);
240 GET AS$: IF AS$ > "E" OR AS$ <
  "A" THEN 240
250 REM *GOTO PROPER ROUTINE*
260 HOME : ON ASC (AS$) - 64 GOSUB
  320,620,1140,280,1360: GOTO
  140
270 REM *SEE DIRECTORY*
280 TEXT : HOME : PRINT : PRINT
  CHR$ (4)"CATALOG"
290 PRINT : INVERSE : PRINT "PRE
  SS ANY KEY"
300 NORMAL : WAIT - 16384,128: GET
  AS$: POP : GOTO 110
310 REM *DIRECTORY TITLE*
320 M$ = "** DIRECTORY TITLE **": GOSUB
  1440: VTAB 5: PRINT "<A> 12
  CHARACTER TITLE"
330 PRINT "<B> 16 CHARACTER TITL
  E": PRINT "<C> 32 CHARACTER
  TITLE"
340 VTAB 9: PRINT "YOUR CHOICE <
  >" CHR$ (8) CHR$ (8);
350 GET AS$: IF (AS$ < "A" OR AS$ >
  "C") AND AS$ < > CHR$ (27) AND
  AS$ < > CHR$ (13) THEN 350
360 IF AS$ = CHR$ (27) OR AS$ = CHR$
  (13) THEN RETURN
370 HTAB 1: CALL - 868: VTAB ASC
```

```
(AS$) - 60: INVERSE : PRINT "
<"AS">": NORMAL
380 IF AS$ = "A" THEN B = 45999:T
  = 46010:ML = 12: POKE 44463
  ,11: POKE 44465,175: POKE 44
  466,179: GOTO 410
390 IF AS$ = "B" THEN B = 45995:T
  = 46010:ML = 16: POKE 44463
  ,15: POKE 44465,171: POKE 44
  466,179: GOTO 410
400 B = 48351:T = 48382:ML = 32: POKE
  44463,31: POKE 44465,223: POKE
  44466,188
410 DH = T:DL = B
420 REM *GET TITLE*
430 VTAB 10: PRINT "ENTER TITLE"
  :V = 12: GOSUB 1460
440 REM *VOLUME #?*
450 PRINT : PRINT : PRINT "DISPL
  AY THE VOLUME NUMBER ?" CHR$
  (8);
460 GET AS$: IF AS$ < > "N" AND A
  $ < > "Y" THEN 460
470 IF AS$ = "N" THEN B = 44480:T
  = B + 2: GOSUB 1750:B = DL:
  T = DH:VOL = 0: GOTO 500
480 POKE 44480,32: POKE 44481,66
  : POKE 44482,174:VOL = 1
490 REM *PRINT TITLE*
500 POKE 34,2: HOME : POKE 34,1:
  VTAB 5: PRINT "THE WAY IT W
  ILL APPEAR": VTAB 8: GOSUB
  1720: IF VOL THEN PRINT PEEK
  (46017)
510 REM *OK?*
520 VTAB 11: HTAB 1: PRINT "RETU
  RN=>OK" SPC(3)"SPACE=>REDO"
  SPC(3)"ESC=>MENU": PRINT :
  PRINT "WHICH ?" CHR$ (8);
530 GET AS$: IF AS$ < > " " AND A
  $ < > CHR$ (27) AND AS$ < >
  CHR$ (13) THEN 530
540 IF AS$ = " " THEN B = 45999:T
  = 46010:ML = 12: POKE 44463
  ,11: POKE 44465,175: POKE 44
  466,179: HOME : GOTO 320
550 HOME
560 IF AS$ = CHR$ (27) THEN B =
  45999:T = 46010:ML = 12: POKE
  44463,11: POKE 44465,175: POKE
  44466,179: RETURN
570 IF AS$ < > CHR$ (13) THEN RETURN
580 REM *PUT TITLE IN MEMORY*
590 MM = 0
600 FOR I = T TO B STEP - 1:MM =
  MM + 1: POKE I,IA%(MM): NEXT
  : RETURN
610 REM *DIRECTORY FORMAT*
620 M$ = "FORMAT ALTERATION": GOSUB
  1440: VTAB 4: PRINT "<A> LOC
  K/UNLOCK CODES": PRINT
  PRINT "<B> FILE TYPES": PRINT
  : PRINT "<C> FILE LENGTHS": PRINT
  PRINT "<D> FILE LENGTH SURRO
  UNDINGS": PRINT : PRINT "<E>
  NUMBER OF COLUMNS IN DIRECT
  ORY"
650 PRINT : PRINT "<ESC> EXIT TO
  MAIN MENU": GOSUB 1790: IF
  PEEK (44567) = 29 THEN CHA =
  30: GOTO 670
660 CHA = (40 / COL) - DC: POKE 4
```

```
4567,CHA - 1
670 VTAB 22: PRINT "FILENAME LIM
  IT: "CHA" CHARACTERS": VTAB
  17: PRINT "WHICH ?" CHR$ (8)
  ;
680 GET AS$: IF (AS$ < "A" OR AS$ >
  "E") AND AS$ < > CHR$ (27) AND
  AS$ < > CHR$ (13) THEN 680
690 IF AS$ = CHR$ (27) OR AS$ = CHR$
  (13) THEN RETURN
700 HOME : ON ASC (AS$) - 64 GOSUB
  720,770,840,880,950: HOME : GOTO
  620
710 REM *LOCK/UNLOCK*
720 T = 44519:B = 44517:M$ = "DIS
  PLAY LOCK/UNLOCK CODES": GOSUB
  1070
730 IF AS$ = "N" THEN 1750
740 GOSUB 1770: VTAB 6:M$ = "ENT
  ER 'UNLOCK' CODE": GOSUB 112
  0: POKE 44508,X
750 VTAB 11:M$ = "ENTER 'LOCK' C
  ODE": GOSUB 1120: POKE 44515
  ,X: RETURN
760 REM *FILE TYPE*
770 T = 44539:B = T - 2:M$ = "DIS
  PLAY FILE TYPES": GOSUB 1070
780 IF AS$ = "N" THEN 1750
790 GOSUB 1770: VTAB 5:M$ = "ENT
  ER BINARY FILE CODE": GOSUB
  1120: POKE 45994,X
800 VTAB 10:M$ = "ENTER APPLESOF
  T FILE CODE": GOSUB 1120: POKE
  45993,X
810 VTAB 15:M$ = "ENTER INTEGER
  FILE CODE": GOSUB 1120: POKE
  45992,X
820 VTAB 20:M$ = "ENTER TEXT FIL
  E CODE": GOSUB 1120: POKE 45
  991,X: RETURN
830 REM *SECTOR #*
840 T = 44557:B = 44555:M$ = "DIS
  PLAY THE FILE LENGTHS": GOSUB
  1070
850 IF AS$ = "N" THEN 1750
860 POKE B,32: POKE B + 1,66: POKE
  T,174: RETURN
870 REM *FUNNY CHARS*
880 M$ = "DISPLAY THE CHARACTER T
  O THE LEFT OF THE FILE LENG
  TH": GOSUB 1070
890 IF AS$ = "N" THEN POKE 44541
  ,128: GOTO 910
900 VTAB 6:M$ = "ENTER THE CHARA
  CTER": GOSUB 1120: POKE 4454
  1,X
910 M$ = "DISPLAY THE CHARACTER T
  O THE RIGHT OF " + CHR$ (10
  ) + "THE FILE LENGTH": GOSUB
  1070
920 IF AS$ = "N" THEN POKE 44559
  ,128: RETURN
930 VTAB 6:M$ = "ENTER THE CHARA
  CTER": GOSUB 1120: POKE 4455
  9,X: RETURN
940 REM *COLUMNS*
950 HOME :M$ = "DIRECTORY COLUMN
  SELECTION": GOSUB 1440: VTAB
  5: PRINT "<A> 1 COLUMN (NORM
  AL)": PRINT "<B> 2 COLUMNS"
960 PRINT "<C> 4 COLUMN DIRECTOR
  Y": PRINT "<D> 5 COLUMNS IN
```

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```

DIRECTORY"
970 PRINT : PRINT "WHICH ?" CHR$
(8);
980 GET AS: IF (AS < "A" OR AS >
"D") AND AS < > CHR$ (13) AND
AS < > CHR$ (27) THEN 980
990 IF AS = CHR$ (27) OR AS = CHR$
(13) THEN RETURN
1000 T = 44580:B = T - 2
1010 IF AS = "A" THEN POKE B,32
: POKE B + 1,47: POKE T,174:
POKE 44567,29: RETURN
1020 POKE 44567,0: GOSUB 1750:CO
L = 5: IF AS = "B" THEN COL =
2
1030 IF AS = "C" THEN COL = 4
1040 RETURN
1050 CHA = (40 / COL) - DC: POKE
44567,CHA - 1
1060 REM "DISPLAY SOMETHING?"
1070 HOME : VTAB 3: PRINT M$ " ?"
CHR$ (8);:ML = 1
1080 GET AS: IF AS < > "Y" AND
AS < > "N" AND AS < > CHR$
(13) AND AS < > CHR$ (27) THEN
1080
1090 IF AS = CHR$ (13) OR AS =
CHR$ (27) THEN POP : RETURN
1100 PRINT CHR$ (8) " "AS: RETURN
1110 REM *ASK FOR ALTERATION*
1120 HTAB 1:V = PEEK (37) + 3: PRINT
M$: GOSUB 1460:X = IA%(1): RETURN
1130 REM *LOAD/SAVE FORMAT*
1140 M$ = "*" LOAD/SAVE DIRECTORY

```

```

TYPE *": GOSUB 1440: VTAB 5:
PRINT "FILENAME TO USE:"
1150 V = 7:ML = 15: GOSUB 1460:ML
= L: POKE 771,237
1160 VTAB 11: PRINT "<L>OAD DIRE
CTORY" SPC( 5)"<S>AVE DIRECT
ORY"
1170 PRINT " ESC=>MENU" SPC( 12)
"SPACE=>REDO": PRINT : PRINT
"WHICH ?" CHR$ (8);
1180 GET AS: IF AS < > "L" AND
AS < > CHR$ (27) AND AS <
> " " AND AS < > "S" THEN
1180
1190 IF AS = CHR$ (27) THEN POKE
771,240: RETURN
1200 IF AS = " " THEN HOME : GOTO
1140
1210 HOME : VTAB 12: HTAB 11: FLASH
: PRINT "ONE MOMENT PLEASE."
: NORMAL
1220 IF AS = "S" THEN 1250
1230 FOR X = 1 TO 3: PRINT CHR$
(4)"BLOAD": GOSUB 1720: PRINT
"."X: NEXT : POKE 771,240: RUN
1240 REM *SAVE FORMAT*
1250 PRINT : PRINT CHR$ (4)"BSA
VE": GOSUB 1720: PRINT ".1,
A$AD98,L$97"
1260 PRINT CHR$ (4)"BSAVE": GOSUB
1720: PRINT ".2,A$B3A7,L$04"
1270 PRINT CHR$ (4)"BSAVE": GOSUB
1720: PRINT ".3,A";DL;"L";D
H - DL + 1

```



```

1280 REM *EXEC FILE*
1290 PRINT CHR$(4)"OPEN";: GOSUB
1720: PRINT : PRINT CHR$(4
)"DELETE";: GOSUB 1720: PRINT
1300 PRINT CHR$(4)"OPEN";: GOSUB
1720: PRINT : PRINT CHR$(4
)"WRITE";: GOSUB 1720: PRINT
1310 FOR X = 1 TO 3: PRINT "BLOA
D";: GOSUB 1720: PRINT ".X:
NEXT : PRINT CHR$(4)"CLOS
E"
1320 HOME : VTAB 7: PRINT "TO IN
STALL NEW FORMAT;: PRINT
1330 PRINT "USE 'EXEC ";: POKE 7
71,240: GOSUB 1720: PRINT "'
"
1340 PRINT : PRINT : POKE 771,24
0: GOTO 290
1350 REM *EXIT*
1360 TEXT : HOME : VTAB 24: POP
: END
1370 REM *INITIALIZE*
1380 T = 0: B = 0: DL = 45999: DH =
46010: CHA = PEEK (44567) +
1: COL = 1: IF CHA < 30 THEN
COL = 2
1390 ML = 0: L = 0: H = 0: V = 0: GOSUB
1790: IF CHA < 13 THEN COL =
4: IF CHA < 5 THEN COL = 5
1400 POKE 768,169: POKE 770,76: POKE
771,240: POKE 772,253
1410 DIM IA%(32)
1420 RETURN
1430 REM *CENTER*
1440 HTAB 20 - INT ( LEN (M$) /
2): PRINT M$: RETURN
1450 REM *INPUT ROUTINE*
1460 L = 0: X = 1: FOR I = 1 TO 32
:IA%(I) = 160: NEXT : VTAB V
: HTAB 1
1470 PRINT "NRML>" CHR$(10):: FOR
I = 1 TO ML: PRINT "-";: NEXT
:H = 6
1480 VTAB V: HTAB H: GET A$
1490 IF A$ = CHR$(29) THEN A$ =
CHR$(91)
1500 IF A$ = CHR$(30) THEN A$ =
CHR$(95)
1510 IF A$ = CHR$(0) THEN A$ =
CHR$(28)
1520 IF A$ = CHR$(13) AND L <
> 0 THEN PRINT : RETURN
1530 IF A$ = CHR$(8) AND L = 0
THEN 1480
1540 IF A$ = CHR$(8) THEN IA%(
L) = 32: L = L - 1: H = H - 1:
PRINT A$;: CALL - 868: GOTO
1480
1550 IF A$ = CHR$(14) THEN HTAB
1: PRINT "NRML";: X = 1: GOTO
1480
1560 IF A$ = CHR$(9) THEN HTAB
1: PRINT "INVS";: X = 2: GOTO
1480
1570 IF A$ = CHR$(6) THEN HTAB
1: PRINT "FLSH";: X = 3: GOTO
1480
1580 IF A$ = CHR$(3) THEN HTAB
1: PRINT "CTRL";: X = 4: GOTO
1480
1590 IF A$ = CHR$(12) THEN HTAB
1: PRINT "LOWR";: X = 5: GOTO

```

```

1480
1600 IF L = > ML OR A$ < " " OR
A$ > CHR$(95) THEN 1480
1610 L = L + 1: H = H + 1: ON X GOTO
1620,1630,1650,1670,1690
1620 PRINT A$;:IA%(L) = ASC (A$
) + 128: GOTO 1480
1630 INVERSE : PRINT A$;: NORMAL
:IA%(L) = ASC (A$) - 64: IF
A$ < "@" THEN IA%(L) = ASC
(A$)
1640 GOTO 1480
1650 FLASH : PRINT A$;: NORMAL :
IA%(L) = ASC (A$): IF A$ <
"@ " THEN IA%(L) = ASC (A$) +
64
1660 GOTO 1480
1670 IF A$ < "@" THEN 1620
1680 INVERSE : PRINT A$;: NORMAL
:IA%(L) = ASC (A$) + 64: GOTO
1480

```

```

1690 IF A$ < "@" THEN 1620
1700 PRINT CHR$( ASC (A$) + 32
);:IA%(L) = ASC (A$) + 160:
GOTO 1480
1710 REM *PRINT WAY IT APPEARS*
1720 FOR I = 1 TO ML
1730 POKE 769,IA%(I): CALL 768: NEXT
: RETURN
1740 REM *NEGATE CAT. ROUTINE*
1750 FOR I = B TO T: POKE I,234:
NEXT : RETURN
1760 REM *ACTIVATE CAT. ROUTINE*
1770 POKE B,32: POKE B + 1,237: POKE
T,253: RETURN
1780 REM *FIGURE EXTRA SPACE*
1790 DC = ( PEEK (44517) < > 234
) + ( PEEK (44539) < > 234)
1800 DC = DC + 3 * ( PEEK (44555)
< > 234) + ( PEEK (44541) <
> 128) + ( PEEK (44559) < >
128): RETURN

```

### Checksums

10	- \$BADD	410	- \$A22B	810	- \$5CCB	1210	- \$CC56	1610	- \$EB3B
20	- \$9B13	420	- \$B7BE	820	- \$762C	1220	- \$92F5	1620	- \$ABE2
30	- \$4D3B	430	- \$8BC1	830	- \$614F	1230	- \$052C	1630	- \$0B7F
40	- \$AD92	440	- \$CDD1	840	- \$CDC5	1240	- \$6C48	1640	- \$5FB9
50	- \$C899	450	- \$C189	850	- \$B9FD	1250	- \$95E9	1650	- \$3788
60	- \$FF65	460	- \$6A87	860	- \$C058	1260	- \$16EC	1660	- \$1861
70	- \$A3BF	470	- \$7D8F	870	- \$1555	1270	- \$0735	1670	- \$9687
80	- \$A900	480	- \$AD1C	880	- \$3FF9	1280	- \$63AD	1680	- \$035E
90	- \$6635	490	- \$1C58	890	- \$2B69	1290	- \$6E0E	1690	- \$FD6E
100	- \$F3B7	500	- \$D176	900	- \$9098	1300	- \$26D7	1700	- \$69A3
110	- \$9C15	510	- \$6E22	910	- \$039A	1310	- \$6925	1710	- \$625F
120	- \$2A19	520	- \$5710	920	- \$7F19	1320	- \$1863	1720	- \$E2E5
130	- \$972C	530	- \$B2D8	930	- \$35A5	1330	- \$5904	1730	- \$9C8D
140	- \$DB48	540	- \$A360	940	- \$9C7F	1340	- \$A3B5	1740	- \$D4D7
150	- \$D3E1	550	- \$F2F9	950	- \$5D7B	1350	- \$DB36	1750	- \$00DF
160	- \$8937	560	- \$F90C	960	- \$F48E	1360	- \$445C	1760	- \$9ED1
170	- \$888C	570	- \$FAE5	970	- \$8836	1370	- \$DEA9	1770	- \$8A3F
180	- \$DA93	580	- \$06A9	980	- \$5190	1380	- \$9620	1780	- \$FE91
190	- \$AAB4	590	- \$BAAB	990	- \$B881	1390	- \$09B4	1790	- \$7566
200	- \$B1A5	600	- \$7DA0	1000	- \$56B2	1400	- \$2E2F	1800	- \$DB86
210	- \$9786	610	- \$F7E7	1010	- \$41FB	1410	- \$841B		
220	- \$E4C8	620	- \$1DEA	1020	- \$8ADF	1420	- \$DEA1		
230	- \$8B1A	630	- \$CBC8	1030	- \$4D2B	1430	- \$375F		
240	- \$063C	640	- \$1611	1040	- \$145B	1440	- \$EE53		
250	- \$A636	650	- \$9DA9	1050	- \$237F	1450	- \$7D2D		
260	- \$3F80	660	- \$0FD6	1060	- \$B3D6	1460	- \$A9EA		
270	- \$F000	670	- \$3129	1070	- \$2A97	1470	- \$CAF9		
280	- \$425C	680	- \$B7F8	1080	- \$C88B	1480	- \$9827		
290	- \$9F73	690	- \$AD61	1090	- \$86B5	1490	- \$4DDB		
300	- \$D62B	700	- \$0359	1100	- \$6D68	1500	- \$2020		
310	- \$5F77	710	- \$8A89	1110	- \$4053	1510	- \$42DE		
320	- \$5780	720	- \$56A7	1120	- \$5D0E	1520	- \$6F8B		
330	- \$2347	730	- \$A7A1	1130	- \$CE09	1530	- \$C01D		
340	- \$C51E	740	- \$332C	1140	- \$AF13	1540	- \$ABB5		
350	- \$403A	750	- \$0BEF	1150	- \$F603	1550	- \$544D		
360	- \$E4E2	760	- \$5CAE	1160	- \$FD17	1560	- \$6BEA		
370	- \$AA62	770	- \$D33A	1170	- \$E6BE	1570	- \$378E		
380	- \$0E23	780	- \$769C	1180	- \$30E5	1580	- \$9B68		
390	- \$FEC5	790	- \$1EC2	1190	- \$0CF3	1590	- \$3166		
400	- \$07D0	800	- \$A494	1200	- \$BA32	1600	- \$859C		

CORE

# COREFILER

COREFILERCOREFILERCOREFILERCOREFILERCOREFILERCOREFILERCOREFILERCOREFILERCOREFILER

## Requirements:

Apple II Plus or compatible with 48K RAM  
One disk drive

A lot of you out there are probably thinking that databases may be the greatest thing since the living girdle, but what good are they to me unless I open my own business manufacturing microprocessor-controlled panty hose, or some such item?

## Moved & Missed An Issue? HERE'S WHY!

\* You didn't go to the post office and sign to have your magazines forwarded.

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To get issues that you've missed, write our subscription department for back issue information.

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SAVE YOURSELF A LOT OF TROUBLE

(Don't miss an issue!)

And send your change of address 30 days before you move, using **postal form 3567** to:

Hardcore COMPUTIST  
Subscription Department  
P.O. Box 44549  
Tacoma, WA 98444

Because the survey of the readers of Hardcore COMPUTIST which we conducted has shown that the average reader cannot maintain a proper mental perspective without typing in at least 250 lines of BASIC or Assembly code each month, the editor decided to present a program that would both satisfy our readers' desires and demonstrate an application of a database for the average person.

This program will allow you to keep a record of any kind of important information you have, whether it be your Christmas card mailing list or a catalog of your collection of sixteenth century Samurai swords.

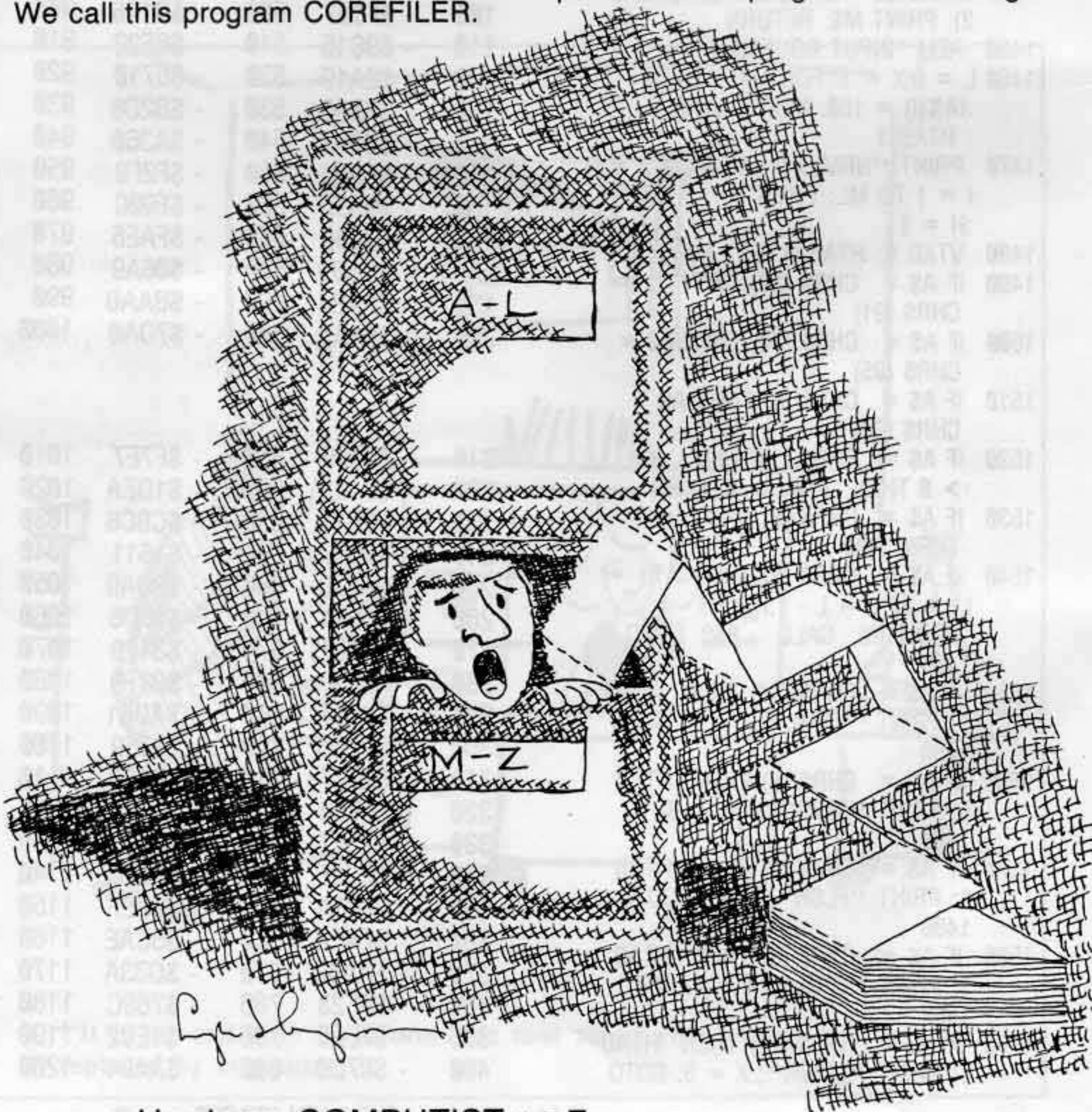
The user can set up the format of the files to meet his particular needs. Then he can enter, edit, search and finally print out the stored information, either one record at a time, or the whole file. We call this program COREFILER.

COREFILER evolved out of a program that Softkey Publishing uses in-house to keep track of its subscribers and advertising clients. Since most people don't have a great need to do this sort of thing, we decided to modify our original database program so that it could be configured to almost any application.

The COREFILER system is really four separate programs which work in conjunction with one another but, because of the length of these programs, this issue we will only contain the main database program. The following issue will contain the other three programs which handle screen formatting, file configuration and menu presentation.

Basically a file management program as currently structured, COREFILER can handle a maximum of 450 records per file on a floppy or hard disk based Apple or Apple compatible. Only one file can be operated on at a time, but this should not be a serious restriction for limited home or small business applications.

Like most other database-type programs, COREFILER uses random access text files for quick storage and retrieval of data. Table 1 gives a complete list of the program's file manage-





ment functions which includes: Add, Delete, Edit, Search, Print and Read. A sorting capability has not been included.

COREFILER may not have all the whistles and bells which some of the commercial database packages have, but its price is surely hard to beat. Enterprising programmers might like to add a sort or more sophisticated search routines to the program.

Because of the length of the COREFILER program, I suggest that the CHECKSOFT program from Hardcore COMPUTIST 1 be run on COREFILER. This will make it much easier for you to spot any errors you may have made while typing in the program. The checksums following the COREFILER listing were generated by using CHECKSOFT in its normal configuration mode (ignore REM's and program pointers. Use line numbers).

Next issue we will print the remaining programs which make up the COREFILER system. By that time, you may have finished typing in the listing from this issue.

### Table 1

### COREFILER Basic Functions

- A** - Adds records to the current file.
- E** - Edits the information in the current record.
- L** - Retrieves the record previous to the current record.
- N** - Retrieves the record which follows the current record.
- R** - Reads in any record in the database.
- S** - Searches the entire database for the specified information in a particular field.
- D** - Deletes the current record from the database.
- P** - Prints out either the current record or the entire file. The printer interface is assumed to reside in slot#1.
- /** - Allows the user to work on another existing file.
- X** - Exits the COREFILER program.

### Editing Functions

- CTRL D** - Deletes the character under the cursor.
- CTRL B** - Jumps to the beginning of the current field.
- CTRL E** - Jumps to the end of data in the

current field.

**CTRL L** - Deletes from the cursor to the end of the current field.

**CTRL R** - Recovers the data that was in the current field before editing was begun.

**CTRL P** - Exchanges the data in the current field with the data in the following field.

**ESC** - Saves the current record to disk and exits the edit mode.

### Add Mode Functions

**ESC** - Saves the new record to disk. Hitting **ESC** a second time exits the "Add" mode.

**CTRL X** - Exits the "Add" mode without saving the current record to disk.

```

10 REM *****
20 REM *
30 REM * COREFILER *
40 REM *
50 REM * FILE MANAGEMENT *
60 REM *
70 REM * PROGRAM *
80 REM *
90 REM *****
95 REM
100 POKE 1013,76: POKE 1014,9: POKE
1015,3
110 FOR X = 777 TO 827: READ X%:
POKE X,X%: NEXT X
120 DATA 201,132,240,3,76,201,22
2,32,177,0,32,227,223,32,44,
213,232,189,0,2,208,250,134,
157,138,32,82,228,160,0,145,
131,200,165,113,145,131,200,
165,114,145,131,160,2,162,0,
165,157,76,226,229
130 G$ = CHR$ (7)
140 A$ = "":D$ = CHR$ (4): TEXT
: HOME :G$ = CHR$ (7)
150 SL = PEEK (770):DV = PEEK (
771)
160 IF PEEK (768) = 255 AND PEEK
(769) = 255 THEN 180
170 POKE 768,255: POKE 769,255: POKE
770,SL: POKE 771,DV
180 GOTO 2630
190 REM READ A FILE
200 PRINT : PRINT OF$XL",V"V: FOR
X = 1 TO RC: PRINT RF$X",B"
Y(S): & INPUT S$(X): NEXT :
PRINT CL$: RETURN
210 REM READ A RECORD
220 IF RR = 0 THEN RETURN
230 A$ = ">> READING RECORD #" +
STR$ (RR) + " <<": GOSUB 11
20
240 PRINT : PRINT OF$XL",V"V: FOR
X = 1 TO NF: PRINT RF$RR",B"
BY(X): & INPUT A$(X): NEXT
: PRINT CL$
250 RETURN

```

## Attention Adventurers!

### ADVENTURE DATA BASE

Hardcore COMPUTIST is looking for adventure hints to any of the popular adventure/fantasy games sold for the Apple II/II Plus or IIe. We hope to develop a data base of these hints and, if sufficient response is received, to publish a regular column in Hardcore COMPUTIST.

### YOUR CLUES, PLEASE

We prefer that these hints not be dead giveaway solutions to dilemmas presented by the particular game but instead, contain just enough information to nudge the stumped adventurer towards the solution of his or her problem.

### HOW AND WHERE

So, if you know how to open the jewel-encrusted egg, how to plug the hole in the row-boat, where to find the key to the treasure chest, or any other information that may be of help to your fellow travelers, please send this information on a 3 x 5 postcard to:

**Hardcore COMPUTIST**  
**Attention: Adventure Hints**  
**P.O. Box 44549**  
**Tacoma, WA 98444**

P.S. Please don't forget to include the name of the adventure game to which your hint pertains.

```

260 REM GET ID NUMBER
270 PRINT : PRINT OF$XL",V"V: PRINT
RF$: INPUT RO,RT,IO: PRINT C
L$: RETURN
280 REM WRITE A RECORD
290 IF RR = 0 THEN WF = RR: RETURN
300 AS = ">> SAVING RECORD #" + STR$(
RR) + " <<": GOSUB 1120
310 PRINT : PRINT OF$XL",V"V: FOR
X = 1 TO NF: PRINT WF$RR",B"
BY(X): PRINT AS(X): NEXT
320 PRINT WF$: PRINT RC: PRINT
RT: PRINT ID: PRINT CL$:WF =
0: RETURN
330 REM READ VARIABLES FILE
340 PRINT : PRINT D$"OPEN"$N$.CO
NFIG": PRINT D$"READ"$N$.CON
FIG": INPUT NF: FOR X = 1 TO
NF: INPUT VT(X),HT(X),NNS(X)
,H2(X),LN(X),BY(X): NEXT : INPUT
XL: INPUT V: PRINT D$"CLOSE"
: RETURN
350 REM FLIP FIELDS
360 CC = CT + 1
370 IF CC > NF THEN CC = 1
380 T$ = AS(CT):AS(CT) = AS(CC):A
$(CC) = T$
390 RETURN
400 REM >> INPUT ROUTINE CODE <<
410 REM PRINT NEW STRING
420 VTAB VT(CT): HTAB H2(CT): IF
NOT ED THEN PRINT AS(CT): RETURN
430 IF LEN (AS(CT)) < 1 AND HT(
CT) = H2(CT) THEN PRINT NNS
(CT):LL = LEN (NNS(CT)): GOTO
450
440 PRINT AS(CT):L = LEN (AS(C
T)):LL = L
450 IF LL = LN(CT) THEN RETURN
460 FOR X = 1 TO LN(CT) - LL: PRINT
CHR$(95):NEXT : RETURN
470 REM DELETE SUBROUTINE
480 IF P > L THEN RETURN
490 IF L = 1 THEN AS(CT) = "": RETURN
500 IF P = L THEN AS(CT) = LEFT$(
AS(CT),P - 1): RETURN
510 IF P = 1 THEN AS(CT) = RIGHT$(
AS(CT),L - 1): RETURN
520 AS(CT) = LEFT$(AS(CT),P - 1
) + RIGHT$(AS(CT),L - P): RETURN
530 REM INSERT SUBROUTINE
540 IF P = 1 THEN AS(CT) = CH$ +
AS(CT): RETURN
550 IF P = L THEN AS(CT) = LEFT$(
AS(CT),P - 1) + CH$ + RIGHT$(
AS(CT),1): RETURN
560 AS(CT) = LEFT$(AS(CT),P - 1
) + CH$ + RIGHT$(AS(CT),L -
P + 1): RETURN
570 REM BACKWARD MOVE
580 P = P - 1: IF P > 0 THEN 610
590 P = 1: IF CT = 0 THEN RETURN
600 NORMAL : GOSUB 420: INVERSE
:CT = CT - 1: IF CT < 1 THEN
CT = NF
610 B$ = AS(CT):L = LEN (AS(CT))
620 RETURN
630 REM FORWARD MOVE
640 P = P + 1: IF P > L + 1 THEN
P = L + 1
650 IF P > LN(CT) THEN P = 1:CT =
CT + 1:L = LEN (AS(CT)): IF

```

```

CT > NF THEN CT = 1
660 RETURN
670 REM MOVE CURSOR BACKWARD
680 IF CH$ = CHR$(8) THEN GOSUB
580: GOTO 990
690 REM MOVE CURSOR FORWARD
700 IF CH$ = CHR$(21) THEN GOSUB
640: GOTO 990
710 REM SAME AS BEFORE
720 IF CH$ = CHR$(18) THEN AS(
CT) = B$:P = 1: GOTO 990
730 IF CH$ = CHR$(16) THEN GOTO
360
740 REM DELETE A CHARACTER
750 IF CH$ = CHR$(4) THEN GOSUB
480: GOSUB 420: GOTO 1080
760 REM EXIT TO MENU
770 IF CH$ < > CHR$(27) THEN
840
780 IF NOT AD THEN NORMAL : GOSUB
420: POP : GOTO 1450
790 FOR D = 1 TO NF: IF AS(D) <
> "" THEN ZW = 1
800 NEXT
810 IF ZW THEN ZW = 0: NORMAL : GOSUB
420: POP : GOTO 1450
820 AD = 0:WF = 0:RR = RR - 1:RC =
RC - 1: NORMAL : GOSUB 220: GOTO
1450
830 REM RETURN TO CALLER
840 IF CH$ = CHR$(13) THEN RETURN
850 REM RETURN WITHOUT SAVE
860 IF CH$ = CHR$(24) THEN RETURN
870 REM JUMP TO END OF LINE
880 IF CH$ = CHR$(5) THEN P =
L + 1: GOSUB 420: GOTO 1080
890 REM JUMP TO START OF LINE
900 IF CH$ = CHR$(2) THEN P =
1: GOSUB 420: GOTO 1080
910 REM CLEAR TO END OF LINE
920 IF CH$ = CHR$(12) AND P =
1 THEN AS(CT) = "": GOSUB 42
0: GOTO 1080
930 IF CH$ = CHR$(12) THEN AS(
CT) = LEFT$(AS(CT),P - 1):
GOSUB 420: GOTO 1080
940 REM INITIAL ENTRY POINT
950 B$ = AS(CT):L = LEN (AS(CT))
960 REM ENTER WITH STRING AND TA
BS
970 GOSUB 420:P = 1
980 REM TAB AND PRINT STRING
990 GOSUB 420: VTAB VT(CT): HTAB
H2(CT) - 1 + P: GET CH$
1000 REM CTRL CHARACTER CHECK
1010 IF CH$ < " " THEN 680
1020 REM INSERT A CHARACTER
1030 IF P < = L THEN GOSUB 540
: GOTO 1060
1040 AS(CT) = AS(CT) + CH$
1050 REM INCREMENT CURSOR
1060 P = P + 1
1070 REM IS FIELD FULL?
1080 L = LEN (AS(CT)): IF L > LN
(CT) THEN L = LN(CT):AS(CT) =
LEFT$(AS(CT),LN(CT))
1090 IF P > LN(CT) THEN P = LN(C
T): PRINT CHR$(7): RETURN
1100 GOTO 990
1110 REM CENTER AND PRINT
1120 GOSUB 1390: VTAB 10
1130 HT = 20 - (LEN (AS) / 2): IF

```

```

HT < 1 THEN HT = 1
1140 HTAB HT: PRINT AS: RETURN
1150 A2$ = ""
1160 REM CENTER AND PRINT WITH P
ROMPT
1170 GOSUB 1390: VTAB 8
1180 IF LEN (AS) > 1 THEN GOSUB
1130: PRINT
1190 IF LEN (A2$) > 1 THEN AS =
A2$: GOSUB 1130: PRINT
1200 VTAB 16
1210 IF AX THEN PRINT " PRESS R
ETURN WHEN READY TO CONTINUE
:"G$:
1220 IF NOT AX THEN PRINT "PRE
SS 'Y' FOR YES OR 'N' FOR NO
(Y/": INVERSE : PRINT "N":
: NORMAL : PRINT "):"G$:
1230 GET AN$: PRINT AN$
1240 IF AX AND AN$ < > CHR$(1
3) AND AN$ < > CHR$(27) THEN
1200
1250 IF NOT AX AND AN$ = CHR$(
13) THEN AN$ = "N"
1260 IF NOT AX AND AN$ < > "Y"
AND AN$ < > "N" THEN 1200
1270 RETURN
1280 REM ZERO DATA STRINGS
1290 FOR CT = 1 TO NF:AS(CT) = "
": NEXT
1300 REM PRINT RECORD STATUS
1310 VTAB 1: HTAB 1: PRINT "RECO
RD #"RR" "": HTAB 17: PRINT
"USED "RC" "": HTAB 30: PRINT
"UNUSED "RT - RC": CALL - 8
68
1320 REM PRINT DATA TO SCREEN
1330 GOSUB 1390: FOR CT = 1 TO N
F: IF HT(CT) = H2(CT) THEN 1
350
1340 VTAB VT(CT): HTAB HT(CT): PRINT
NNS(CT):
1350 GOSUB 420: NEXT : VTAB 19: RETURN
1360 REM PRINT 40 "="S
1370 HTAB 1: FOR X = 1 TO 40: PRINT
"=":NEXT : RETURN
1380 REM CLEAR DATA WINDOW
1390 POKE 34,2: POKE 35,17: HOME
: POKE 34,18: POKE 35,24: RETURN
1400 REM ERROR-NO RECORDS
1410 AS = "> NO RECORD AVAILABLE
<":AX = 1: GOSUB 1150
1420 REM COMMAND MENU
1430 FOR CT = 1 TO NF:AS(CT) = "
": NEXT
1440 REM NORMAL ENTRY POINT
1450 CALL - 10621:ED = 0: GOSUB
1310: IF WF THEN GOSUB 290:
GOSUB 1310
1460 IF AD THEN 1660
1470 HOME
1480 PRINT "(A) ADD": HTAB 11: PRINT
"(S) SEARCH": HTAB 28: PRINT
"(D) DELETE"
1490 PRINT "(E) EDIT": HTAB 11:
PRINT "(R) READ RECORD": HTAB
28: PRINT "(I) NEW FILE"
1500 PRINT "(L) LAST": HTAB 11:
PRINT "(P) PRINT": HTAB 28
: PRINT "(?) STATUS"
1510 PRINT "(N) NEXT": HTAB 28:
PRINT "(X) EXIT"

```

```

1520 HTAB 1: VTAB 24: PRINT "ENTER COMMAND: "; GET AN$: VTAB
23
1530 IF AN$ = "A" THEN 1660
1540 IF AN$ = "E" THEN 1720
1550 IF AN$ = "L" THEN 1780
1560 IF AN$ = "N" THEN 1820
1570 IF AN$ = "S" THEN 1870
1580 IF AN$ = "R" THEN 2200
1590 IF AN$ = "P" THEN 2270
1600 IF AN$ = "D" THEN GOSUB 24
90: GOTO 1450
1610 IF AN$ = "X" THEN 2570
1620 IF AN$ = "?" THEN 2620
1630 IF AN$ = "/" THEN RUN
1640 PRINT CHR$(7); GOTO 1520
1650 REM ADD A RECORD
1660 IF RC = RT THEN A$ = "> DISK FULL <": GOSUB 1150: GOTO 1450
1670 AD = 1: HOME : PRINT : HTAB 14: PRINT "ADD A RECORD": PRINT : PRINT "PRESS <ESC> TO RETURN TO COMMAND MENU."
1680 RC = RC + 1: SE = 0: RR = RC: ED = 1: GOSUB 1290: CT = 1: WF = 1
1690 B$ = A$(CT): INVERSE : GOSUB 970: NORMAL : GOSUB 420: CT = CT + 1: IF CT > NF THEN CT = 1
1700 IF CH$ = CHR$(24) THEN WF = 0: RC = RC - 1: RR = RC: GOSUB 350: GOSUB 220: GOTO 1450
1710 GOTO 1690
1720 IF RR = 0 THEN 1410
1730 HOME : PRINT : HTAB 14: PRINT "EDIT A RECORD": PRINT : PRINT "PRESS <ESC> TO RETURN TO COMMAND MENU."
1740 ED = 1: GOSUB 1310: CT = 1: WF = 1
1750 INVERSE : GOSUB 950: NORMAL : GOSUB 420: CT = CT + 1: IF CT > NF THEN CT = 1
1760 GOTO 1750
1770 REM READ LAST RECORD
1780 REM
1790 RR = RR - 1: IF RR < 1 THEN RR = 1: GOTO 1450
1800 GOSUB 220: GOTO 1450
1810 REM READ NEXT RECORD
1820 REM
1830 RR = RR + 1: IF RR > RC THEN RR = RC: GOTO 1450
1840 GOSUB 220: GOTO 1450
1850 REM >> ENTRY SEARCH <<
1860 REM CLEAR SCREEN
1870 VTAB 1: HTAB 9: PRINT "": GOSUB 1390: PRINT : X = 1
1880 REM PRINT FIELDS
1890 PRINT X". "N$(X); IF X > NF THEN X = X + 1: HTAB 20: PRINT X". "N$(X): IF X > NF THEN X = X + 1: PRINT : GOTO 1890
1900 HOME : PRINT
1910 REM GET FIELD NUMBER
1920 HOME : PRINT : PRINT "FOUND IN WHAT FIELD? (1-"NF") :": CT = 0: VT(0) = 20: LN(0) = 2: H2(0) = 30: A$(0) = "": ED = 1
: GOSUB 970
1930 IF LEN (A$(CT)) < 1 THEN 1450
1940 S = VAL (A$(CT)): IF S < 1 OR S > NF THEN 1920
1950 REM GET SEARCH KEY
1960 HOME : PRINT : PRINT "ENTER ITEM TO SEARCH FOR:": LN(0) = LN(S): VT(0) = 22: H2(0) = 1: A$(0) = "": ED = 1: CT = 0: GOSUB 970: SF = LEN (A$(0))
1970 REM CLEAR SCREEN
1980 ED = 0: HOME
1990 IF SF < 1 THEN 1450
2000 REM IS DATA IN MEMORY
2010 IF S = SE THEN 2060
2020 REM GET THE DATA
2030 A$ = "> RECALLING DATA <": GOSUB 1120: GOSUB 200
2040 GOSUB 200
2050 REM COMPARE TO KEY
2060 SE = S: RX = RR: A$ = "> SEARCHING <": GOSUB 1120
2070 FOR RR = 1 TO RC
2080 IF LEFT$(S$(RR), SF) = A$(0) THEN GOSUB 220: GOSUB 2150
2090 NEXT
2100 REM KEY NOT FOUND
2110 A$ = "SORRY. I COULD NOT FIND:": A2$ = "> " + A$(0) + "<": IF LEN (A2$) > 40 THEN A2$ = A$(0)
2120 AX = 1: GOSUB 1170
2130 RR = RX: GOSUB 220: GOTO 1450
2140 REM CORRECT RECORD?
2150 GOSUB 1310: HOME : PRINT : PRINT "IS THIS THE RECORD YOU WANT? (Y/": INVERSE : PRINT "N": NORMAL : PRINT ") :": GET AN$: IF AN$ = "Y" THEN POP : GOTO 1470
2160 IF AN$ = CHR$(27) THEN POP : RR = RX: GOSUB 220: GOTO 1450
2170 HOME : A$ = "> SEARCHING <": GOSUB 1390: VTAB 10: GOSUB 1130
2180 RETURN
2190 REM >> READ A RECORD <<
2200 HOME : PRINT : HTAB 5: PRINT G$ "ENTER RECORD NUMBER TO READ: :": CT = 0: VT(CT) = 20: LN(CT) = 3: H2(CT) = 34: HT(CT) = H2(CT): N$(CT) = STR$(RR): A$(CT) = "": ED = 1: GOSUB 970
2210 IF LEN (A$(CT)) < 1 THEN 1450
2220 HOME
2230 RX = VAL (A$(CT)): IF RX < 1 OR RX > RC THEN PRINT CHR$(7): GOTO 2200
2240 RR = RX
2250 GOSUB 220: GOTO 1450
2260 REM PRINT SCREEN DATA
2270 IF RR = 0 THEN 1410
2280 HOME : VTAB 19: PRINT "TURN ON YOUR PRINTER! THEN PRESS [RTN]": NORMAL : GET A$
2290 HOME : PRINT "PRINT TEST PA
TERN FOR ALIGNMENT?": PRINT : HTAB 10: PRINT "[Y]ES OR [N]O":
2300 GET A$: IF A$ < > "Y" AND A$ < > "N" THEN 2300
2310 IF A$ = "N" THEN PRINT : GOTO 2390
2320 D1 = 1: PRINT : PRINT D$: "PR #": PR: FOR D = 1 TO NF: PRINT SPC( HT(D) - D1): IF HT(D) < > H2(D) THEN PRINT N$(D): SPC( H2(D) - (HT(D) + LEN (N$(D))))
2330 PRINT LEFT$(TE$, LN(D)); IF VT(D) = VT(D + 1) THEN D1 = H2(D) + LN(D): NEXT : GOTO 2360
2340 PRINT : IF VT(D) + 1 < VT(D + 1) THEN FOR S3 = VT(D) + 2 TO VT(D + 1): PRINT : NEXT
2350 D1 = 1: NEXT
2360 PRINT : PRINT D$ "PR#0": HOME : PRINT "DO YOU WANT ANOTHER TEST?": CHR$(8)
2370 GET A$: IF A$ < > "Y" AND A$ < > "N" THEN 2370
2380 IF A$ = "Y" THEN 2320
2390 PRINT "DO YOU WANT TO PRINT THE WHOLE FILE"
2400 GET A$: IF A$ < > "Y" AND A$ < > "N" THEN 2400
2410 IF A$ = "Y" THEN BZ = 1: FOR ZB = 1 TO RC: RR = ZB: PRINT : PRINT D$ "PR#0": GOSUB 230: VTAB 24
2420 D1 = 1: PRINT : PRINT D$ "PR#": "PR: PRINT : PRINT : FOR D = 1 TO NF: PRINT SPC( HT(D) - D1): IF HT(D) < > H2(D) THEN PRINT N$(D): SPC( H2(D) - (HT(D) + LEN (N$(D))))
2430 PRINT A$(D); IF VT(D) = VT(D + 1) THEN D1 = H2(D) + LEN (A$(D)): NEXT : GOTO 2470
2440 PRINT : IF VT(D) + 1 < VT(D + 1) THEN FOR S3 = VT(D) + 2 TO VT(D + 1): PRINT : NEXT
2450 D1 = 1: NEXT
2460 IF BZ THEN NEXT ZB: BZ = 0
2470 PRINT : PRINT D$ "PR#0": GOTO 1450
2480 REM DELETE A RECORD
2490 IF RR = 0 OR RC = 0 THEN 1410
2500 A$ = "YOU ARE ABOUT TO ERASE A RECORD": A2$ = "DO YOU WISH TO PROCEED?": AX = 0: GOSUB 1170: IF AN$ < > "Y" THEN 1450
2510 IF RR = RC THEN RC = RC - 1 : RR = RC: GOSUB 220: GOSUB 310: RETURN
2520 HOME : A1 = RR: RR = RC: GOSUB 220: HOME : RR = A1
2530 RC = RC - 1: IF RC < 0 THEN RC = 0
2540 GOSUB 310
2550 RETURN
2560 REM EXIT PROGRAM
2570 IF NOT PP THEN 2590
2580 PR# PR: FOR H = 1 TO 36: PRINT : NEXT H: PR# 0: CALL 1002

```

```

2590 REM
2600 TEXT : HOME : PRINT : PRINT
      CHR$(4)"RUN HELLO.DB"
2610 REM STATUS DISPLAY
2620 PRINT CHR$(7): POKE 772,2
      55: GOTO 1450
2630 RT = 450:NF = 17: DIM VT(18)
      ,HT(18),NN$(18),MS(18),AS(18)
      ),H2(18),LN(18),BY(18)
2640 HOME : VTAB 3: PRINT "WHAT
      IS THE NAME OF THE FILE": INPUT
      NS: IF NS = "" OR LEFT$(NS
      ,1) < "A" THEN 2640
2650 ONERR GOTO 2750
2660 PRINT DS"VERIFY"NS: POKE 21
      6,0
2670 GOSUB 340
2680 PR = 1
2690 OF$ = DS + "OPEN" + NS + ",L
      ":RF$ = DS + "READ" + NS + "
      ",R":WF$ = DS + "WRITE" + NS +
      ",R":CL$ = DS + "CLOSE": FOR
      D = 1 TO 40:TE$ = TE$ + "X":

```

```

NEXT
2700 GOSUB 270:RC = RO:ID = IO
2710 DIM SS(RT)
2720 VTAB 2: GOSUB 1370: VTAB 18
      : GOSUB 1370: POKE 34,18
2730 RR = RC: GOSUB 220: GOTO 145
      0
2740 REM FILE NOT ON DISK
2750 POKE 216,0: TEXT : HOME
2760 EM$ = NS + " IS NOT ON THIS
      DISK"
2770 PRINT G$: VTAB 5: HTAB 20
      - LEN(EM$) / 2: PRINT EM$
2780 VTAB 10: HTAB 4: PRINT "PLE
      ASE INSERT CORRECT DATA DISK
      "
2790 VTAB 12: HTAB 3: PRINT "RET
      URN TO CONTINUE OR ESC TO EX
      IT ": GET AS
2800 IF AS = CHR$(27) THEN HOME
      : END
2810 IF AS = CHR$(13) THEN RUN
2820 PRINT G$: GOTO 2790

```

```

1600 - $A40E
1610 - $67FC
1620 - $4137
1630 - $AB94
1640 - $69D1
1650 - $A86D
1660 - $1178
1670 - $DCD6
1680 - $8D05
1690 - $AD7F
1700 - $58A8
1710 - $32C3
1720 - $6778
1730 - $8313
1740 - $40DD
1750 - $00D2
1760 - $F336
1770 - $632D
1780 - $ECF8
1790 - $0CA6
2200 - $8DB7
2210 - $9C8F
2220 - $60BF
2230 - $50BC
2240 - $C223
2250 - $92CB
2260 - $815F
2270 - $3F3F
2280 - $8085
2290 - $8DD4
2300 - $B6B5
2310 - $FB0D
2320 - $3F08
2330 - $EF94
2340 - $C7AB
2350 - $4008
2360 - $B8E6
2370 - $13A5
2380 - $73F7
2390 - $C7DA

```

```

2400 - $7F61
2410 - $DB03
2420 - $BCEF
2430 - $A1A8
2440 - $5F67
2450 - $6604
2460 - $314F
2470 - $6548
2480 - $2489
2490 - $73C1
2500 - $4FA1
2510 - $47C4
2520 - $8D0B
2530 - $0BDE
2540 - $33D6
2550 - $6995
2560 - $2A34
2570 - $F9BC
2580 - $1FC3
2590 - $EC05

```

```

1800 - $843B
1810 - $0011
1820 - $9ACA
1830 - $F38C
1840 - $BB01
1850 - $8AE2
1860 - $9512
1870 - $267E
1880 - $6900
1890 - $BF2C
1900 - $D7C2
1910 - $1506
1920 - $CC9E
1930 - $A0D3
1940 - $DC87
1950 - $BC0F
1960 - $E0C4
1970 - $A30B
1980 - $6EF8
1990 - $4796

```

```

2600 - $B73E
2610 - $15B9
2620 - $7FD7
2630 - $B18A
2640 - $B0DB
2650 - $B206
2660 - $C0BE
2670 - $667A
2680 - $5D82
2690 - $3E9F
2700 - $F0F3
2710 - $D808
2720 - $B744
2730 - $AF6D
2740 - $D228
2750 - $B160
2760 - $B48E
2770 - $F8AE
2780 - $35FB
2790 - $7AA0
2800 - $F5FB
2810 - $1BD7
2820 - $E529

```

## CHECKSUMS

```

10 - $BADD
20 - $9B13
30 - $4D3B
40 - $AD92
50 - $C899
60 - $FF65
70 - $A3BF
80 - $A900
90 - $924D
95 - $2608
100 - $2D63
110 - $C342
120 - $5349
130 - $B595
140 - $8931
150 - $BA4C
160 - $AE4A
170 - $F5E4
180 - $411A
190 - $308B
400 - $7980
410 - $903C
420 - $C453
430 - $7767
440 - $11B4
450 - $1C1B
460 - $EC21
470 - $2D01
480 - $309D
490 - $0E23
500 - $5C04
510 - $F8B8
520 - $1BE0
530 - $4741
540 - $BF4C
550 - $951F
560 - $F9B1
570 - $E2CD
580 - $6E1A
590 - $4490

```

```

800 - $CE0A
810 - $E0C3
820 - $40A8
830 - $45A9
840 - $ECE4
850 - $E9C3
860 - $9E6A
870 - $1F17
880 - $08F6
890 - $33D7
900 - $D3D3
910 - $8AB8
920 - $D52F
930 - $BCA4
940 - $D1D0
950 - $F02F
960 - $A654
970 - $055B
980 - $FABF
990 - $3A8D
1200 - $ADBF
1210 - $732C
1220 - $A320
1230 - $1F72
1240 - $F346
1250 - $57D2
1260 - $0B7B
1270 - $AC1A
1280 - $A8F4
1290 - $B4F2
1300 - $707E
1310 - $0C68
1320 - $B274
1330 - $C3B2
1340 - $4673
1350 - $7828
1360 - $B29C
1370 - $E962
1380 - $88AF
1390 - $4ADB

```

```

200 - $836B
210 - $254D
220 - $22E4
230 - $64E9
240 - $9844
250 - $CDA1
260 - $ED69
270 - $90E2
280 - $3AF0
290 - $7BE5
300 - $DC22
310 - $0396
320 - $A083
330 - $174F
340 - $B896
350 - $C63F
360 - $D130
370 - $E01B
380 - $45B5
390 - $E22D
600 - $620D
610 - $1F29
620 - $7185
630 - $76B3
640 - $F7C6
650 - $3430
660 - $B4BC
670 - $23B4
680 - $D72B
690 - $403B
700 - $CA1C
710 - $93EE
720 - $A267
730 - $B482
740 - $0D01
750 - $2951
760 - $0A78
770 - $3CFD
780 - $245C
790 - $EE27

```

```

1000 - $7CB6
1010 - $5113
1020 - $926F
1030 - $8F43
1040 - $28A0
1050 - $B02C
1060 - $D38E
1070 - $2E15
1080 - $B42A
1090 - $EE87
1100 - $00B3
1110 - $9F3C
1120 - $92BC
1130 - $D4B8
1140 - $676D
1150 - $050C
1160 - $8C80
1170 - $3706
1180 - $1F0A
1190 - $905F
1400 - $BDC4
1410 - $660D
1420 - $8366
1430 - $A562
1440 - $F839
1450 - $11E6
1460 - $C053
1470 - $780B
1480 - $5433
1490 - $E19C
1500 - $3720
1510 - $8B9D
1520 - $F3C7
1530 - $EE83
1540 - $A6CA
1550 - $AF79
1560 - $B05F
1570 - $CF58
1580 - $A117
1590 - $63BC

```

```

2000 - $0961
2010 - $6992
2020 - $BD8D
2030 - $7B3B
2040 - $EA2B
2050 - $79C0
2060 - $9A1A
2070 - $6BBA
2080 - $1A35
2090 - $0F10
2100 - $5EB0
2110 - $A5AD
2120 - $E360
2130 - $5C65
2140 - $C7A1
2150 - $2069
2160 - $B5A8
2170 - $7CFB
2180 - $4260
2190 - $6E00

```



## Softkey For Mask Of The Sun

By John J. Liska

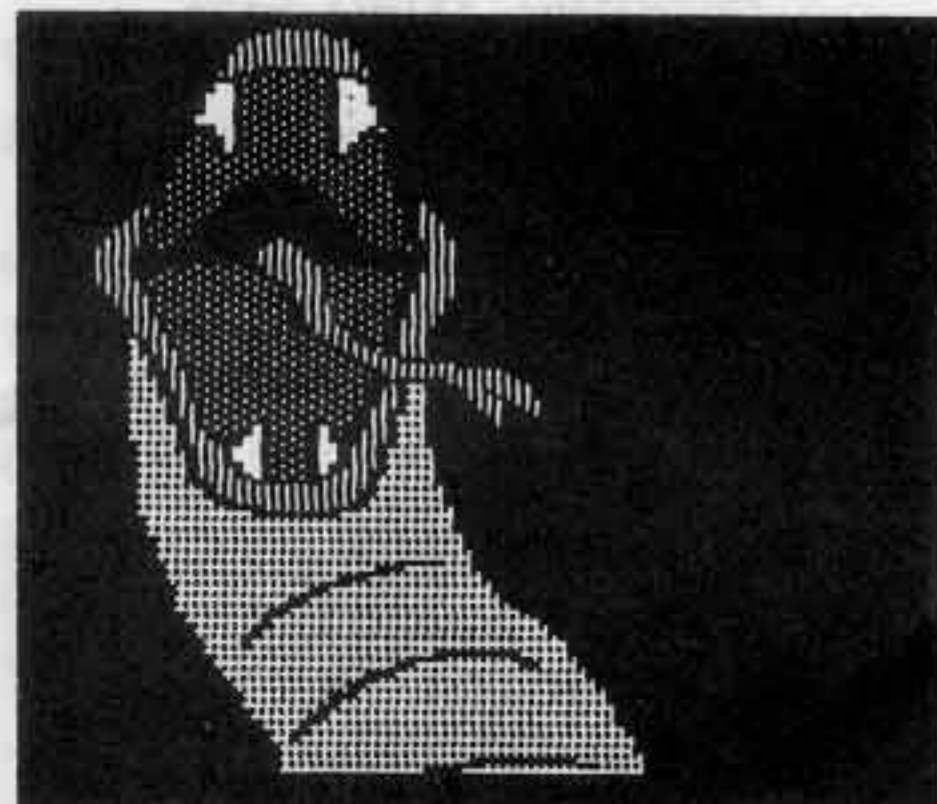
**MASK OF THE SUN,**  
Ultrasoft, Inc.  
24001 SE 103rd St.  
Issaquah, WA 98027

**REQUIREMENTS:** Apple ][ Plus  
One disk drive (two are preferred)  
Mask of the Sun program disk  
DOS system master  
One blank disk

Now you can unlock one of the most maddening adventures you have ever attempted to solve-

### *Mask Of The Sun* By Ultrasoft

In this diabolical foray, your quest is to retrieve the legendary Mask of the Sun and live to tell the tale. You will encounter many things along the way which will defy common sense and your own intuitive logic, yet must be met.



The basic procedure is the same as the modified COPYA/DOS combination used to unlock ZORK (Computist #1). The only change to DOS seems to be the use of non-standard end marks on tracks \$03 through \$22 and incorrect checksums on the DOS tracks.

The first problem is to get the information off the original disk and onto the copy disk, here is how:

1) Boot the 3.3 Master Disk.

**PR#6**

2) Clear program in memory and initialize the front side of the disk you wish to copy to

**FP**

**INIT SIDE A**

3) Drop into the monitor

**CALL-151**

4) Modify DOS so that it ignores end marks and checksums.

**B92D:18 60**

**B989:18 60**

5) Put back in the system master and use COPYA to copy SIDE B to the back side (the side you **didn't** initialize in step 2).

**RUN COPYA**

6) When finished with the back side, use FID to copy every file (using the wildcard (=) and prompting features of FID) from side A except "LL(V27)" to the front side of the freshly INITIALIZED disk.

**BRUN FID**

We now have all the files copied except the one that checked for copy protection. In order to make this disk work, we have to make a start up file.

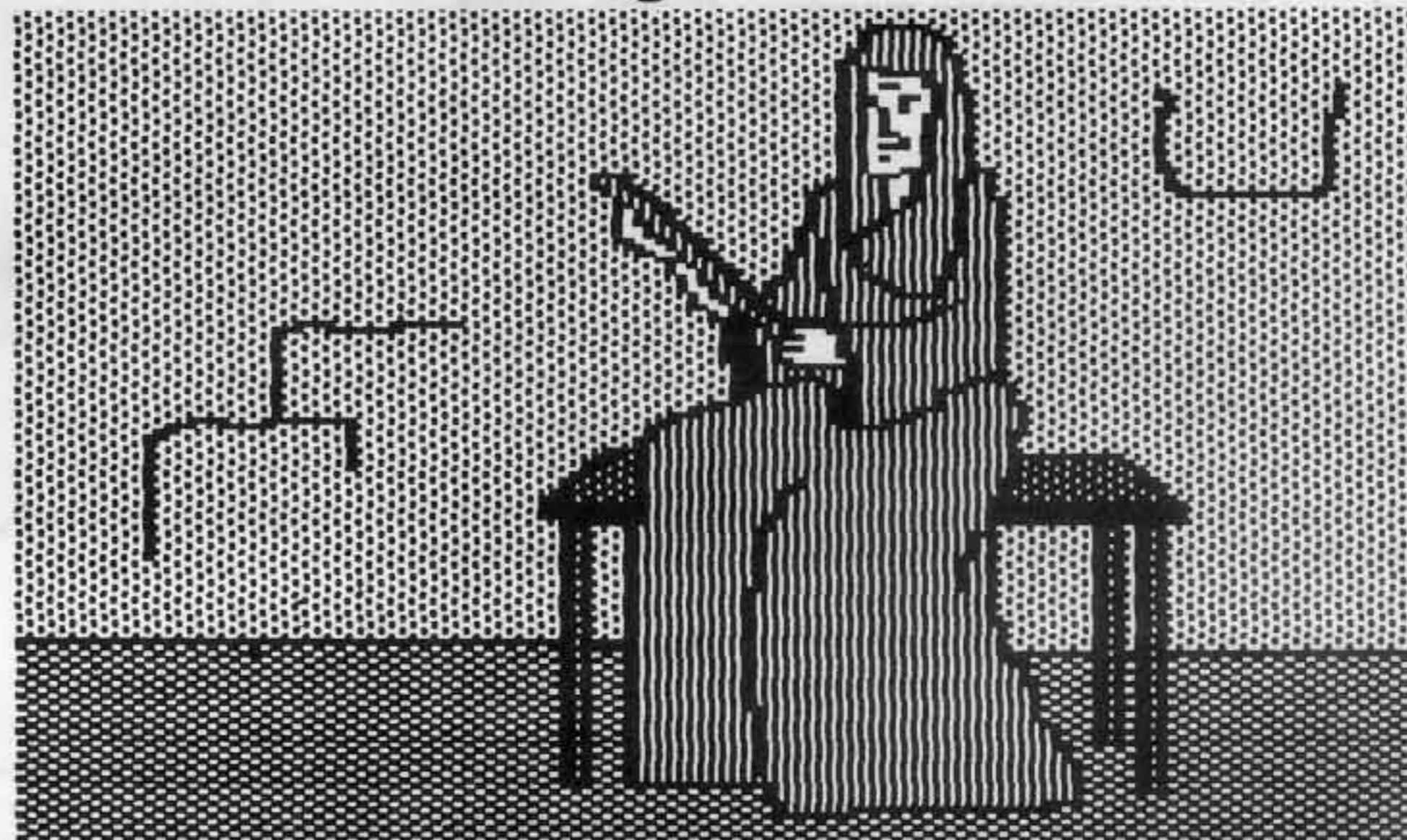
7) Type in this start-up program and save it to the front side of the copy.

**10 PRINT CHR\$(4) "EXEC DISK"  
SAVE SIDE A**

That's it! Whenever you boot, you will get a FILE NOT FOUND message, but that is O.K. The reason for this is because the text file named DISK is trying to BRUN LL(V27), but since it isn't on this disk, DISK just goes on to the next command.

You now have a copy of Mask of the Sun on a normal disk for you to examine until you bust (or solve the adventure, whichever comes first).

Now, would someone please tell me how I can get past the **BLASTED** snake!



"In exchange for your kindness,  
please take this flute.  
It may help you at some time . . ."  
[ waiting ]

## Upper & Lower Case Output For Zork

By Brian Burns

**Requirements:** Apple //e or ][ plus  
with lower case

Sector editor such as DiskEdit  
or Disk Zap

Any Infocom Adventure (not just Zork)

If you own an Apple //e, or have lower case on your II or II Plus, you are entitled to the following modification for Infocom adventures. This modification allows the game to display all of its messages in upper and lower case instead of all capital letters. If you didn't know already (I doubt you did), all of the text in any of Infocom's adventures is stored on the disk as upper and lower case (not in ASCII form, but as 3 characters compacted into 2 bytes). However, since not ALL Apples have lower case display as does the Apple //e, the lower case text must be converted to upper case before being printed to the screen. This is accomplished by a short routine which I will show you how to remove from the disk.

1) Make a copy of your Infocom game with the Softkey for Zork in Hardcore COMPUTIST #1, or the Softkey for Witness in Hardcore COMPUTIST #4. (These are exactly alike and either Softkey will work on any Infocom game).

2) After making the copy, run your sector editor program and read track 2, sector 9 of the disk you just made.

3) Look at bytes 4C through 56 (with older versions of ZORK I and II this area has been moved to bytes 9D through A8). They should contain the following....

**C9 60 90 07 C9 80 B0 03 38 E9 20**

4) Replace this code eleven EA's.

5) Write this sector back to the disk.

6) Read track 2 sector 7.

7) Change byte 9D from 3F to FF and write it back out.

8) Read track 2 sector B and change byte FC from 01 to 02.

9) Write the sector back out and you're done!

### Explanation of Procedure

The first step is necessary for two reasons. First, most sector editor programs only work on normal (or normalized) disks. Second, it is NOT a good idea to make changes to your original disk (that is why it is write-protected).

Steps two through five inactivate the routine that converts the letters to uppercase.

Steps six and seven stop the room and score information at the top of the screen from being printed in inverse. This is necessary because when lowercase letters are inversed (AND-ed with \$3F), they become meaningless garbage.

Steps eight and nine alter the text window so that there is a blank line between the information at the top of the screen and the text of the game. This just helps to distinguish that information from the rest of the game.

I think you'll find upper and lowercase much easier on the eyes. Have fun.



### For our U.S readers:

**When ordering back issues, please note that we ship most orders United Parcel Post.**

*Continued from page 4*

are not really hackers but who have one the programs in question, can actually follow along cook-book fashion and come out the other end with the desired results. Thanks!

I also very much appreciate the responses to most of the letters published in the Input section. One of the most frustrating things in most columns of this type is to have a reader ask a question in print, and then find one must wait three or four months (or more) to get even a preliminary answer. Now, if you would just increase the size of the Input section...Oh well, can't have everything at once.

A personal preference would be fewer softkeys for games and more for applications programs, but of course, I realize you have readers of all interests. Like others, I too have a wish list of programs for which I have been hoping to see softkeys. My list includes Sensible Speller, Visiblend, Basic Accounting and The Accountant among others. A suggestion: If you were to print the Top 30 or Top 50, it might give the hackers out there an idea of which programs are most in need of softkeys.

Finally, a need of my own: Does anyone know of a relatively inexpensive, programmable add-on keyboard. I am thinking of something like the VIP Key-Whiz, which is really what I want. But the price of VIP is so outrageous, it is out of the question. I thought a board called Keyport 717 might be the answer (it sells for \$175 as opposed to \$450 for VIP), but all of its functions are loaded into the Apple's memory and it requires a real programmer's knowledge to adopt to a particular application program. The VIP, on the other hand, puts the functions the user wants into its own RAM and requires no knowledge of programming. If only its price were not so high! Any ideas?

Once, again, thanks for the great improvement in the magazines. Keep up the good work!

Thomas E. Militello, M.D.  
Rancho Palos Verdes, CA

*Dr. Militello: We think your suggestion that we print a "wish list" of softkeys is an excellent one. In fact, because of your suggestion and the tremendous response we received from our readers after requesting softkeys in Hardcore COMPUTIST no. 5., we can see no reason to delay printing the "Most Wanted List."*

*You can find this list on page 4 of*

*this issue.*

*Our staff would like to thank you for your suggestions, encouragement and the compliments on Hardcore COMPUTIST no. 5.*

### Worried About a Crash

I enjoy your magazine very much and look forward to every issue.

I have Flight Simulator II and cannot make a backup copy. I have tried Copy II +, Nibbles Away II and Pirates Friend. None of these will copy it. Do you know something about this program?

Tom Peragine  
Pompano Beach FL

*Mr. Peragine: Sorry, we do not as yet have a means to backup the excellent Flight Simulator II. We have included FS-II in our new "Wanted List" which you can find on page 4 of this issue.*

### Another Wish List

The latest Hardcore was the best ever. I especially appreciated the boot-code tracing.

I would appreciate your giving attention to the following: 1) Sensible Speller seems to have everyone baffled. Why? 2) Broderbund is especially hard to copy. One gets 0 track errors and even nibble counts, but "Arcade Machine" won't boot. It will run if the Master is booted first, but... 3) Is there any way you could interview "Mr. Xerox" or Krac-Man? Their talents for breaking stuff all the way down to FID-able files is amazing. 4) You might mention that "Cracking techniques" featuring material by the above is available through Pirates Harbor. However, I have not found it very helpful because it assumes I know DOS better than I do. 5) I am sure you have seen the Fast-Copy program (called Pirate's Friend, Fastass Copy, etc.) that copies 5 tracks at a time and works on many copy-protected programs. I believe it is in the public domain. If you have a copy, could you disassemble it and give us an overview of the logic of such a program.

I would also like to know the logic of the "parameters" one changes in Copy II + or Locksmith. I know there are address or data field headers, but how does one discover which to change and know why?

*Continued on page 31*

# Advanced Playing Techniques

## Star Maze

Contributed by Ferrell Wheeler

### Star Maze

Sir-Tech Software

It seems the pinwheel and the wall snail are extremely difficult to shoot so, instead of wasting a bomb on them, here's a method for destroying them and anything else in the game at no risk:

1) Drive repeatedly straight into a wall at a fairly slow speed until the ship is completely inside the wall.

2) Once inside, turn around and position the ship so that only enough of its nose is sticking out to still allow for firing.

When in this position, nothing can hit the ship, not even when the snail is walking on the same wall the ship is in!

You can even use this technique to go through walls, but this seems to use up a lot of fuel.

## The Wizard and the Princess

Contributed by Donald Oliveau

### The Wizard and the Princess

Sierra On-Line Systems

If the player "dies" in this game, there's a way to revive him or her. When the computer asks you, "Do you wish to play again?" after the "death" has occurred, answer "N" for no and then press "RETURN" twice. This restores you to life at the spot you were "killed" with all your inventory intact.

## Wizardry: Proving Grounds of the Mad Overlord

Sir-Tech Software

It seems as though a lot of Wizardry players already know how to create a very powerful bishop, but here is the technique anyway:

1) Take the bishop into the maze and then camp.

2) Inspect the bishop's character and choose the identity ("I") option.

3) Keep trying to identify item #9 until the word "success" appears at the bottom of the screen.

4) The bishop should now have 100,000,000 experience points.

# Adventure Tips

## Cranston Manor.....

Sierra On-Line Systems

Knights in armour do not like rodents.

Drown the computer to get the platinum sphere.

## Time-Zone.....

Sierra On-Line Systems

There is more than one piece of jade in the Chinese Garden.

## The Wizard and the Princess.....

Sierra On-Line Systems

Try kissing an amphibious creature.

The giant seems to be fond of music.

Don't waste time on peasant women.

## Mask of the Sun.....

Ultrasoft

While under the Temple of the Sun, be sure to wear the mask before every move.

The cat may need its head.

It's tough to shoot reptiles in the dark.

## Deadline.....

Infocom Inc.

Dig for evidence in the rose garden.

# SLAY YOUR DRAGONS!

The Softkey Library has disks which contain all the programs that have appeared in Hardcore and CORE. We even have program disks for sold-out issues of Hardcore.



You have better things to do than slave over a hot keyboard.

Save yourself hours of typing!

- Library Disk #5.....\$9.95
- Hardcore COMPUTIST #7:  
Corefiler                      Disk Directory Designer
- Library Disk #4.....\$9.95
- Hardcore COMPUTIST #6:  
Modified ROMs      Crunchlist  
Crucial Code Finder
- Library Disk #3.....\$9.95
- CORE Games issue:  
Destructive Forces  
Dragon Dungeon
- Library Disk #2.....\$19.95
- CORE Utilities issue:  
Hi-Res Utilities      Dynamic Menu  
Line Find              GOTO Replace  
GOTO Label              Fast Copy
- Hardcore COMPUTIST#3:  
Map Maker
- Hardcore COMPUTIST#4:  
Ultima II Character Generator
- Disk Control.....\$15.00
- Disk Edit                      IOB  
Menu                              Disk View

Please print clearly:

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_

VISA     MC                      EXP \_\_\_\_\_

SIGNATURE \_\_\_\_\_

US funds only.                      Send order to:  
Washington state                      Hardcore COMPUTIST Program Library  
residents add 7.8%                      P.O. Box 44549  
sales tax.                                  Tacoma, WA 98444  
Foreign orders add 20% postage & handling.                      HC7  
Please allow 4-6 weeks for delivery.

This will tell you the loading location of the last BLOADED file. It will appear "backasswards" with the low byte first and the high byte second (i.e., 00 08 is equivalent to \$0800). Do a 8001 to list the first screen-full of the program.

Upon examination, you see that the accumulator is loaded and then stored in a location within DOS. After this happens a few times, you will see a JSR (jump to subroutine) at \$B7B5. Now you may ask, "What is all this stuff?"

On-Line is using the second stage of DOS to load in the game of Mouskattack. You are looking at the first stage (of three stages) of the load and are actually tracing the boot as described in earlier issues of Hardcore COMPUTIST, but using normal DOS.

The listing will appear as follows:

```

0 8 0 0 - LDA #$00
0 8 0 2 - STA $B7EB ;Volume 0 matches anything
0 8 0 5 - LDA #$01
0 8 0 7 - STA $B7F4 ;Command code, 1=Read
0 8 0 A - LDA #$18
0 8 0 C - STA $B7EC ;Track # to start loading from
0 8 0 F - LDA #$03
0 8 1 1 - STA $B7ED ;Sector # to start loading from
0 8 1 4 - LDA #$95
0 8 1 6 - STA $B7F1 ;High byte of page to load to
0 8 1 9 - LDA #$00
0 8 1 B - STA $B7F0 ;Low byte of page to load to
0 8 1 E - LDA #$03
0 8 2 2 - STA $14 ;Sector counter in zero page
0 8 2 4 - LDA #$B7
0 8 2 6 - JSR $B7B5 ;RWTS sector read routine
0 8 2 9 - BCS $0822 ;Branch to $822 if Error
0 8 2 C - INC $B7F1 ;Increment page to load
0 8 2 F - INC $B7ED ;Increment sector to load
0 8 3 1 - DEC $14 ;Decrement sector counter
0 8 3 3 - BNE $0822 ;If sector # <> 0 branch to $822
0 8 3 5 - JMP $9500 ;Jump to $9500

```

Starting with track 18, sector 3, the data is being loaded into location \$9500.

The sector number and memory page in which the data will be stored is incremented and the process continues until sector F of track 18 is reached. Jump to location \$9500 to start the next stage of the load. If you jump to the monitor at location \$835 instead of \$9500, you can examine the next stage of the load. Do this by typing

**835:4C 59 FF N 800G**

At \$9500, the same thing happens again but in a larger perspective. The codes become more obscure and difficult to follow, so I won't list them here.

But now you ask, "What was the purpose of this exercise?"

By examining the code at \$9500, you can find the starting page at which Mouskattack loads. You can even find the starting location! Can you see where?

The starting location of the loading program is at \$A00 and the starting location of the loaded program is at \$5300. This is the reward for all your labor!

Since the load code lives at \$9500 and DOS occupies \$9D00 and up, Mouskattack must live from \$A00 to \$94FF, with a starting location at \$5300. Not mentioned is the third load which overwrites the demo code. This load is the only part of the disk that is really protected. Our COPYA copy will work up to this load, but not past it, for the game.

Keep in mind that the code from \$900 to \$95FF is not

destroyed by a slave boot. Since Mouskattack lives within this area, it then becomes easy to crack. Here is the procedure:

- 1) Boot your original copy of Mouskattack.
- 2) After the demo and, when the prompt HOW MANY PLAYERS? appears, insert a blank, initialized slave disk.
- 3) Hit "Reset." It does not matter if you have an old-style monitor or not. With an autostart monitor, your slave disk will boot.
- 4) Enter the monitor.  
**CALL-151**
- 5) To enable you to save larger binary files to disk, type:  
**A964:FF**
- 6) Type in  
**9FD:4C 00 53**
- 7) Save the program  
**BSAVE MOUSKATTACK,A\$9FD,L\$8B03**
- 8) Have fun with the game!

Remember how I mentioned that the load of Mouskattack was rather slow? This is due to the method in which sectors are read in from the disk.

Also, the sector number increments along with the page number loaded to. If On-Line had started with the high page number, instead of the low page number and read the sectors in decreasing order, instead of incrementing order, the load would have taken a fourth of the time, providing the manufacturers had used normal DOS 3.3 skewing.

This is the logic that the fast-loading DOS's have taken in order to increase loading and save time.



### Bugs In Hardcore COMPUTIST #5

#### page 8

#### Screenwriter II Softkey

Step 5 should read:

5) Load the second file  
**BLOAD EDITOR PART1.OBJ0**

#### page 15

#### Cracking The Egbert II Communications Disk

Step 6 should read:

6) Make the moved bootcode JuMP into the monitor after loading track 0, sector 0  
**\*86F8:4C 59 FF N 8600G**

#### page 18

Step 35 should read:

35) Fix the same catalog patch in the RCV program  
**\*BLOAD RCV**  
**\*4302:20**  
**\*BSAVE RCV,A\$4000,L\$58B**

#### page 19 - first column

The two lines following the sentence; "Type in the following in immediate execution mode:"; should read:

**JF2 = PEEK(175) + PEEK(176) \* 256 - 8 : FOR**  
**A = 1 TO 4 : POKE F2 + A, 0 : NEXT**  
**JSAVE RTTY**

Likewise, the two lines following the sentence; "Again in immediate execution mode type:"; should read:

**JF2 = PEEK(175) + PEEK(176) \* 256 - 8 : FOR**  
**A = 1 TO 4 : POKE F2 + A, 0 : NEXT**  
**JSAVE ECW**

We would like to thank Dennis Goodwin and Dr. Keith Goldstein (author of "Cracking The Egbert II Communications Disk") for calling these errors to our attention.



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*Continued from page 28*

Keep up the great work until the insanity of protection is ended.

John Langlois  
Milton WI

*Mr. Langlois: The Pirate's Friend copy program you mention seems to bear an amazing resemblance to the early versions of Copy II Plus. As such, it is doubtful whether this program is in the public domain, although it may seem to be because of the number of copies that are floating about.*

*You have come up with some good suggestions for future Hardcore COMPUTIST articles. Although we can't make any promises, we will try to work some of your ideas into articles for the magazine.*

### An Elite Adjustment

The documentation accompanying the RANA Elite I disk drives claims the speed of these drives is not adjustable, as are most other Apple-compatible drives. However, I have found that on my RANA I the speed can indeed be adjusted. Here's how:

1) Remove the disk drive cover. 2) The speed adjustment potentiometer is labeled R7 and is located in the middle rear of the disk drive analog board. A clockwise adjustment of this potentiometer will increase the drive's speed and a counter-clockwise adjustment will slow the drive speed.

Donald L. Russell  
Faribault MN

*Mr. Russell: Thanks for your tip. We might only add that if you make this adjustment you will void your warranty, but that is something most people do within 10 minutes of acquiring a new computer product anyway.*



## Whiz Kid

By Ray Darrah

Yes, here I am this month with another protection trick. Once again, this procedure "Locks Up" a program, but as long as it is on a normal disk, it can be copied.

### RESET VECTOR

By now you've probably heard many times about a program making the reset vector do one thing or another. So here is an explanation of how it works.

It all starts when you press the key marked "RESET." Instead of going through the keyboard latch at memory location 49152 (or -16384 or \$C000), the reset key is connected directly to pin 40 of the Central Processing Unit (CPU). This is the long chip placed at a right angle to the other chips on your circuit board.

Whenever pin 40 is grounded (i.e. the "RESET" key is pressed or the computer is turned on), the microprocessor (CPU) stops whatever it was doing and immediately runs the program that memory locations 65532 and 65533 (\$FFFC and \$FFFD) point to. These locations (and the program they point to) are in ROM and therefore, cannot be changed by a program.

### RESET PROGRAM

When the CPU is first turned on, it acts just like pin 40 has just been grounded (i.e. "RESET" key was pressed). Because of this, when the "RESET" key is pressed, the program that the CPU runs has to determine if the computer was just turned on or not.

To solve this problem, Apple came up with a little system that works nicely. They decided to dedicate three RAM memory locations to the task of processing the "RESET" key. The first two locations tell the program where you want it to go when a "RESET" occurs and the third ensures that the location, pointed to by the first two bytes is valid.

If for some reason the third byte isn't the correct complement of the second byte (very likely to occur when just turned on because the RAM holds random numbers), the program assumes that the computer was just turned on and runs through the power up sequence which stores good values in the three locations, clears the screen, prints "APPLE II" and tries to boot a disk. On the other hand, if the third byte is correct, then it merely executes the program pointed to by the first two bytes.

This powerful system of Reset handling enables you to "tell" (via POKE) this Reset program to execute a program whenever the key is pressed. Or you could fool the program by making the powerup (third) byte incorrect. The program would then assume the computer to be just turned on and run through the above mentioned powerup sequence.

Now that you have an understanding of the "RESET" vector, all that is left to explain is how to make the third byte the correct complement of the second, so the computer won't boot-up when "RESET" is pressed. Luckily, the monitor ROM has a subroutine that does just this. Otherwise, it would be quite difficult to do from BASIC.

The procedure: Just POKE in the numbers that point to the subroutine you wish to execute and then do a CALL-1169. It's that easy! Try this:

1) Enter the monitor.

CALL-151

2) Type in this short program.

Not everyone who copies software is a

# Pirate



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Continued from page 30

**300:A0 60 A9 18 20 A8 FC AD 30 C0 88 D0 F5 20 EA  
03 4C 03 E0**

3) Get back into BASIC.

**E003G**

4) Point the reset vector to our new program.

**POKE1010,0:POKE1011,3**

5) Make the third byte (location 1012) valid.

**CALL-1169**

6) Press "RESET."

As the above example points out, the three locations are 1010, 1011 and 1012. It also shows that the routine which validates the third byte is at -1169.

If you don't want to go through the hubub of writing a machine language program, you could just fool the computer by changing the third (or powerup) byte. Try this:

1) Alter the powerup byte by one.

**POKE 1012,ABS(PEEK(1012)-1)**

2) Press "RESET."

Wow! It acts like you just turned it on.

### INTEGER CARDS

All those softkeys that say "Reset into the monitor" work because the ROM on those cards have a totally different reset program. This different program simply executes the monitor program which, needless to say, just puts the computer in the monitor.

See you next issue!



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