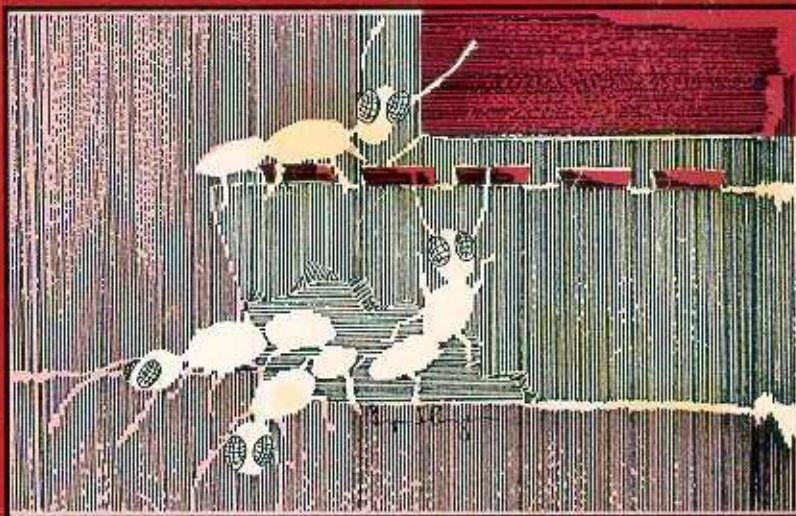


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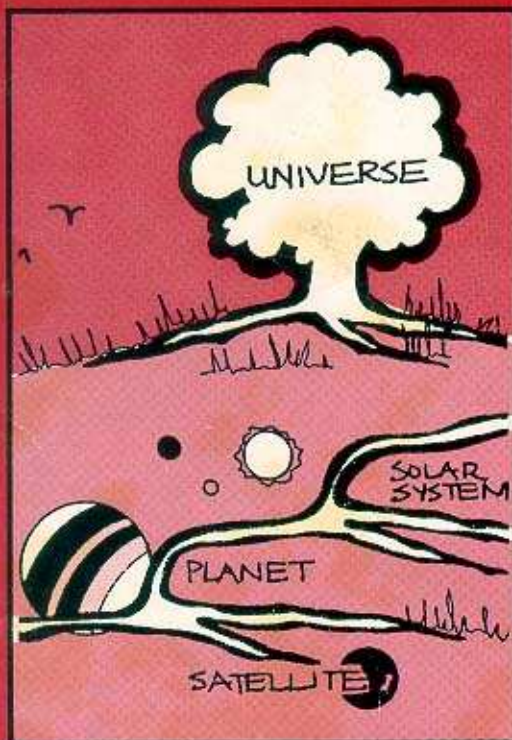
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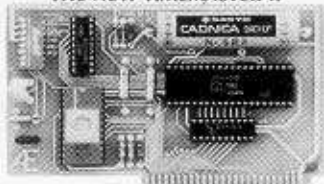
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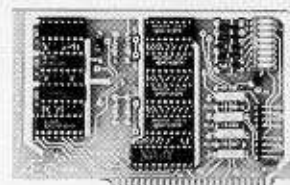
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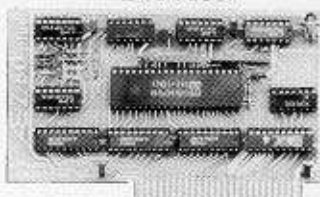
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VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
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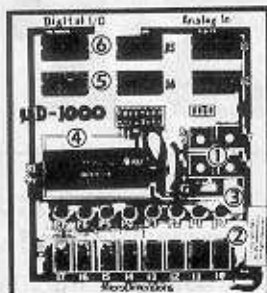
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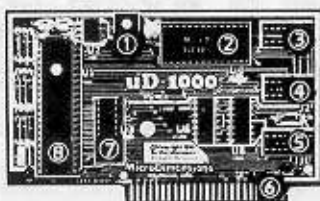
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INPUT INPUT INPUT

The Fourth Dimension

I am writing about the articles on Ultima II in Hardcore Computist no.4. The programs supplied were a great aid to my gaming. The table on page 14 of that issue displays a few "unknowns" which led me to discover that a certain address, \$4E13, refers to the time period. Assigning these values to this location will place the player into the following periods:

Value in \$4E13	Time Period
00	Legends
01	Pangea
02	B.C.
03	A.D.
04	Aftermath

Using this information, the information from an Ultimap or two, and that from the table on page 14, it is possible to locate a place and time, and project the character there!

Many thanks to your magazine for a great group of articles.

Peter Thorpe
Hong Kong

Search or Destroy?

I have a problem that I hope you can help me with. I copied a 99 sector program from a magazine on my Apple II+ with 64K memory. I saved it, saw a mistake towards the last and corrected it, saved it again and wound up with only one line in my program! Yet if I use the view file utility on my Copy II+ disk, I can see the text of the program still there. I just can't retrieve it or bring it back. This isn't the first time I've done this boo-boo and I don't know why it happened or what I can do about it.

Do you have any suggestion outside of blowing up my Apple? Can you recommend any utility program that would bring it back for me? I dread to think of re-typing all that over again. I am very interested in computing and would also appreciate it if you could list

6 or 8 of the best programs or utilities available to help. I am in my 70's and do not intend to compete with the younger hackers, but I like to keep my brain agile, even if the rest of me is falling apart. Using my Apple sure beats sitting in my rocking chair!

Another thing. In magazines, most writers assume that the average reader must be a computer genius. I have printed out entire programs, and at the end the author might say it is for the Apple III ... but with a few minor corrections or changes it will work on a II+ or it is made to work on a Brother printer but with a few minor changes it can be made to work on an Epson. Then they drop it. If they know the changes, why in the "#%#\$\$#%\$#" don't they put them in the article? It's discouraging and I'm not the only one who feels that way. A lot of the members in our Apple club have the same beef.

Well, thanks for letting me bend your ear. I hope you can help me with my problem.

Andrew Paranya
Winterhaven, CA

Mr. Paranya:

From the description you have given of your problem, it sounds as if one of the Applesoft line pointers has been destroyed. Unfortunately, there are no commercial utilities that we know of that will remedy this problem. However, your problem can be fairly easily solved if you are willing to learn how Applesoft stores the lines of a program.

An Applesoft program normally begins at \$801 (2048 decimal) in memory. Each line of a program is stored as a series of hexadecimal bytes with a 00 indicating the end of each line. The first two bytes of every line contain, in lo/hi format, a pointer to the memory location of the next line. The program line number is stored as the third and fourth bytes of each line, again in lo/hi format. The remainder of the bytes in the line, up to the end-of-line 00, are the encoded statements of the program. If a line

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- * Bit-Copy Parameters

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INPUT continued from page 3

is the last line of the program then the pointers to the next program line point at 00's. Take for instance the following simple two line program:

```
10 PRINT  
20 END
```

This program would be stored starting at \$801 as:

Addr.	Byte	Function
801:	07	- Lo byte of pointer.
802:	08	- Hi byte of pointer.
803:	0A	- Line # lo byte (10).
804:	00	- Line # hi byte.
805:	BA	- Token for PRINT.
806:	00	- Indicates end of line.
807:	0D	- Lo byte of pointer.
808:	08	- Hi byte of pointer.
809:	14	- Line # lo byte (20).
80A:	00	- Line # hi byte.
80B:	BA	- Token for END.
80C:	00	- Indicates end of line.
80D:	00	- The two 00's here
80E:	00	- indicate the end of the program.

Apparently the pointers in the second line of your program somehow got set to zeroes, instead of pointing to the next line in memory.

To remedy your problem you need to load in your program, enter the monitor and correct the pointers in the second line of the program (look for 3 consecutive bytes of 00) so that they point to the next line in memory. You should only have to change these two bytes before resaving your program (you may want to save it under a different name, in case of a problem).

If this does not work then you may consider blowing up your computer (or just pouring Pepsi over the motherboard with the power turned on). But seriously, we hope this solves your problem. For more information on how Applesoft stores programs, see the Call A.P.P.L.E. publication "All About Applesoft."

As to your question about what we consider the best utility programs for the Apple, our favorites are:

Global Program Line Editor (Beagle Brothers)
Bag of Tricks (Quality Software)
The CIA (Golden Delicious Software)
Copy II+ (Central Point Software)

If you want to program in Assembly language, our favorite assembler is the

S-C Macro Assembler from S-C Software Corp.

Back to Basics

I have really enjoyed your magazine and I think that it is about time that somebody start publishing the things you publish.

I have only one comment; your softkeys always assume that we know what you are talking about. I can follow the steps with no problem, but I have no idea of what I am doing. I would like to see a column or two that starts at the basics and works its way up. How about it?

Seth Miller
Sacramento, CA

Seth: Your point is well taken. Because we have received so many suggestions similar to yours, we will be publishing a column on copy-protection which begins with the basics. See page 29 of this month's issue.

Time Zone

For anyone who has Time Zone from Sierra On-Line, a word of caution: Do not try to copy it with the built-in copier on side A of the disk. It is very unreliable and it would take a lot of playing before you run across the error(s). I suggest using COPYA instead.

After using COPYA to copy the disk(s), use a bit copier with a Nibble-counter option to copy track 0 of side A. This will save you a lot of headaches later on.

Eric Kinney
Walla Walla, WA

Rumor Mill

Have you looked closely at any of the pictures of Apple's new Macintosh computer and noticed that all of its integrated circuits are soldered directly to the motherboard? Apparently the Apple IIe is to suffer the same fate

The January, 1984 edition of Apple Assembly Lines (S-C Software) reports that future Apple IIe's will have most of their chips soldered in, rather than mounted in sockets. Supposedly this will increase the reliability of the IIe's. Needless to say, this will make things hard for those who like to make their own repairs and/or modifications.

READERS' SOFTKEY & COPY EXCHANGE

Deprotecting Pandora's Box

By Clay Harrell

Pandora's Box
Datamost, Inc.
8943 Fullbright Ave
Chatsworth, CA 91311

Requirements:

Apple, with 48K
One disk drive, with DOS 3.3
A sector editor, such as the Inspector
or Disk Zap
A blank disk
Pandora's Box

When program publishers buy a protection scheme, they generally use it for as many programs as possible to get the most for their money (yes, protection schemes are just programs that people write and sell).

The advantage of this is that once you learn what they are doing, it is easy to backup many of their programs.

Datamost and Infocom are two examples of this. If you can backup ZORK I, then you can backup ZORK II and ZORK III and DEADLINE and the rest.

The people at Datamost used a modified DOS for many of their programs until about April 1983. After that they started using a different scheme of protection on a lot of their programs. But the company published at least seven good games before April 1983 and Pandora's Box was one of them.

The deprotection method I am about to describe will apply to many of them, but we will be using Pandora's Box as an example.

Modified DOS

As we said, Datamost uses a modified DOS for its protection scheme. Normally, this is apparent from the BASIC prompt that appears on the screen after a few seconds into the boot.

Datamost, however, turns on the hires screen right when the boot starts to hide this. But we still know there is a modified DOS because of the way the boot sounds.

Listen to your normal DOS disks boot. You will hear the same sound every time. First, the drive spins for half-

a-second or so. This is track 0, sector 0, through sector 9 getting loaded into \$B600 to \$BFFF.

Then, you hear the drive's read-write head slide up to track 2 to load in the rest of DOS. Tracks 2 and 1 are read in quickly and the read-write head slides up to the catalog, track 17, and the hello program is located and run.

Now, listen to Pandora's Box load in. You will hear the same sounds. This is a dead giveaway that a modified DOS is being used.

What to do

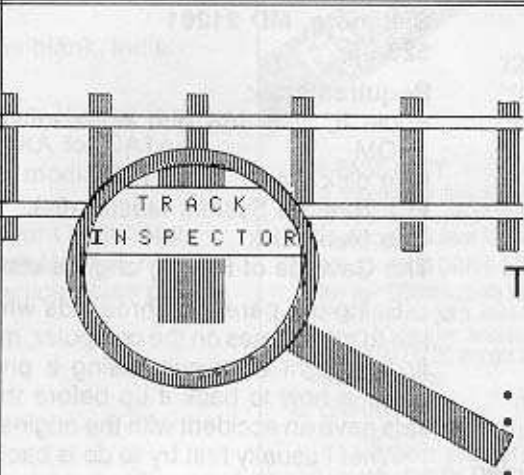
Whenever a modified DOS is used the first thing you should do is boot a normal DOS disk and defeat the DOS error-checking. DOS checks the carry bit to determine if any errors have occurred in a disk access.

If the carry bit is clear, DOS assumes that everything is OK and just keeps on going. The routine that gets jumped to if an error is suspected is at \$B942. This simply sets the carry bit and returns to the calling routine.

To defeat the error-checking, we only have to change address \$B942 from \$38 to \$18. This simple modification will allow us to copy previously uncopyable disks with COPYA.

All that is left to do is to change the Datamost DOS just slightly so that it will live in a normal DOS 3.3 environment. At track 0, sector 3, change byte \$91 from \$DF to \$DE. What the manufacturers have done to make their disk "uncopyable" is to change the epilog byte from the normal \$DE to \$DF. This will sufficiently confuse the copy program, preventing easy copies. (If you do not know what is meant by an "epilog" byte, please refer to Beneath Apple DOS by Don Worth and Pieter Lechner. This manual is indispensable for further understanding of DOS).

In addition, byte \$42 must be changed from \$38 to \$18 on the same track and sector. This is an insurance policy, more or less, that everything will work correctly in the normal DOS 3.3 environment.



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What you are actually doing is changing byte \$B942 in DOS, as we did before to make the COPYA copy, but you are doing it directly to the disk for permanence.

These two modifications are all we need to do to make Pandora's Box a straight COPYA disk.

The Steps

In step-by-step fashion, here's what you should do to make Pandora's Box copyable with COPYA:

- 1) Boot normal DOS 3.3
- 2) Enter the monitor
CALL-151
- 3) Change byte \$B942 from \$38 to \$18 by typing:
B942:18
- 4) Execute the COPYA program
RUN COPYA
- 5) Copy Pandora's Box to a blank disk
- 6) Re-boot normal DOS 3.3 and run your sector editor. Change the following bytes:

Trk	Sct	Byte	From	To
00	03	42	38	18
00	03	91	DF	DE

- 7) Write the sector back out to your COPYA disk version of Pandora's Box.

Softkey For Donkey Kong

By Dan Lui

Donkey Kong
Atari, Inc.
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Sunnyvale, CA 94086
\$29.95

Requirements:

Apple, with 48K
COPYA
The Inspector, or similar program
One blank disk

Donkey Kong, another popular game from Atarisoft, contains all the four different structures (or screens) and plays in a similar fashion to the game that is featured in the arcades. It, also, uses a similar (if somewhat different) format of protection to the other programs that Atarisoft produces.

The procedure to unlock it is as follows:

- 1) Start the COPYA program
RUN COPYA
- 2) Once loaded, terminate the program

with
CTRL C

- 3) Delete line #70 to avoid the reload of the copy routine
70
- 4) Enter the monitor
CALL-151
- 5) Type the following:
B928: 18 60
B988: 18 60
3D0G
- 6) Execute the program
RUN
- 7) After the disk is copied, use the Inspector to read track 0, sector 3
- 8) Change the following:

Trk	Sct	Byte	From	To
0	3	\$35	AA	DE
0	3	\$3F	DE	AA
0	3	\$91	AA	DE
0	3	\$9B	DE	AA

The procedure is now finished and you can copy the disk with COPYA.

Backup For The Caverns Of Freitag

By C.J. Singer

The Caverns of Freitag
Muse Software
347 N Charles
Baltimore, MD 21201
\$29.95

Requirements:

Apple II, with 48K and Applesoft in ROM
One disk drive
FID from 3.3 System Master disk
One blank disk
The Caverns of Freitag original disk

Being the parent of three kids who like to play games on the computer, my first thought after purchasing a program is how to back it up before the kids have an accident with the original.

What I usually first try to do is back-up the disk with Locksmith, but I don't really care for this method because it doesn't allow you to look at the program to see how it works and it does not allow you to modify it.

Here's my first, albeit somewhat tedious, explanation of how to backup the Caverns of Freitag. I will provide another, easier method below.

The game comes from Muse Software, of Castle Wolfenstein fame.

The Hard Way

- 1) Boot the Caverns of Freitag disk

from drive 6

PR#6

- 2) While the disk is booting, stop the HELLO program from running

CTRL C

- 3) To make sure the HELLO program is in memory, type

LIST

You should see the Caverns of Freitag listed on your monitor. If no program is listed, go back to step 1 and try again.

- 4) The Caverns of Freitag uses a modified DOS, which has changed some of the DOS commands. The INIT command has not been changed, however, so we can INITIALIZE a blank disk, which will contain the modified DOS along with the HELLO program currently in memory. So, insert a blank disk into your drive and type

INIT HELLO

If you want to see how Muse has modified the normal DOS commands you can use a sector editing program, such as ZAP from Bag of Tricks or DISKEDIT, to view track 1, sectors 7 and 8. If you compare what you find with a list of the normal DOS commands you will find that the SAVE command has been changed to LSDK, CATALOG to KSJFLKA, MON to 983 and BSAVE to 87364.

- 5) Now put your original disk back in the drive and use Muse's modified CATALOG (KSJFLKA) to see what files are on the disk

KSJFLKA

- 6) Write down the list of files which are displayed so that you can save them to the disk you just initialized. You don't have to write down the HELLO file since it has already been transferred.

- 7) The first file on your list should be a binary file called OILER. Load it into memory

BLOAD OILER

- 8) When a new binary file is loaded into memory, its address is stored at \$AA72 and \$AA73 (hi/lo format) and its length is stored at \$AA60 and \$AA61. Enter the monitor and display the address and length of the file OILER

CALL-151

AA72.AA73
AA60.AA61

For the OILER file you should get an address of \$02DE and a length of \$00D5.

9) Put your backup disk in the drive and use the 87364 (the modified BSAVE command) to save the file, using the address and length parameters you just determined in the previous step

87364 OILER,AS02DE,L\$00D5

10) Repeat the process of BLOADing each binary file from the Caverns of Freitag original disk, determining its address and length and using the 87364 (BSAVE) command to transfer the files onto the backup disk.

11) For the Applesoft files on the list, you can just LOAD each one of them from the original disk and, then, LSDK (SAVE) them onto the backup disk.

Like I said; the above procedure is long and tedious, but it works.

Now for the easy method!

The Easy Way

1) Go through steps 1 through 4, outlined above.

2) Insert your DOS 3.3 System Master and boot it

PR#6

3) Load the FID program into memory at \$6800 where it won't get overwritten when we boot the Caverns of Freitag disk in the next step

BLOAD FID,AS\$6800

4) Boot the original Freitag disk and, again, stop it from running the HELLO program

PR#6

CTRLC

5) Enter the monitor, memory move FID from \$6800 back down to \$803 and, then, run FID to copy the files

CALL-151

803 < 6800.9000M

803G

6) Copy the files from the original disk to the blank, initialized disk using FID's wildcard option.

Now that you have a backup copy you can look at the Caverns of Freitag, using **CTRLC** and **KSJFLKA** for CATALOG. You can **LOAD** or **BLOAD** to study or modify any of the files on the disk.

If you have a sector editor you may even want to change track 1, sectors 7 and 8, so that they will contain the normal DOS commands, instead of the ones which Muse put on the disk.

Short Softkey For Visifile

By C. Masters

Visifile

VisiCorp.

2895 Zanker Rd.

San Jose, CA 95134

\$250.00

Requirements:

Apple, with 48K

One blank disk and a sector editing program

1) Copy the disk, using **COPYA**

2) Use the sector editor to read track \$22, sector 4, of the backup disk

3) Change byte \$2D from \$0A to 0F and write the sector back to the disk.



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Quicktrace
Anthro-Digital
103 Bartlett Ave
Pittsfield, MA 01201
\$50.00

Requirements:
 Apple II Plus
 QUICKTRACE (program)

I'm sure that many of you who are Assembly language buffs have bought either The Bug (by Sensible Software) or Quicktrace (by Anthro-Digital) or both, like me. Each is a great tool for debugging or analyzing your own or another's programs.

But this isn't a review...
 Quicktrace can display, "D," up to

six memory locations for monitoring as well as having a full-speed JSR command, "X," which is excellent. The Bug has great display and disassembly commands, "Z" and "L."

The following program is an addendum to Quicktrace. It adds three new commands: L, Z, and Q, which are similar in function to those found in The Bug. Quicktrace and this addendum form Quick.Bug which has all the advantages of both programs together without suffering from the omissions.

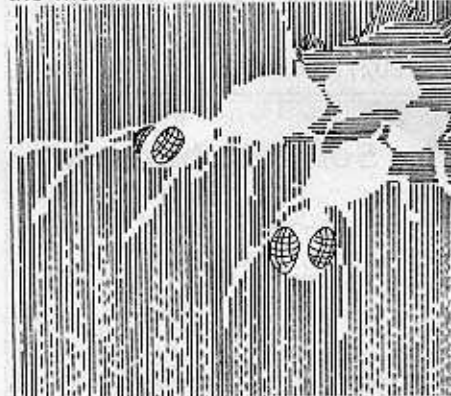
If you are wondering why I chose to modify or add to Quicktrace instead of The Bug, I can tell you that the latter is protected and, thereby, much harder to inspect or analyze.

Program Enhancements: **QUICK.BUG** By Enrique Gamez

Creating Quick.Bug

The following is a step-by-step procedure for creating Quick.Bug:

1) Load Quicktrace at \$8400 and enter the monitor



BLOAD QUICKTRACE,AS8400
CALL-151

The default for Quicktrace's monitor command, "M," is \$FF69. We must change it to \$9200, where our addendum begins. The low byte is at \$8551; the high byte is at \$8564.

2) Make the default monitor vector point to the addendum

8551:00
8564:92

Now, the first time you press "M" from Quicktrace you will jump to the starting address of Quick.Bug.

3) At this point you should enter the hexdump on page 9.

4) Now all you have to do is save it
BSAVE QUICK.BUG,AS8400,L\$EA8

That's it!

Here are the added commands you have once you enter Quick.Bug:
 L- Disassemble 14 lines

Page 8

Z- Display a screenful of hex and ASCII
M- Exit to the real monitor
Q- Return to Quicktrace

Unfortunately, my code isn't relocatable as is the original Quicktrace. You could make this conversion your next project, but I must report that I have had only one instance where memory conflicts forced me to load Quicktrace elsewhere. One is usually just concerned with analyzing sections of a program. Rarely would you ever want to step through a 120-sector game!

Try This One

But while we are on the subject of enhancements, here is one for Quick.Bug:

85EC:03 1A 09 04 02 2D 16 0E

Try this one too:

8575: 01 00 84 00 18 00 8D 00 19 00
E9 00 13 10 00 02 10 13

These two little modifications highlight the registers and other information with inverse characters. This greatly improves the display's readability but they also mess up a printout, alas!

Can't have everything...or can you?

Hardcore COMPUTIST no.6

Quick.Bug Source Code

```

1000 * QUICKTRACE ADDED COMMANDS
1010 * BY ENRIQUE GAMEZ
1020 * L= DISASSEMBLE $14 CMDS.
1030 * Z= DISPLAY HEX & ASCII
1040 * M= GO TO MONITOR
1050 * Q= RETURN TO QUICKTRACE
1060 * RTN= DO LAST CMD, DEFAULT
1070 * TO 'Z'
1080 *
1090 .OR $9200
1100 .TA $800
1110 *
1120 CV .EQ $25
1130 INV.FLAG .EQ $32
1140 PROMPT .EQ $33
1150 PC .EQ $3A
1160 BGN.ADDR .EQ $3C
1170 GETLNZ .EQ $FD67
1180 ZMODE .EQ $FFC7
1190 GETNUM .EQ $FFA7
1200 BELL .EQ $FF3A
1210 CROUT .EQ $FD8E
1220 LIST .EQ $FE5E
1230 MONITOR .EQ $FF69
1240 XAM8 .EQ $FDA3
1250 PRA1 .EQ $FD92
1260 PRTBLNK .EQ $F94A
1270 COUT .EQ $FDED
1280 QUICKTRACE .EQ $8400
1290 *
1300 LDA #SA4 ;USE '$' PROM
PT
1310 STA PROMPT
1320 DEC CV ;DON'T SCROLL
SCREEN
1330 ENTRY JSR GETLNZ ;INPUT ROUTIN
E FROM MONITORROM, PG. 169
1340 JSR ZMODE
1350 JSR GETNUM
1360 *
1370 CMPARE CMP #SC6 = $39+$8D = CR
BEQ RETURN
1380 CMP #SF3 = $19+$DA = 'Z'
1390 BEQ Z.ENTRY
1400 BEQ Z.ENTRY
1410 CMP #S05 = $39+$CC = 'L'
1420 BEQ L.ENTRY
1430 CMP #SEA = $19+$D1 = 'Q'
1440 BEQ Q.ENTRY
1450 CMP #S06 = $39+$CD = 'M'
1460 BEQ M.ENTRY
1470 JSR BELL ;NOT L,Z,M,Q
1480 DEC CV
1490 JMP ENTRY ;TRY AGAIN
1500 *
1510 RETURN LDA CMD.FLAG ;GET LAST CMD
USED
1520 JMP CMPARE ;BRANCH TO EI
THER L OR Z
1530 L.ENTRY STA CMD.FLAG ;SAVE IT
1540 LDA #S0A ;DISASSEMBLE
10 OPERATIONS
1550 JSR LIST
1560 JSR CROUT
1570 JMP ENTRY
1580 Q.ENTRY JMP QUICKTRACE
1590 M.ENTRY JMP MONITOR
1600 *
1610 Z.ENTRY STA CMD.FLAG
1620
1630 LDA #S14 ;# OF LINES T
O DECODE
1640 STA ROWCOUNTER
1650 LDA BGN.ADDR+1
1660 STA PC+1
1670 LDA BGN.ADDR
1680 STA PC
1690 EOR #S07 ;TO ROUND OUT
A LINE TO
1700 AND #S07 ;NEAREST 8 BY
TES
1710 STA COLCOUNTER
1720 EOR #S07
1730 BEQ .1
1740 JSR PRA1 ;PRINT CR AND
BGN.ADDR IN HEX

```

BEEP!

NO ERROR?



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```

1750 .1 JSR XAMB ;DOES ALL THE 2070 CMD.FLAG DA #SF3 ;LAST CMD
DECODING WORK!
1760 LDX #S2 ;FORMATTING 2080 ROWCOUNTER BS 1
1770 JSR PRIBLNK ;2 SPACES 2090 COLCOUNTER BS 1
1780 LDY #0
1790 .6 LDA (PC),Y
1800 BPL 2 ;<$80 ?
1810 CMP #SA0 CONTRL CHAR?
1820 BCC 3 ;YES, SKIP IT
1830 .8 CMP #SE0 NORMAL CHAR?
1840 BCC 4 ;YES
1850 LDX #SFF ;SET NORMAL V
IDEO
1860 STX INV.FLAG ;SEE PG.168 (
SFE84)
1870 .3 LDA #SA0 ;A SPACE
1880 .4 JSR COUT ;PRINT IT
1890 LDX #SFF ;SET NORMAL V
IDEO
1900 STX INV.FLAG
1910 CPY COLCOUNTER ;ADJUST PRI
NT LOCATION
1920 BEQ .5 ;IF DONE
1930 INY
1940 BNE .6
1950 .5 DEC ROWCOUNTER
1960 BNE .7 ;IF NOT DONE
1970 JMP ENTRY
1980 *
1990 .2 CMP #S21
2000 BCC .3 ;IF CODE <$21
; SKIP IT
2010 ORA #S80 ;ALL OTHERS M
AKE NORMAL
2020 LDX #S3F ;SET INVERSE
VIDEO
2030 STX INV.FLAG ;SEE PG. 168,
SFE80
2040 BNE .8
2050 JMP ENTRY ;DONE, GO BAC
K AND WAIT FOR CMD.
2060 *

```

Quick.Bug Hexdump

```

9200: A9 A4 85 33 C6 25 20 67 $2EF6
9208: FD 20 C7 FF 20 A7 FF C9 $EF99
9210: C6 FD 18 C9 F3 F0 2E C9 $1A8A
9218: 05 F0 16 C9 EA F0 20 C9 $96BD
9220: 06 F0 1F 20 3A FF C6 25 $B653
9228: 4C 06 92 AD A5 92 4C 0F $BB37
9230: 92 8D A5 92 A9 0A 20 5E $8BB4
9238: FE 20 8E FD 4C 06 92 4C $8D6F
9240: 00 84 4C 69 FF 8D A5 92 $6250
9248: A9 14 8D A6 92 A5 3D 85 $9D72

9250: 3B A5 3C 85 3A 49 07 29 $4680
9258: 07 8D A7 92 49 07 F0 03 $CD22
9260: 20 92 FD 20 A3 FD A2 02 $3E48
9268: 20 4A F9 A0 00 B1 3A 10 $4C88
9270: 25 C9 A0 90 08 C9 E0 90 $7E69
9278: 06 A2 FF 86 32 A9 A0 20 $1E32
9280: ED FD A2 FF 86 32 CC A7 $DDFC
9288: 92 F0 03 C8 D0 DF CE A6 $874B
9290: 92 D0 BA 4C 06 92 C9 21 $CFBB
9298: 90 E3 09 80 A2 3F 86 32 $05E3

92A0: D0 D3 4C 06 92 F3 $6424

```

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ADVANCED PLAYING TECHNIQUES

Offing the SS

Contributed by Sean Williams

Castle Wolfenstein
Muse Software

If you are tired of running into S.S. guards, especially when you no longer have any grenades to destroy them with, use the following technique and any S.S. can be killed with the use of bullets.

- 1) As the S.S. guard approaches, point your gun at him and run into him.
- 2) As the screen is going through the collision routine, press the key which makes the gun point at the S.S. guard again.
- 3) To take his bullet-proof jacket away, press "U."
- 4) If the screen replies with "SEARCHING...", run into the guard again. (Remember to point your gun at him again during the collision routine).
- 5) Press "U" again and the guard will lose his bullet-proof jacket.
- 6) The guard can now be killed with plain bullets.

Note: This procedure works best if you are wearing a vest yourself!

Bountiful Bobs

Contributed by Johnny Yukon

Miner 2049'er
Microlab

For this APT you need to have an old F8 ROM on the motherboard or INTEGER card. This APT will let you choose the starting level and will give an unlimited number of Bounty Bobs to player number one.

- 1) Boot up Miner 2049'er and go through the joystick adjustment routine.
- 2) When the game asks "One or Two Players?" hit RESET to get into the monitor.
- 3) Enter the desired starting level minus 1 at \$814 and the actual starting level at \$812. For instance to start on level 05 type:
814:04 N 812:05
- 4) Enter the following:
0972:A9 03 8D 16 08 8D 17 08 4C 81 09 N 981G
- 5) The game will start up and player number one will have an unlimited number of Bounty Bobs.

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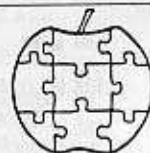
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Once a program is unlocked by myself or someone else, I quickly dive in and "personalize" it.

What I do is change title pages or delete them to make the program load faster; I change or add default responses to entry prompts or I change the general layout of screen information to suit my particular application. I might even substitute my own shapes for someone else's shape tables (just for grins and giggles).

In games, I may want to change the scoring criteria, what level I am on, alter mazes, substitute sound effects, etc. There's all sorts of fun stuff one can do without being a programmer of genius. After all, it's a lot easier to alter another person's program than to write one from scratch.

You already know the program works in its original state (or we'll assume it does) so the trick is to change one thing at a time then run it and see if it still works. You may need to analyze a program a bit to make these al-

There is a remedy

I'll venture to say that every game ever written for the Apple, which can be played with the keyboard, contains the following three bytes: AD 00 C0.

As it turns out, these bytes are so common that I usually use their location as a starting point in my analyses of a program (game or otherwise). It is a good point of reference since these bytes are usually accompanied by several CoMPares (CMP) to see if certain keys were pressed.

A\$2A1,LSFC

To install the code finder, type BRUN CRUCIAL CODE FINDER

Once installed, the code finder is ready to take the drudgery out of program analyzing.

Here is the format to use when calling the code finder:

HHHH.GGGG^{CTRL}Y J1 J2 J3 J4...

"HHHH" and "GGGG" are four-digit hexadecimal numbers like 092F and D000, separated only by a period. These numbers, respectively, design-

Personalizing A Program

By Enrique Gamez

A sample disassembly listing might look like this:

```
LDA $C000 ;GET A KEY CODE
BPL NO.KEY ;EXIT, NO KEY HAS BEEN
                PRESSED
STA $C010 ;RESET THE KEY LATCH
CMP #UP ;WAS IT THE UP KEY?
BEQ MOVE.UP ;YES, MOVE THE SHIP
                UPWARDS
CMP #DOWN ;WAS IT THE DOWN
                KEY?
BEQ MOVE.DOWN ;YES, MOVE THE SHIP
                DOWNWARDS
```

All this brings us to my program and why I wrote it. Most commercial programs are upwards of 80 sectors long and a chore to flip through, 20 instructions at a time, using the monitor "L" command. My program, CRUCIAL CODE FINDER, allows you to type in the bytes you wish to search for and then speedily does this otherwise boring task. I suggest the use of this program whenever you're beginning an analysis and see how much time and eyestrain you'll save!

Once CRUCIAL CODE FINDER is installed all you need to do is (from the monitor) type the beginning address to search, the ending address and the bytes to search for. Of course, it may find erroneous code, because the occurrence of the specified bytes might be part of a data table or something. But the valid code it finds is usually quite useful.

Using the Code Finder

Before we begin, type in the hex-dump on page 12 and

BSAVE CRUCIAL CODE FINDER,

nate the beginning and ending memory locations you wish to search through. "CTRL"Y is obtained by pressing the key marked "CTRL" and the key marked "Y" simultaneously and should come immediately after "GGGG." The "J1 J2 J3 J4..." is a string of any length, consisting of two-digit hexadecimal numbers represent-

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Page 28 CORE 1, no. 3

terations but you don't need to analyze, or even understand, everything to get started.

The very useful modification I will explain below shows how to change the controls of your favorite game. I'm sure most of you out there in Pac-land have played those games (mostly made in Japan) which force us to contort and/or disfigure our hands in order to reach the movement, thruster and fire keys.

ing the bytes you wish to find in the program. If you want, you may use X's instead of some of these numbers. In this case, the search routine will allow anything to match those bytes in the string.

For example, let's change that finger-contorting game I talked about. First, you would install the code finder, then you would BLOAD the menace and type something like this:

```
0800.9500CTRL Y X 00 C0
```

The above command would find any references to location \$C000. By changing the machine-language compares that undoubtedly follow to the values representing the keys you wish to use, your fingers will live happily ever after.

The first time through, it is a good idea to write down the places it finds that seem to be valid code and then examine them with the monitor.

After it finds the specified pattern, the program will display the instructions, starting with the matched bytes, and wait for a key to be typed. At this time, the "ESC" key will exit the search and place you back in the monitor; any other key will continue the search.

My theory is simple: let the computer do all the tedious work, leaving the creative, fun part for us. Have fun!

Crucial Code Finder Source Code

```
1000      .OR S2A1      .JUST RIGHT S
0 THAT THE REAL CODE WILL END UP AT $300
1010      .TF  CRUCIAL CODE FINDER
1020 * -----
1030 * CRUCIAL CODE FINDER
1040 * BY ENRIQUE GAMEZ
1050 *
1060 * ENHANCED BY RAY DARRAH
1070 * -----
```

```
1080
1090 A1L      EQ $3C      .LSB OF 'FROM
' LOCATION
1100 A1H      EQ $3D      .MSB
1110 A3L      EQ $40      .LSB OF 'TO'
LOCATION
1120 A3H      EQ $41      .MSB
1130 A2L      EQ $3E      .LSB OF TEMPO
RARY DATA
1140 A2H      EQ $3F      .MSB
1150 BUFF      EQ $200
1160 BUFPTR      EQ $FF
1170 GETNUM      EQ $FFA7
1180 WILD.VAL      EQ $DB      .VALUE TO STO
RE FOR WILDCARD
1190 MONITOR      EQ $FF69      .ENTER THE MO
NITOR ROUTINE
1200 KEYBOARD      EQ $C000
1210 KEY.RESET      EQ $C010
1220 ESCAPE      EQ $1B      .KEY CODE FOR
ESC KEY
1230 PCL      EQ $3A      .PROGRAM COU
NTER LSB FOR DISASSEMBLING
1240 PCH      EQ $3B      .MSB
1250 HOME      EQ $FC58      .ROUTINE TO C
LEAR THE SCREEN
1260 DISASSEMBLE      EQ $FE63      .ROUTINE THAT
LISTS 6502 INSTRUCTIONS STARTING AT PCL
& PCH
1270 MODE      EQ $31      .TELLS MONITO
R WHAT HAS TRANSPIRED SO FAR
1280 CTRL.Y      EQ $3F8      .CONTROL Y VE
CTOR
1290 COUT1      EQ $FDF0      .PRINT ASCII
1300
1310 * -----
1320 * CHANGE <CTRL>Y VECTOR
1330 * -----
1340
1350 SETUP      LDA #54C      .MAKE THE CON
TROL Y VECTOR JMP
1360          STA CTRL.Y
1370          LDA #START      TO THE START
OF THE PROGRAM
1380          STA CTRL.Y+1
1390          LDA /START      .GET MSB
1400          STA CTRL.Y+2
1410          LDY #0          .PRINT THE IN
SATLLED MESSAGE
1420 PRINT1      LDA MESSAGE1.Y .GET A BYTE
TO PRINT
1430          PHA          .SAVE IT IN C
ASE IT WAS THE LAST ONE
1440          ORA #80        .MAKE IT NORM
AL
1450          INY          .NEXT OFFSET
1460          JSR COUT1      .PRINT IT
1470          PLA          .RESTORE WHAT
IT WAS
1480          BMI PRINT1      .IF GREATER T
HAN 128, THEN PRINT ANOTHER
```

```
1490          RTS          .WERE DONE, R
ETURN
1500 MESSAGE1      .HS 808D      .CARRIAGE RET
URNS BEFORE MESSAGE
1510          .AS  CRUCIAL CODE FINDER INSTAL
LED.'
1520          .HS 808D      .CARRIAGE RET
URN AFTER FIRST SENTENCE
1530          .AS  'USE <CTRL>Y FROM THE MON
ITOR'
1540          .HS 80DD      .CARRIAGE RET
URNS AFTER ENTIRE MESSAGE
1550
1560 * -----
1570 * BEGINING OF PROGRAM
1580 * -----
1590
1600 START      LDA A2L      .MOVE A2L & A
2H TO A3L & A3H
1610          STA A3L
1620          LDA A2H
1630          STA A3H
1640          INC MODE      .TELL MONITOR
NOT TO OVER-WRITE THE ADDRESSES
1650
1660 * -----
1670 * CONVERT THE SEARCH BYTES
1680 * -----
1690
1700          LDY #0          .MAKE THE BUF
FER OFFSET ZERO
1710          STY BUFPTR
1720 FINDFIRST      INY
1730          LDA BUFF.Y      .FIND THE FIR
ST DATA BYTE
1740          CMP #899      .IS IT A CONT
ROL Y?
1750          BNE FINDFIRST
1760 .1          INY          .START WITH N
EXT BYTE
1770          LDA BUFF.Y      .KEEP GOING P
AST THE SPACES
1780          CMP #5A0      .SPACE
1790          BEQ .1
1800 CONVERT      JSR GETNUM      .CONVERT THE
BYTE INTO HEX
1810          LDA A2L      .RETRIVE THE
CONVERTED BYTE
1820          LDX BUFPTR      .GET THE POIN
TER TO WHERE IT GOES
1830          STA BUFF.X      .STORE IT
1840          INC BUFPTR      .POINT TO NEX
T BYTE
1850          DEY          .REPLACE Y WI
TH THE LAST CHARACTER GOTTEN
1860          LDA BUFF.Y      .EXAMINE THE
NEXT BYTE
1870          INY
1880          CMP #88D      .FINISHED?
1890          BEQ START.LOOKIN .YES, BEG
IN THE SEARCH
```

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```

1900      CMP #'X'+$B0      ;IS IT A WILD CARD?
1910      BEQ WILDCARD
1920      CMP #$A0        ;IS IT A SPACE?
1930      BEQ CONVERT    ;YES, KEEP CONVERTING
1940 WILDCARD LDA #WILD.VAL ;STORE TWO CONSECUTIVE VALUES
1950      LDX BUFPTR
1960      INC BUFPTR     ;NEW LOCATION IN THE BUFFER
1970      STA BUFF,X
1980      DEX
1990      STA BUFF,X
2000      INY            ;GET THE NEXT BYTE FROM THE BUFFER
2010      BNE CONVERT    ;ALWAYS
2020
2030 *-----
2040 * SEARCH FOR THE SEQUENCE
2050 *-----
2060
2070 START.LOOKING
2080      LDY #0          ;START AT BEGINING OF POINTER
2090      LDX #0          ;START AT BEGINING OF INPUT BUFFER
2100 TRY1   LDA BUFF,X   ;GET BYTE TO LOOK FOR
2110      CMP #WILD.VAL  MIGHT BE A WILDCARD
2120      BNE NOT.WILD
2130      INX            ;SEE IF TWO CONSECUTIVE WILD VALUES
2140      CMPBUFF,X      ;MATCH?
2150      BEQ FOUND1.MATCH;YES, SIMULATE MATCH
2160      DEX            ;NOT A WILDCARD SO RESTORE X
2170 NOT.WILD CMP(A1),Y   ;DOES IT MATCH THE CURRENT LOCATION?
2180      BNE NEXT.BYTE  ;NO, TRY NEXT BYTE
2190 FOUND1.MATCH
2200      INX            ;GET NEXT BYTE FROM BUFFER
2210      INY            ;GET NEXT BYTE FROM MEMORY
2220      CPX BUFPTR    ;COMPLETE MATCH?
2230      BCC TRY1      ;NO, TRY TO MATCH THE NEXT BYTE
2240      JSR HOME      ;CLEAR THE SCREEN
2250      LDA A1L        ;MOVE A1L & A1H TO PCL & PCH
2260      STA PCL
2270      LDA A1H
2280      STA PCH
2290      LDA #23        ;DISASSEMBLE 23 LINES
2300      JSR DISASSEMBLE ;GO DO IT
2310
2320 WAIT   BIT KEYBOARD ;WAIT FOR A KEY
2330      BPL WAIT
2340      STA KEY.RESET ;RESET THE KEYBOARD STROBE
2350      LDA KEYBOARD  ;GET KEY VALUE
2360      CMP #ESCAPE   ;IS IT AN ESCAPE?
2370      BNE NEXT.BYTE
2380 EXIT   JMP MONITOR  ;ESCAPE WAS PRESSED SO JUMP TO THE MONIT
OR
2390
2400 *-----
2410 * GET THE NEXT ADDRESS TO SEARCH
2420 *-----
2430
2440 NEXT.BYTE INC A1L      ;GET THE NEXTO BYTE TO SEARCH
2450      BNE .1        ;START BY INCREMENTING LSB THEN MSB IF NE
EDED
2460      INC A1H
2470 .1    LDA A1H        ;COMPARE T SEE IF FINISHED
2480      CMPA3H        ;REACHED DESTINATION?
2490      BCC START.LOOKIN ;NO, SEARCH HERE TOO
2500      LDA A1L        ;DOES THE LSB MATCH AS WELL
2510      CMPA3L
2520      BCC START.LOOKIN ;NO, KEEP SEARCHING
2530      BCS EXIT      ;IF DONE, JUMP INTO THE MONITOR

```

Crucial Code Finder Hexdump

```

02A1: DA FD 68 6A 45 0B 2A      $6BDB
02A8: 45 0C 85 0B 45 0C 6A 85 $3027
02B0: 0C 20 DC 02 90 BD A2 03 $7149
02B8: 20 4A F9 A9 A4 20 ED FD $795E
02C0: A5 0B A6 0C 20 41 F9 20 $9EAB

```

```

02C8: 8E FD 60 A4 FD A6 FC 20 $5C3B
02D0: 8E FD 20 40 F9 A0 00 A9 $87D6
02D8: BA 4C ED FD A5 FC C5 FE $B30E
02E0: A5 FD E5 FF E6 FC D0 02 $2E86
02E8: E6 FD 60 BE D9 A0 C6 D2 $5BB3

```

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```

02F0: CF CD A0 D4 C8 C5 A0 CD $157A
02F8: CF CE C9 D4 CF D2 8D 0D $DA98
0300: A5 3E 85 40 A5 3F 85 41 $4E46
0308: E6 31 A0 00 84 FF C8 B9 $7639
0310: 00 02 C9 99 D0 F8 C8 B9 $7809
0318: 00 02 C9 A0 F0 F8 20 A7 $51FA
0320: FF A5 3E A6 FF 9D 00 02 $7A22
0328: E6 FF 88 B9 00 02 C8 C9 $142A
0330: 8D F0 18 C9 D8 F0 04 C9 $FC1F
0338: A0 F0 E3 A9 DB A6 FF E6 $2CB2

```

```

0340: FF 9D 00 02 CA 9D 00 02 $8687
0348: C8 D0 D3 A0 00 A2 00 BD $CC63
0350: 00 02 C9 DB D0 07 E8 DD $4955
0358: 00 02 F0 05 CA D1 3C D0 $62F0
0360: 28 E8 C8 E4 FF 90 E8 20 $A97B
0368: 58 FC A5 3C 85 3A A5 3D $9625
0370: 85 3B A9 17 20 63 FE 2C $62F6
0378: 00 C0 10 FB 8D 10 C0 AD $3EBC
0380: 00 C0 C9 1B D0 03 4C 69 $659F
0388: FF E6 3C D0 02 E6 3D A5 $5811
0390: 3D C5 41 90 B6 A5 3C C5 $D4D3
0398: 40 90 B0 B0 E9          $3EC0

```

Requirements:
 48K Apple II Plus
 One disk drive
 A supply of 2716 16K EPROM chips
 Several 24-pin, low-profile sockets
 Access to an EPROM burner

SoftKey Publishing assumes no responsibility for any damage done to the computer while following this procedure.

In the article "Hidden Locations Revealed" (HARDCORE COMPUTIST 3, p. 10) the author addressed the idea of what to do when performing a softkey on a program that uses the text page for valid code use.

He suggested a small hardware modification to the Apple to enable one to see the text page of a program while

another page (i.e., hi-res page) was supposed to be displayed.

What I am about to discuss is an inexpensive modification to your computer that is about as good (maybe even better) than those cards that save all of memory. Needless to say, this is a very good means to achieve that end on programs which use volatile (easily erasable) memory.

Volatile memory includes such locations as a great deal of page zero, page one, page two and the text page location at \$400 to \$7FF. For example, as you type and characters are echoed onto the text screen, locations \$400-\$7FF change. Each ASCII (American Standard Code for Information Interchange) character is represented on the screen in one of the locations in the range of \$400 to \$7FF.

In most softkeys it has been assumed that by hitting "RESET" (with the old-style monitor, of course) and dropping into monitor, we can snoop through memory and find what we need to save or disregard.

In the softkey entitled "Hidden Locations Revealed," the idea was addressed that the text page and the keyboard input buffer (page 2) were used for valid program storage and that upon resetting, these volatile memory locations would be destroyed.

Indeed, it is no new trick to many software publishers that using the text page and other volatile memory locations is a good way to keep the public

from snooping through their programs and possibly reducing them to a more copyable form.

Hitting "RESET"

To understand this more clearly, let's examine what happens when you hit the "RESET" key.

Instead of going through the input latch at \$C000 as the other keys on the keyboard do, the "RESET" key is connected directly to pin 40 of the 6502 microprocessor chip. This is the big long chip just in front of the slots on the motherboard.

When "RESET" is pushed, pin 40

locations point to a series of routines that check to see if the computer is just being powered up or if "RESET" had been typed before. If it finds the power already on, it jumps to the routine pointed to by locations \$3F2 and \$3F3. Normally, they point to the BASIC warmstart and, therefore, you get the Applesoft prompt.

The "old-style" monitor found in the older Apple II models has \$59 and \$FF stored in locations \$FCCC and \$FCCD. This causes the Apple to jump to the routines at \$FF59. These routines set the keyboard for input, the monitor (or TV) for output, the text page for viewing and, finally, it puts

you in the machine language monitor with an asterisk prompt.

In the "au-

to start" ROM, anyone can program where they want their Apple to go, when the "RESET" key is pressed, by changing the code at \$3F2 accordingly. In the "old-style" monitor, however, there is no way to prevent a reset from occurring and, eventually, giving you the monitor prompt. This is

MODIFIED ROMS

By Ernie Young

gets connected to ground and the computer unconditionally jumps to the address contained in locations \$FFFC and \$FFFD. These locations are in the F8-monitor ROM and, depending on which F8-monitor ROM you have, your computer can do one of two things.

There are two flavors of monitor



ROMs in the Apple world, known as the "autostart" and the "old-style" monitor ROMs.

In the "autostart" F8-ROM, which is used in the Apple II Plus model, these

obviously essential if you want to break into a program to examine the code but, as mentioned in "Hidden Locations Revealed," this is no guarantee to performing a working softkey.

Destructive "RESET"

The problem is that when we reset into the monitor, many locations are destroyed. These locations may or may not be essential to the program's operation.

For example, the following zero page locations are destroyed by an "old-style" reset: \$20-\$29, \$32, \$33, \$35-\$39 and \$48.

But, even worse than that, the entire text screen scrolls up one line when the monitor prompt is printed. This scrambles locations \$400-\$7F8 and destroys locations \$400-\$427 completely.

Most software publishers know this and use it against us to keep us, "unwants," from snooping through their code. This becomes evident if you hit "RESET" and find that the text page is filled with garbage and other incomprehensible junk.

Ultimately, we would like to be able to save locations \$00 to \$8FF in non-volatile memory upon hitting "RESET" and, then, to exit to the monitor for examination. I include \$800-\$8FF, even though it doesn't get destroyed on resetting, because it gets wiped out when we do a 48K slave disk boot. The best place to store this information would be at \$2000-\$28FF, since this is normally the hi-res page used in most games and is not destroyed by booting a slave disk. (Remember that \$00-\$8FF and \$9600-\$BFFF are destroyed when booting a 48K slave disk).

In order to save these volatile memory addresses into locations \$2000-\$28FF, we need to change what normally happens when we hit "RESET." This may seem impossible to do since what happens when we hit that key is predetermined in ROM and, therefore, is not changeable.

Well; yes and no.

We can copy the code from the F8-ROM down to RAM, change it and burn it into a new ROM!

Help from EPROM

Of course, this assumes that you have access to an EPROM (Eraseable, Programmable, Read Only Memory) programmer and some 2716 EPROM chips.

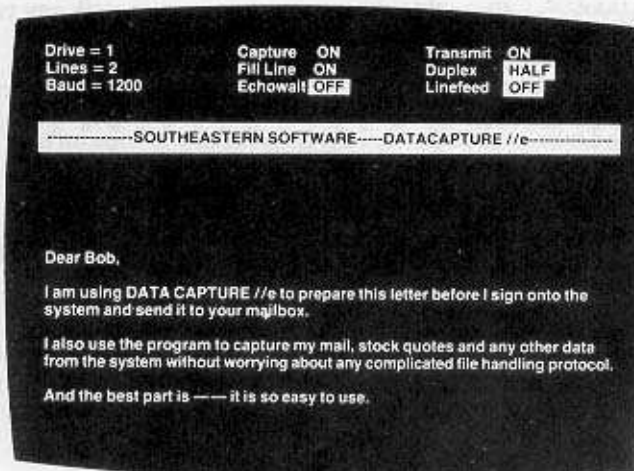
Most computer stores that are worth anything will be willing to burn you a new 2716 chip for a reasonable fee if you do not have your own access to an EPROM programmer. These 2716 chips are available from many sources. See the back of any BYTE magazine for names of suppliers of the



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So, assuming you have access to these two resources, all we have to do is alter the normal F8-code.

First, let's develop the code that we will need to jump to when the "RESET" key is pressed, moving memory from \$00-\$8FF to \$2000-\$28FF. This requires some knowledge of assembly language but if you are not familiar with machine code try and follow along anyway.

(While going to the extreme of burning new ROM, it would also be a good idea to change the NMI (non-maskable interrupt) vector to point to our new routine).

1. Let's start by moving the code at \$F800-\$FFFF down to RAM. Location \$2800 would be a good place for it

2800 < F800.FFFFF

For our next step, we need a place to put our "Super Saver" routine. We don't have any open memory locations, but we do have some routines in the monitor code which we never use, like the tape read and write routines. These will have to be sacrificed for our new routines which are printed-

ed page 28.

To enter this code, CAREFULLY type in the hexdump on page 28.

Now, change the RESET and the NMI vectors in our RAM version of the F8-ROM

2FFA:CD FE CD FE

Save the file onto a disk with the command:

**BSAVE MODIFIED F8.ROM,
A\$2800,L\$800**

Now, burn your new EPROM!

Plugging-in your New F8 Monitor ROM

In order to use your new, modified, ROM, we must install it in the motherboard (or in an integer card).

But, first, we have to make one explanation: both the 2716 you just burned and the original 9316 ROM, used by Apple, are Read-Only-Memory devices, containing 2K bytes of information, which gives us 16K bits of information. Hence, 16K ROMs. But, unfortunately, they are not totally compatible. The arrangement of the pin numbers are slightly different.

To use your new EPROM, you must make these changes directly to the chip itself (not advisable), or to a jumper socket which your new chip will plug into. This, then, will be plugged into the motherboard, or integer card.

For the latter, you will need a 24-pin, low-profile socket, which is available from Radio Shack or similar stores.

With the socket upside-down and the pins looking you in the face, it should look like figure 1.

Figure 1

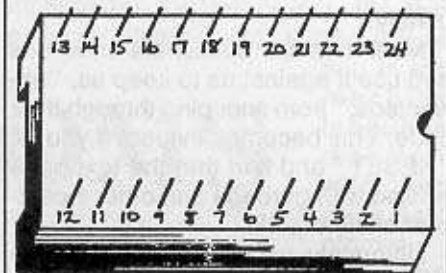
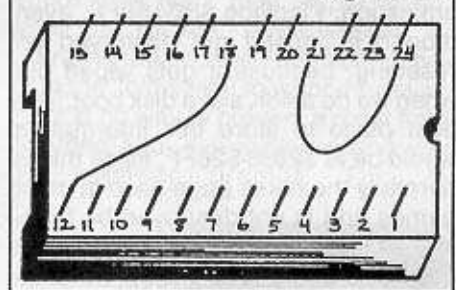


Figure 2



Your soldering skills come in handy now. Using some short, hi-gauge wire (wire-wrap is preferable, but anything in the 26-30 gauge will work), solder a piece between pins 21 and 24 and then solder a piece between pins 12 and 18.

Be extremely careful not to short out the wire or to cross-solder any pins! Also, try and solder as close to the base of the socket as possible, since you have to cut off pins 18 and 21 after you have finished soldering them.

The next step is to cut off pins 18 and 21 as close to the base of the socket as you can, without cutting the freshly soldered wires. Remember that pins 18 and 21 should be short enough so they will not touch the socket you will be plugging this one into.

The socket should now look like figure 2.

Double-check your soldering and

Hardcore continued on page 28

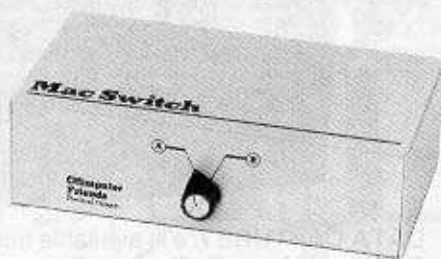
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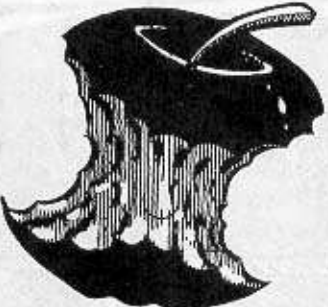
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| <input type="checkbox"/> 09 Assault of the Clone Master | <input type="checkbox"/> 20 The Black Death | <input type="checkbox"/> 32 House of Ill Repute | <input type="checkbox"/> 02 EAMON Utilities |
| <input type="checkbox"/> 10 Magic Kingdom | <input type="checkbox"/> 21 Quest for Marron | <input type="checkbox"/> 33 Orb of Polaris | <input type="checkbox"/> 03 EAMON Utilities |
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are eliminated and variable spacing is supported. Transaction file merge lets you edit data in one file based upon information stored in a different file.

Transaction File Merge only works with numeric and dollar-sign (\$) fields. This option is only applicable to a limited number of specific user operations.

The Re-block option is used to create extra space and is included on the master disk of DB Master, Version Four but not on Version Three.

It is primarily used with large files or on one which already has more than one data diskette and is close to splitting onto another. It has limited applicability for hard disk users.

The Re-block option creates another data diskette that removes extra spaces from data storage to shrink the file to its optimum size. This leaves more room on the diskette for storage.

Change Protected Fields lets you change fields from Read Only status to normal and vice versa. This is for users that have established protected fields against other users of their data base.

Printing Data Entry Forms is included in Version Four. It lets you print data entry forms and print the DB Master short form.

Finally, File Statistics does the same thing as the File Maintenance option of DB Master.

Summary

Overall, Utility Pak #2 has some very good options with the Global Editor and Label Printer options.

Although these functions can be accomplished from DB Master in some form, they are done much more effectively using the utility program. If you do a lot of global editing or label printing, then Utility Pak #2 will streamline operations for you.

The other options are applicable to specific users only and, thus, may not be needed by most.

DB Master Stat Pak
Manufacturer: Stoneware, Inc.
Language: Applesoft, Machine
Hardware: 48K Apple, DB Master,
Versions Three or Four, two disk drives
Suggested retail: \$129.00

DB Master's Stat Pak extends the range of statistical information that can be calculated for data stored in DB Master files.

Stat Pak performs mean and standard deviation calculations and other

powerful statistical tests, including linear regression, correlation and chi-square analysis. This program differs from the Statistics option of the DB Master Report Generator which generates mean and standard deviation figures, in that it calculates without printing a report.

The documentation is an excellent tutorial in the operation of Stat Pak as well as the interpretation of statistical test results and the use of the statistical tables. However, a basic understanding of probability and statistics is still required for any user of Stat Pak.

Like other DB Master "utility paks," Stat Pak cannot be booted and must be accessed via the File Maintenance option on the main DB Master program diskette.

Stat Pak is designed to help you determine when to use the various statistical tests, how to interpret the results of the tests, to employ procedures specific to running the tests and it, even, provides sample test results with their interpretations.

The tests will be briefly explained below.

Statistical Tests

Mean and standard deviation is the most common statistical test. This option calculates the mean, standard deviation, standard error of the mean and coefficient of variation. In addition, this option sorts data and arranges it into a frequency distribution.

The T-tests are used to compare the means of two populations, either paired or unpaired. Like the T-tests, the Mann-Whitney and Wilcoxon tests are used to compare two population means. These tests make fewer assumptions about the sampled populations than do the T-tests and can, therefore, be more widely applied. The Mann-Whitney test uses unpaired data, while the Wilcoxon test uses paired samples.

Stat Pak also computes the one-way analysis of variance (ANOVA). ANOVA compares the means of more than two populations. Chi-Square analysis is used to determine whether two different traits or characteristics in a population are independent. For example, chi-square analysis can help you decide whether hair color and sex are traits which are independent of each other in human beings.

Linear regression and correlation will help decide whether two variables are linearly related. For example, you can test for a linear relationship between calorie input and weight gain in

people. Only first order analysis of the form $Y = mX + b$ is supported.

Linear regression tries to match a straight line to a set of data points, which can then be used for projection. Correlation determines the validity or accuracy of that line.

Numeric Data Only

To use data from a DB Master file, all data must be numeric. Up to 350 individual data items can be processed by DB Master. For large data files, this can result in numerous calculations. The user must then piece the different sets of calculations together.

This approach does not result in statistically correct answers and, so, unless a small sample is desired, you must determine your own selection criteria for your files in order not to exceed the limit of 350 data items.

After specifying the statistical test and data elements, you input the maximum number of decimal places to be reported in the output and the data values to be ignored during calculations (like zero or null inputs). Stat Pak, then, calculates the test which you can display on the screen or dump to printer.

All the equations used in Stat Pak are provided in the Appendix. All equations can be found in any book about statistics and are standard formulae.

Since the program limits the data to 350, no assumptions regarding large data inputs are introduced, making the program very accurate.

Results from each test were compared against similar results for tests run on a main frame system and checked by hand. A T-test was, then, run on the comparison. The resulting comparison rated greater than .999 in accuracy, indicating the statistical rigorosity of the Stat Pak results.

Summary

Overall, Stat Pak is an excellent module for users who are interested in statistics.

The documentation is excellent and by far the best of all the utility programs.

Most of the important statistical tests are provided. The only limitations of Stat Pak are the restriction to 350 data samples, to first order polynomial in linear regression and the lack of an F-test. Since the last two are not necessary to most users, the limitations are not that significant. Stat Pak is, thus, a valuable addition to DB Master.

CRUNCHLIST By Ray Darrah

-LIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST

CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST CRUNCHLIST

Crunchlist is an ampersand (&) utility designed for maximum disk-space utilization when creating EXECable text files.

An EXECable text file is one in which part (or all) of a program has been saved as keystrokes instead of the usual way (as Applesoft tokens). Such a program is said to be "Captured." When done properly, EXECing the file (typing 'EXEC Filename') is just like keying the program in. Therefore, program lines are inserted between (or replace) the existing lines of program in memory.

DOS allows the commands necessary to create an EXECable file (i.e. OPEN and WRITE) only in deferred execution. Because of this, one must actually alter the program they wish to capture. Usually this alteration is the addition of a new first line number. Then, a RUN will accomplish the save. A typical line that accomplishes the capture of lines 1000 through 9999 would look something like this:

```
1 NMS = "CAPTURED":DS = CHR$ (4)
: PRINT D$"OPEN"NM$: PRINT D
$ "WRITE"NM$: POKE 33,33: LIST
1000 - 9999: PRINT D$"CLOSE"
: TEXT : END
```

Notice the LIST 1000-9999 statement. When the Applesoft interpreter comes across this, it does a regular listing. But, rather than each character of the listing being printed on the screen, they are sent to the disk and stored consecutively under the filename "CAPTURED". As you probably have already noticed, a lot of spaces are inserted into a regular listing to make it more readable. When you capture a program in this manner, all those spaces are saved on the disk.

Since these spaces aren't required when typing line numbers back in (even via EXEC), why have them laying around on your disk just taking up space?

Crunchlist eliminates this diskette waste by listing specified line numbers without unnecessary spaces! In addition to the disk storage gained because of this, the captured programs take less time to save and less time to EXEC back in.

Using Crunchlist

First, type in the hex dump on page 27 and

BSAVE CRUNCHLIST, A\$300, L\$98

Whenever you wish to install Crunchlist, simply type

BRUN CRUNCHLIST

With Crunchlist installed, one uses the ampersand instead of the command word "LIST" on those lines he wishes to Crunchlisted (i.e. captured). Therefore, using Crunchlist, the above line number which does the capturing would look like this:

```
1 NM$ = "CAPTURED":DS = CHR$ (4)
: PRINT D$"OPEN"NM$: PRINT D
$ "WRITE"NM$: & 1000 - 9999: PRINT
D$"CLOSE": END
```

In addition to the word "LIST" being replaced by the ampersand, the "POKE 33,33" and "TEXT" statements have been removed. This is because Crunchlist, as opposed to Applesoft, doesn't indent line numbers (which is just more empty space). Try Crunchlisting some long lines in immediate execution for a good example.

Now your ready to start capturing EXECable files and conserve disk space at the same time. This is great for saving lines that appear frequently in your creations (like a title page or REMarks stating the illustrious author). I'm sure you can think of many other uses for Crunchlist.

Crunchlist Source Code

```
1000 * .....
1010 * .....
1020 * CRUNCH LIST .....
1030 * .....
1040 * .....
1050 * BY RAY DARRAH .....
1060 * .....
1070 * .....
1080 .....
1090 .....
1100 .....
1110 .....
1120 .....
1130 * .....
1140 * APPLESOFT ROUTINES/LOCATIONS .....
1150 * .....
1160 .....
1170 LINGET .EQ $DA0C SETS "LINNU
M" TO NUMBER TYPED
1180 FNDLIN .EQ $D61A MAKES "BASIND
EX" POINT TO THE LINE NUMBER CONTAINED IN "LIN
NUM"
1190 LINPRT .EQ $ED24 ROUTINE THAT
PRINTS X,A IN DECIMAL
1200 TOKENTABLE .EQ $D0DD TABLE OF TOKE
NS SPELLED OUT
```

```
1210 GETCHR .EQ $D72C ROUTINE THAT
GETS NEXT CHARACTER OF COMMAND WORD
1220 .....
1230 * .....
1240 * MONITOR ROUTINES .....
1250 * .....
1260 .....
1270 COUT .EQ $FD0D PRINT A AS AS
CII .....
1280 CROUT .EQ $FD8E PRINT A CARRI
AGE RETURN
1290 .....
1300 * .....
1310 * ZERO PAGE LOCATIONS .....
1320 * .....
1330 .....
1340 CHRGOT .EQ $87 RETRIEVE THE
LAST CHARACTER FROM BASIC
1350 CHRGET .EQ $81 GET A NEW BAS
IC CHARACTER
1360 LINNUM .EQ $50 NUMBER OF LAS
T LINUMBER TO LIST
1370 BASINDEX .EQ $98 POINTER TO CU
RRENT LINE THAT WE ARE LISTING
1380 TEMP .EQ $85 TEMPORARY ST
ORAGE OF THE OFFSET FOR THIS LINE
1390 BYTENLINE .EQ $9D USED BY GETCH
R SHOULD POINT TO WHICH TOKEN YOUR GETTI
NG
1400 .....
1410 * .....
1420 * PAGE THREE LOCATIONS .....
1430 * .....
1440 .....
1450 AMPER .EQ $3F5 AMPERSAND
JMP LOCATION
1460 .....
1470 * .....
1480 * START OF PROGRAM .....
1490 * .....
1500 .....
1510 .OR $300 SQUEEZE IT IN
TO PAGE THREE
1520 .TF CRUNCHLIST
1530 LDA #54C MAKE AMPERSA
ND JMP TO START
1540 STA AMPER
1550 LDA #START
1560 STA AMPER+1
1570 LDA /START
1580 STA AMPER+2
1590 RTS HOOKUP COMPL
ETE
1600 START JSR LINGET SET LINNUM TO
START OF RANGE
1610 JSR FNDLIN POINT BASINDE
X TO 1ST LINE
1620 JSR CHRGET RANGE SPECIFI
ED?
1630 BEQ MAINLIST YES, LIST IT
1640 JSR CHRGET SKIP THE MINU
S
1650 JSR LINGET SET LINNUM TO
END RANGE
1660 MAINLIST LDA LINNUM IS THE END NU
MBER A NULL?
1670 ORA LINNUM+1
1680 BNE NEXTLIST IF NO, START
LISTING
1690 LDA #5FF YES IT IS, SO
SET THE END NUMBER TO 65535
1700 STA LINNUM
1710 STA LINNUM+1
1720 NEXTLIST LDY #1 LIST AN ENTIR
E LINE
1730 LDA (BASINDEX),Y IS HIGH B
YTE OF LINK ZERO
```


the connections to be certain that pins 18 and 21 are cut off.

MAKE SURE THE APPLE POWER IS OFF BEFORE CONTINUING.

Now, carefully remove the ROM labelled F8 (it is the socket farthest to the left that has 24 pins, as you face the keyboard) and plug this jumper socket into the motherboard. (You could plug this socket into your integer card in the same fashion). Now, plug the modified EPROM into this jumper socket and you will all be done!

Go ahead and turn on your Apple and, if you had followed these instructions correctly, you will see the text page filled with "garbage." At this time, press "RETURN" to get things going as usual.

How to use the "Super Saver" F8 ROM

From now on, whenever you press "RESET," the computer will just freeze (no beep or anything). Then, you must press one of three keys, depending on what you want the computer to do.

First of all, by pressing "RETURN" the computer will just do the usual kind of reset (i.e. JuMP to BASIC). Secondly, by typing "-" the computer will act as if you have the "old-style" F8-ROM and JuMP into the monitor without any memory saves. Finally, a ":" will engage the "Super Saver," thus, moving the volatile memory (locations \$0000 through \$900) into locations \$2000 through \$2900, with the stack pointer saved at \$2901 and it will put you in the monitor.

Uses for your Modified ROM

Remember our original problem with DISK ORGANIZER II in the article "Hidden Locations Revealed?" Well, now we can boot the program and, at the desired time, hit "RESET," type ":" and save all of memory from \$00-\$900 at \$200-\$2900, as well as the stack pointer at \$2901!

All that is left to do, now, is to find the starting location and what memory is used and the hard part of your software is done!

Recapitulation

1) Acquire a blank 2716 and access to an EPROM programmer.

2) Boot a disk with normal DOS and enter the monitor

CALL-151

3) Move the memory from ROM to RAM

2800 < F800.FFFFFM

4) Type in the hexdump on page 28.

5) Alter the RESET and the NMI vectors

2FFA: CD FE CD FE

6) Save the modifications

BSAVE MODIFIED F8ROM, A\$2800,LS800

6) Burn the blank 2716 with this saved code.

7) Using a low-profile, 24-pin socket, solder pin 12 to pin 18, then solder pin 21 to pin 24.

8) Cut off pins 18 and 21 as close to the socket body as possible.

9) Plug the jumper socket into the F8 socket on the motherboard or integer card.

10) Plug the modified 2716 into the jumper socket and you are done!

Source Code

```

1000 * -----
1010 * SUPER SAVER
1020 * MODIFIED F8-ROM
1030 * BY ERNIE YOUNG
1040 * ENHANCED BY RAY DARRAH
1050 * -----
1060
1070 .OR $FECD
1080 .TA $2ECD
1090
1100 * -----
1110 * EQUATES
1120 * -----
1130
1140 KEY.RESET .EQ SC010
1150 KEYBOARD .EQ SC000
1160 A1L .EQ $3C ;LSB ADDRESS
1
1170 A1H .EQ $3D ;MSB ADDRESS
1
1180 A2L .EQ $3E ;LSB OF ADRE
SS 2
1190 A2H .EQ $3F ;THE MSB OF A
DDRESS 2
1200 A4L .EQ $42 ;LSB ADDRESS
4
1210 A4H .EQ $43 ;THE MSB OF A
DDRESS 4
1220 MONITOR .EQ $FF59 ;ENTRY POINT
TO THE MONITOR
1230 RESET .EQ $FA62 ;ENTRY TO NEW
FB RESET ROUTINE
1240 MON.MOVE .EQ $FE2C ;MONITOR "M"
ROUTINE
1250 COUT1 .EQ $FD0 ;ROUTINE TO P
RINT ASCII
1260 HOME .EQ $FC58 ;ROUTINE TO C
LEAR TEXT SCREEN
1270 TEXT .EQ $FB2F ;ROUTINE THAT
SELECTS THE TEXT SCREEN
1280
1290 * -----
1300 * EVALUATE WHAT TYPE OF RESET
1310 * IS DESIRED
1320 * -----
1330
1340 WAIT .BIT KEYBOARD ;WAIT UNTIL A
KEY IS PRESSED
    
```

```

1350 BPL WAIT
1360 STA KEY.RESET
1370 LDA KEYBOARD ;GET THE KEY
1380 CMP #- ;IS IT AN "OL
D" F8 RESET
1390 BEQ MONITOR ;YES, JUMP IN
TO THE MONITOR
1400 BCS NEW.STUFF ;IF A COLON,
THEN DO THE NEW RESET
1410 JMP RESET ;DO A REGULAR
RESET
1420
1430 * -----
1440 * SAVE THE STACK POINTER
1450 * -----
1460
1470 NEW.STUFF TSX ;GET THE VALU
E OF THE STACK POINTER
1480 STX $2901 ;AND SAVE IT
AT $2901
1490
1500 * -----
1510 * MOVE PAGES $00 AND $01
1520 * INTO PAGES $20 AND $21
1530 * -----
1540
1550 LDY #0 ;START WITH B
YTE ZERO
1560 SAVE1 LDA 0,Y ;GET A ZERO P
AGE BYTE
1570 STA $2000,Y ;SAVE IT
1580 LDA $100,Y ;GET A STACK
BYTE
1590 STA $2100,Y ;AND SAVE IT
1600 JMP AROUND.CODE ;JUMP AROU
ND THE MONITOR STUFF
1610 .OR $FEFD ;NEW ORIGIN F
OR THE CODE
1620 .TA $2EFD
1630 AROUND.CODE INY ;GET OFFSET F
OR NEXT BYTE
1640 BNE SAVE1 ;IF NOT DONE,
MOVE ANOTHER BYTE
1650
1660 * -----
1670 * SET UP FOR MONITOR MOVE
1680 * -----
1690
1700 STY A1L ;MSB OF FROM
ADDRESS IS ZERO
1710 STY A4L ;THE MSB OF T
HE TO ADDRESS IS ALSO ZERO
1720 STY A2L ;MOVE CODE TH
ROUGH $900
1730 LDA #9
1740 STA A2H
1750 LDA #2 ;MOVE CODE ST
ARTING AT $200
1760 STA A1H
1770 LDA #S22 ;MOVE CODE IN
TO PAGE $22
1780 STA A4H
1790
1800 * -----
1810 * EXIT
1820 * -----
1830
1840 JSR MON.MOVE
1850 JSR TEXT ;SET THE TEXT
SCREEN
1860 JSR HOME ;CLEAR SCREEN
1870 JMP MONITOR
    
```

Hexdump

```

2ECD: 2C 00 C0 $0E8B
2ED0: 10 FB 8D 10 C0 AD 00 C0 $B6A9
2ED8: C9 2D F0 7D B0 03 4C 62 $1B98
2EE0: FA BA 8E 01 29 A0 00 B9 $D15A
2EE8: 00 00 99 00 20 B9 00 01 $9B59
2EF0: 99 00 21 4C FD FE 20 00 $1FE5
2EF8: FE 68 68 D0 6C C8 D0 E7 $C5C6
2F00: 84 3C 84 42 84 3E A9 09 $2A77
2F08: 85 3F A9 02 85 3D A9 22 $9E7A
2F10: 85 43 20 2C FE 20 2F FB $F0AC
2F18: 20 58 FC 4C 59 FF 60 $66E7
    
```



WHIZ KID

BY RAY DARRAH

Editor's Note: Recently, Hardcore COMPUTIST received many requests for a simple, easy to follow guide that will take a beginning computer's user step-by-step through copy protection and deprotection.

Well folks, here it is!

Starting with this issue, Hardcore COMPUTIST will be featuring a column by staff programmer Ray Darrah, entitled "Whiz Kid." Its goal is to make computer whiz kids out of Hardcore COMPUTIST readers. It will mainly focus on copy protection and deprotection but may stray from the subject sometimes.

Before going any further, however, Whiz Kid assumes that you have read the Applesoft manual and possess a working knowledge of BASIC (on the Apple). Also, a general understanding of RAM (Random-Access Memory), ROM (Read-Only Memory) and the Apple DOS 3.3 disk operating system would help.

What is Copy Protection?

The answer is really quite simple. Copy Protection is a non-standard method of preserving data, programs or otherwise. This means that data stored on a protected disk you bought "looks" completely different from data stored on the disk you INITIALIZED yesterday.

In later issues we'll discuss disk-based protection in depth. But for now, here are a few tricks you can do that protect programs, but not from being copied.

The RUN Flag

A little known feature exists in the Applesoft ROM which allows the programmer to "tell" the ROM (via POKE) that a specific program is not to be listed.

The memory location which holds the information of whether or not to list this particular program is at 214 (or \$D6 in hexadecimal). If locations hold a number higher than 127, Applesoft will not evaluate any typed commands (i.e. commands issued for immediate execution). Instead, Applesoft will RUN the program as soon as any line at all is typed.

To try this out:

1) LOAD in your favorite program and add line zero

0 POKE 214,128

2) Now run and then stop the program

RUN

CTRL C

3) Try typing something other than RUN

LIST

Notice how the program RUNs no matter what you type. This would be very useful in keeping unwanted eyes (and every other bodily part) out of your program.

Unfortunately, this protection scheme has two flaws. First of all, because the ROM has to encounter the POKE statement before this protection becomes active, simply LOAD-ing the program will override it. The second is that although BASIC commands don't work, DOS (Disk Operating System) commands do (e.g. CATALOG and FP), so the program can be easily copied using normal DOS commands.

continued on page 32

Not everyone who copies software is a

PIRATE

Even honest users need back-ups.

So, where do you go to learn? Who teaches you how to back-up your critical application programs? Why is it so difficult to "fix" your expensive computer software?

Get Out Of The Dark

Thousands of Apple users have joined a rapidly growing network which allows them to 1) exchange tips on program modifications and enhancements 2) swap game secrets (...like where to find the jewel-encrusted egg), and 3) explore Advanced Playing Techniques and get those two extra ships when they really need them.

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The Essential Data Duplicator:

REVIEW

The Essential Data Duplicator
Manufacturer: Utilico Software
Language: Machine
Hardware: Apple II, with 48K and at least one disk drive
\$79.95

A few weeks ago, I received a much talked about nibble copier called "The Essential Data Duplicator" from Utilico Software. I simply couldn't wait to try it out.

While booting, I heard the strangest disk arm noises I've ever encountered. Ah!, I thought, sophisticated disk arm movement routines. "It looks like COPY II Plus has met its match," I said to myself.

Putting that thought aside when the title page came up, I banged a couple of keys to get to the main menu. I then noticed the addition of quarter tracks to the standard read/write error table at the top of the screen. "That's what I heard when it booted," I thought.

Even though the addition of quarter-tracks seemed superfluous, because they can be easily read or written on from an adjacent half-track, I took off my drive cover to see if it actually positions the read head between half-tracks. When I saw that EDD (The Essential Data Duplicator) accomplished this, I was reminded of a pet rock; a novel idea, but really not very useful.

Before going any further, I thought I'd read the manual.

Documentation

I found myself lost a few times while reading the 43 page, non-typeset manual that accompanies EDD. It desperately needs a glossary to define the terminology it uses extensively throughout the pamphlet. In addition, procedures aren't explained clearly or adequately enough to be even understandable. In short, there is a lot of room for improvement in the EDD manual.

But, from this manual, I gathered that the Essential Data Duplicator is one of the "New Breed" of nibble copiers which do a lot more than the old copiers do during the default copying procedure.

For this reason, EDD is supposed to be able to copy more programs without changing parameters than the other bit-copiers. In practice, however, this seems untrue.

While using EDD, I found that the number of programs I could copy reliably was substantially less than claimed. Furthermore, because of the extra steps EDD goes through, the backup procedure takes a very long time (in comparison with the other bit-copier programs). This applies even to copying disks with simple protection.

While scrutinizing the generally inadequate explanation of EDD parameters presented, I soon noticed that some of the parameters seemed useless and the most important ones were not explained well enough for application.

As an example, parameter \$14 controls whether the hi-res screen is shown during copying or not. This produces some neat hi-res effects, but can't actually be used for presenting data in an understandable format.

When playing your favorite arcade game, can you tell what the dots and lines actually are in memory? It's a good thing that you don't have to change parameters to copy programs with EDD, because you can't tell which ones to change anyway.

Performance

The makers of EDD say that it can copy timing or "sync" bits more accurately than other copiers. However, they don't say exactly what EDD does to determine a timing bit from a data bit.

I believe it is impossible to do this, but EDD actually chops off (or inserts more of) these, hopefully valid, timing bits during the normal copying mode.

What if the omitted bits aren't really "sync" bits? There goes the chance of a working backup!

To further complications, EDD is heavily copy-protected and has, supposedly, been programmed to make unreliable copies when it tries to backup itself. It definitely is a difficult program to copy. So it seems that the assurance of a backup doesn't apply to EDD. My guess is that Utilico Software believes other programs are more worthy of backing up than their own.

Interesting Stuff

All this aside, EDD has some very

unique features.

For instance, it has two ways of keeping nibble count. One way (as mentioned) is by inserting and deleting sync bits. Using the other, EDD will keep writing the track and verifying it until the track has the same number of nibbles as the original.

While this is occurring, the user hurriedly adjusts his drive speed in an attempt to get the displayed difference down to zero. My first thought was that this would be an excellent way to make a near-perfect copy. However, I realized that if the drive speed changes while EDD is writing a track, the bits on that track will not be evenly spaced. This would result in a copy of poor quality.

Because EDD does not wait until you are ready for it to write the track, this feature is difficult (if not impossible) to operate as it was intended.

Also included is a feature that will allow you to adjust your drive speed to that of the drive on which the disk you are trying to copy was written. Using this feature before you start to copy a program should give you a better chance of a good copy, even on tough protection schemes.

Unfortunately, what exactly is being displayed during this option is not explained clearly. But, even after figuring out what I was looking at, I had a VERY difficult time using this feature. It didn't help me to copy programs more reliably, anyway.

Because the number of disks EDD failed to copy accurately for me was substantial, I put it through a little test. Using the normal copying mode, I copied five different (normal DOS 3.3) diskettes. I was amazed when EDD created unreadable sectors on two of them. Apparently, to EDD, normal DOS 3.3 is a very sophisticated protection technique.

In my opinion, EDD is a copying package that has some strong points, but some features need to be worked out better. I think it best to wait for Eddie's father (a more advanced, better documented version of EDD) which will, hopefully, be available in the not-too-distant future.

Editors note: As this issue of Hardcore Computist was going to press, we received an updated version of The Essential Data Duplicator. We plan to review this latest version of EDD in an future issue of Hardcore Computist.

Reviewed by Dave Thompson



The CIA

Golden Delicious Software
7 Sloan Avenue
London SW3 3JD, England
\$65.00

Anyone who owns and uses a bit-copy program like Copy II+ or Locksmith knows that without a set of parameters the bit copiers will usually not produce a bootable backup disk. The question is, how does one go about finding correct settings for the parameters without spending countless hours experimenting with different combinations of the more than fifty individual parameters?

The CIA: Review

"The CIA.....is a set of five disk utilities which allows the user to investigate the manner in which almost any copy-protected disk is put together.....Although there are other programs on the market.....never before have these functions been combined into one package and sold with a quality piece of documentation."

The CIA (Confidential Information Advisors) from Golden Delicious Software LTD is a set of five disk utilities which allow the user to investigate the manner in which almost any copy-protected disk is put together. These utilities are a great aid in the determination of parameter settings for copy protected disks. The CIA package also includes "The CIA Files", a manual of more than 60,000 words which serves as a reference manual for the experienced user and a tutorial for those new to the world of the Apple's disk format.

The five disk utility modules include: "Tricky Dick" (a sector editor), "The Linguist" (track nibble dump utility), "The Code Breaker" (translate table editor), "The Tracer" (disk search utility) and "The Tracker" (displays a list of tracks and sectors being accessed on the disk). Although there are other programs on the market which can accomplish most of these tasks, never before have these functions been combined into one package and sold with a quality piece of documentation.

The CIA's sector editing module, Tricky Dick, is termed in the documentation as the "Chief Executive Officer" because of the way it works in conjunction with the other CIA utilities. Tricky Dick is a stand-alone module, but the services of all the other modules, except "The Tracker", have to be invoked through Tricky Dick. More on this interaction in a minute.

When you are using Tricky Dick you can change the address and data header and trailer bytes to anything you want, including wild cards, so that

disks with altered marks can be read. You also have the ability to defeat the use of data and address field checksums when reading or writing sectors.

Once a sector has been read by Tricky Dick you can list it in an Applesoft or Integer BASIC or machine language disassembly format. This ability comes in handy when performing such techniques as boot code tracing.

Of course, if you have a protected disk with data and address marks altered to unknown values Tricky Dick, like any other sector editor, will generate the familiar "I/O ERROR" when trying to read such a sector. To make life easier for those who want to view the

data on such protected disks, "Tricky Dick" can work with The CIA module which is capable of directly dumping the raw (untranslated) nibbles from any specified track. This module is called "The Linguist".

The Linguist cannot function by itself, but must be accessed through Tricky Dick. Normally, to use The Linguist, one would load both Tricky Dick and The Linguist into memory by choosing option 2 from the main disk menu. Once The Linguist has been loaded into memory, it can be invoked while in Tricky Dick by typing a `CTRL E`. This calls upon the services of The Linguist which, first of all, recalibrates the disk drive read/write head to track zero. You can then select, in increments of one half track, the track which you wish to read. A `CTRL R` will read in the entire contents of the selected track and display the contents in their raw, untranslated format. This allows you to scan the track and see exactly what values are being used for the address and data marks, sync bytes, etc. Once you have figured out what address and data marks are being used, Tricky Dick can be reentered by typing `CTRL C`. The appropriate values for the address and data marks can then be inserted into Tricky Dick and, hopefully, the sector read operation will proceed smoothly.

The Linguist also has the ability to pass one sector of information back to Tricky Dick for editing purposes. The Linguist is able to use any of the 3 encoding techniques (6 & 2, 5 & 3 or 4 & 4) to translate one sector of data and pass it to Tricky Dick. This is done in

The Linguist by choosing the desired encoding scheme, placing the cursor on the first byte following a data sector header, and then typing `CTRL T`. Control is then passed back to Tricky Dick with the translated sector data being displayed on the screen. This data can then be viewed, edited or listed in its appropriate language.

The next CIA module, The Tracer, adds some of the capabilities of Omega's Inspector to The CIA. The Tracer, which again works in conjunction with Tricky Dick, allows you to verify a disk's formatting and to search it for a VTOC (Volume Table of Contents), Catalog, Track/Sector lists and up to six different strings (with "wildcards") in ASCII (high or low format) or hexadecimal. This verification and/or search can proceed over any range of tracks and sectors which you specify. When one of these items is found on the disk, the user is placed back into Tricky Dick with the cursor placed over the first byte of the desired information.

The Tracer's scan rate is very rapid; for instance to search an entire DOS 3.3 disk for six nonexistent strings takes 72 seconds, or just slightly over 2 seconds per track.

With the facilities of The Tracer, it becomes an easy matter to find track/sector lists of deleted files, specific assembly language instructions, program menus, references to the keyboard or any other type of information you may want to sniff out. Because The Tracer works in conjunction with Tricky Dick, the disk scan can be performed on protected disks if their data and address marks can be found which, of course, you can do by using The Linguist.

My only criticism of The Tracer is that it is rather difficult to correct typing mistakes when entering the search strings or the track and sector search ranges. If you make a mistake when entering any of these items, you cannot back space over or delete these mistaken characters; all you can do is enter `CTRL SHIFT @` and type the whole string or search range all over again. This is not exactly state-of-the-art "user friendliness."

Like the Linguist and the Tracer, the next module, The Code Breaker, also must be used in conjunction with "Tricky Dick". The Code Breaker allows you to change the RWTS translate tables to protect your own disks from being read or copied by others. These translate tables are needed to transform encoded or "pre-nibbled" bytes into values which can actually be stored on the disk (high bit set and no more than 1 pair of consecutive 0's in DOS 3.3). If the values in the table are altered and a disk is written using the altered table, then that disk is unreadable to normal DOS because the bytes

on the disk can not be properly translated back to their original values. This may all sound a bit bewildering unless you have read "Beneath Apple DOS" or The CIA manual, but basically, The Linguist allows you to alter the tables and then have Tricky Dick read or write using the new translate tables. The Code Breaker is, therefore, useful for both protecting your own disks and reading from protected disks written with altered translate tables. Reading from a disk written with an altered translate table is actually a bit tricky since you have to know how the translate table has been altered. The manual, however, does give examples of how to use The Tracer to find translate tables which have been relocated and/or altered from that of normal DOS.

The last module of The CIA, The Tracker, is the only one which does not work in conjunction with Tricky Dick. The idea behind The Tracker, at first glance, seems to be very good; the ability to display which tracks and sector on a disk are being accessed. In practice, however, The Tracker can only be used on disks with a more-or-less normal DOS 3.3. This precludes using The Tracker for such things as finding where a nibble count is stored on a protected disk. The main use of The Tracker would seem to be to demonstrate how DOS allocates files and, possibly, to locate bad sectors on a damaged disk.

Whenever The Tracker is used in conjunction with a program it displays a list of all tracks and sectors accessed by the program at the top of the screen. If there is a lot of disk access being done the screen can get pretty crowded and confusing, especially if the program is also displaying information on the text screen.

The "CIA Files", a 127 page manual accompanying The CIA is a very good piece of documentation. Each of the five utilities has a chapter devoted to it which contains a tutorial for newcomers on how to get the best use out of The CIA. These tutorials contain information not only on how to use The CIA, but also general information the VTOC, sector and data headers, sync bytes, how to get extra sectors on a disk and several different protection schemes.

There are areas in which The CIA Files could be improved upon, however. My first gripe is the lack of an alphabetical index. The manual does have an extended table of contents, but I feel that no documentation of more than ten pages should lack an index in the back.

My other criticism of the documentation has to do with its discussion of software protection techniques. Although several different protection schemes are discussed, there are never any specific examples of what software products are using which protection schemes. To me, it appears that this omission was intentional. For whatever reason this information was not included, I think some specific examples of protection schemes would be helpful in learning how to best utilize The CIA package.

The only other disk utility package I have seen which compares with The CIA is "Bag of Tricks" by the authors of Beneath Apple DOS. While each of these packages has its strong points, The CIA utilities are not copy protected as are the Bag of Tricks programs. The folks at Golden Delicious should be commended for the decision not to copy protect their software.

Although The CIA programs themselves are not protected The CIA disk does come with a protected track and a half track so owners can hone their disk snooping skills. The tracks are not transferred by FID, so it is necessary to either practice on the disk original or to use The Linguist and Tricky Dick to transfer these tracks to a backup disk.

The manufacturer's suggested price of The CIA is \$65.00 which, in my opinion, is rather reasonable given the quality of the software and documentation. Delivery of The CIA, when ordered directly from Golden Delicious, does take a minimum of six weeks. So be patient. The CIA is worth waiting for.

Reviewed by Gary Peterson



DOS Listing

DOS intercepts and evaluates every character printed. This includes program listings as they roll up your screen. Whenever a `CTRL-MCTRL-D` string is printed, DOS examines subsequent bytes up to the next RETURN character (`CTRL-M`) and tries to execute them (e.g. VERIFY HELLO).

If you could make your program contain the correct sequence of characters (i.e. `CTRL-MCTRL-D FP`), you could have the DOS obliterate the program whenever it is listed. For that matter, you could instruct DOS to do any of a number of things, like maybe DELETE the file from the disk.

To try this out:

1) Clear the program in memory and set DOS pointers to correct locations

FP

2) Get your favorite program from disk (or type one in).

3) Add line zero (it is important not to type a space after the REM)

0 REMMDFP

4) Change the first two characters after the REM statement to control characters

POKE2054,13:POKE2055,4

I suggest that you SAVE this file before LISTing it.

Now, as soon as you LIST it, the program will vanish. Try changing the FP in line 0 to CATALOG or some other disk command. DOS will attempt to execute any command placed here every time you LIST the program.

You can even make the actual number of the program line disappear by adding ASCII (American Standard Code for Information Interchange) code 08 (`CTRL-H`'s). These move the cursor backward.

After the appropriate number of `CTRL-H`'s (i.e., when the cursor reaches the left edge of the text line) use spaces to erase any words or numbers preceding the DOS command.

That's about all for this issue. Tune in next time for more of Whiz Kid.



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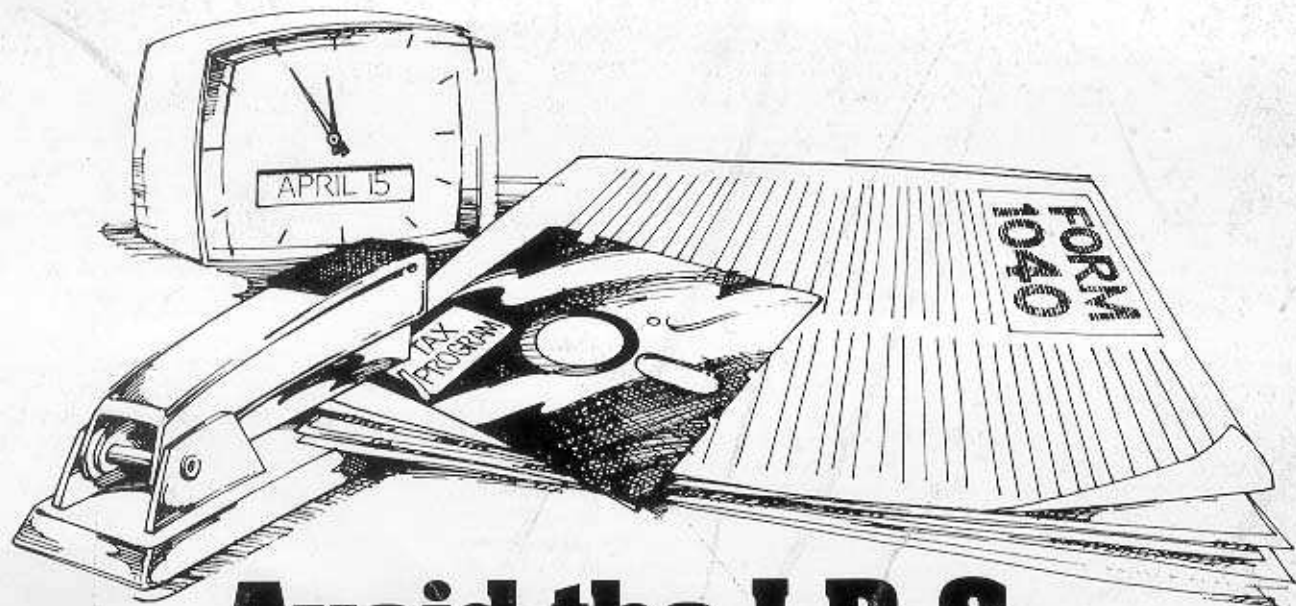
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