

For The Serious User Of Personal Computers

COMPUTIST

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🍏 RDEX *Features:*

- **Electronic Art's Protection Language**—By Phil Goetz
- **How to find hidden code with EOR DiskScan**—By Phil Goetz
- **Lower Case & Infocom Games Revisited**—By Greg Poulos
- **Monsters of Might & Magic**—By Les Minaker
- **A Character Editor for Rings of Zilfin**—By Aaron Schoeffler
- **A Single Data Disk for all your Print Shop Graphics**—By Klaus Iden
- **The Product Monitor**—By Jeff Hurlburt

🍏 RDEX *Softkeys:*

American Challenge 🍏 Arctic Fox 🍏 Bard's Tale II 🍏 BoulderDash Construction Set 🍏 California Games 🍏 Championship Wrestling 🍏 Chief of Detectives/Drawing Conclusions 🍏 Deep Space 🍏 Dome Simplified Bookkeeping System 🍏 Dr. Ruth's Computer Game of Good Sex 🍏 Earth Orbit Stations 🍏 Factory 🍏 Galaxy Search/Predicting Outcomes 🍏 Game Maker 🍏 Hacker II 🍏 Hardball IIGs 🍏 Ikari Warriors 🍏 Labyrinth 🍏 Marble Madness 🍏 Master Diagnostics IIe 🍏 Math Blaster 🍏 Mickey's Space Adventure 🍏 Micro-Computer Learning Games 🍏 Microzine #14 🍏 Microzine #24 🍏 Milliken Math Series 🍏 Mind Prober 🍏 M - ss - ng L - nks 🍏 Morning Star Spelling 🍏 Mountain Climbing/Cause and Effect 🍏 Movie Monster Game 🍏 Pond 🍏 Race Track/Reading for Detail 🍏 Reading Comprehension Main Idea & Details 🍏 Rings of Zilfin 🍏 Roadwar 2000 🍏 School Days/Inference 🍏 Ski Crazy 🍏 Softswitch 🍏 Sub Mission 🍏 Time Capsule/Reading Skills 🍏 Tuesday Morning Quarterback 🍏 Typewriter 🍏 Where in Europe is Carmen Sandiego 🍏 Wortgefecht 🍏 Xevious

IBM RDEX: *Softkey:* ■Symphony v1.00 ■TK!

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Notes 'n things.....

■ OOPS!

Seems that I made a mistake when I told you about the Starter Kit. The cost of the starter kit is \$2 when ordered separately or if you have already received your free copy. Here's the information on the Starter Kit again, with the corrections included.

■ What's a Starter Kit?

The Starter Kit is a disk with most of the programs (previously published in COMPUTIST) that you need to get started with disk "snooping" and "converting". This includes SUPER IOB v1.5 (with STANDARD.CON, FAST.CON, SWAP.CON and NEWSWAP.CON), CAPTURE (a routine to convert Applesoft controllers into EXECutable text files), DISKEDIT (for direct disk viewing and editing), the NIBBLER (for viewing raw data from the disk in nibblized form), the CORE DISK SEARCHER (to find byte patterns on the disk), the DOS ALTERER (to make custom DOS changes) and CHECKSOFT and CHECKBIN (to generate the checksums that we print so you can compare and check for errors in your typing).

■ Where's my Starter Kit?

If you are a new subscriber, you will receive the Starter Kit automatically. If you are renewing and have never received a Starter Kit, ask for the Kit at the same time that you send your renewal and it will be sent to you at no extra charge.

■ Starter Kit for \$2

If you are a current subscriber but you're not ready to renew, then send two dollars and we'll put the Starter Kit in a bubble pack mailer and sent it to you. You do have to be a subscriber. We'll let everyone know when there are significant updates or changes to the the Starter Kit.

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Readers Data

For serious users of Apple computers: II, II+, //c, //e, IIGs, Macintosh

New COMPUTIST readers using Apple IIs are advised to read this page carefully to avoid frustration when attempting to follow a softkey or entering the programs printed in this issue.

What is a softkey, anyway?

Softkey is a term which we coined to describe a procedure that removes, or at least circumvents, any copy-protection on a particular disk. Once a softkey procedure has been performed, the resulting backup copy can usually be copied by the normal copy programs (for example: COPYA, on their DOS 3.3 System Master disk).

Commands and control keys

In any article appearing in COMPUTIST, commands which a reader is required to perform are set apart by being in boldface and on a separate line. The **RETURN** key must be pressed at the end of every such command unless otherwise specified. Control characters are specially boxed. An example of both is:

6 **Ⓢ**

Press **6** Next, place one finger on the **Ⓢ** key and then press **P** Remember to enter this command line by pressing **RETURN**.

Other special combination keypresses include **ⓈRESET** or **ⓈⓈRESET**. In the former, press and hold down **Ⓢ** then press **RESET**. In the latter, press and hold down both **Ⓢ** and **Ⓢ** then press **RESET**.

Special requirements

Special prerequisites for COMPUTIST articles, programs and softkeys are usually listed at the start under:

■ Requirements:

Software recommendations

- ✓ Applesoft program editor such as *Global Program Line Editor (GPLE)*.
- ✓ Sector-editor such as *DiskEdit* (in the *COMPUTIST Starter Kit*) or *ZAP* from *Bag of Tricks*.
- ✓ Disk-search utility such as *The Inspector*, the *CIA* or the *Core Disk Searcher* (in the *COMPUTIST Starter Kit*).
- ✓ Assembler such as the *S-C Assembler* from S-C software or *Merlin/Big Mac*.
- ✓ Bit-copy program such as *Copy II Plus*, *Locksmith* or *Essential Data Duplicator (EDD)*.
- ✓ Text-editor (that produces normal sequential text files) such as *Applewriter II*, *Magic Window II* or *Screenwriter II*.
- ✓ *COPYA*, *FID* and *MUFFIN* from the *DOS 3.3 System Master* disk are also useful.

Super IOB and Controllers

This powerful deprotection utility (in the *COMPUTIST Starter Kit*) and its various Controllers are used in many softkeys. (It is also on each Super IOB Collection disk.)

Reset into the Monitor

Softkeys occasionally require the user to stop the execution of a copy-protected program and directly enter the Apple's system monitor. Check the following list to see what hardware you will need to obtain this ability.

Apple II+, //e, compatibles: 1) Place an Integer BASIC ROM card in one of the Apple slots. 2) Use a non-maskable interrupt (NMI) card such as *Replay* or *Wildcard*.

Apple II+, compatibles: 1) Install an F8 ROM with a modified reset-vector on the computer's motherboard as detailed in the *Modified ROM's* article (*COMPUTIST #6* or *Book Of Softkeys III*) or the *Dual ROM's* article (*COMPUTIST #19*).

Apple //e, //c: Install a modified CD ROM on the computer's motherboard. Cutting Edge Ent. (Box 43234 Ren Cen Station-HC; Detroit, MI 48243) sells a hardware device that will give you this important ability but it will void an Apple //c warranty.

Recommended literature:

- ✓ *Apple II Reference Manual*
- ✓ *DOS 3.3 manual*
- ✓ *Beneath Apple DOS*, by Don Worth and Pieter Lechner, from Quality Software
- ✓ *Assembly Language For The Applesoft Programmer*, by Roy Meyers and C.W. Finley, from Addison Wesley

Keying in Applesoft programs:

BASIC programs are printed in a format that is designed to minimize errors for readers who key in these programs. If you type:

10HOME:REMCLEAR SCREEN

The LIST will look like:

10 HOME : REM CLEAR SCREEN

...because Applesoft inserts spaces into a program listing before and after every command word or mathematical operator. These spaces usually don't pose a problem except in line numbers which contain REM or DATA commands. There are two types of spaces: those that have to be keyed and those that don't. Spaces that must be typed appear in COMPUTIST as delta characters (Δ). All other spaces are there for easier reading. NOTE: If you want your checksums (See **Computing checksums**) to match up, you must key ONLY the Δspaces after DATA statements.

Keying In Hexdumps

Machine language programs are printed in COMPUTIST as hexdumps, sometimes also as source code. Hexdumps are the shortest and easiest source to type in. You must first enter the monitor:

CALL -151

Key in the hexdump exactly as it appears in the magazine, ignoring the four-digit checksum (\$ and four digits) at the end of each line. A beep means you have typed something that the monitor didn't understand and must, therefore, retype that line.

When finished, return to BASIC with:

3DOG

BSAVE the program with the filename, address and length parameters given in the article.

The source code is printed to help explain a program's operation. To key it in, you will need the *S-C Assembler* or you will have to translate pieces of the source code into something your assembler will understand (see table of *S-C Assembler* directives in *COMPUTIST #17*).

Computing checksums

Checksums are 4-digit hexadecimal numbers which tell if you typed a program exactly as it appears in COMPUTIST.

There are two types of checksums: one created by the *CHECKBIN* program (for machine language programs) and the other created by the *CHECKSOFT* program (for BASIC programs). Both appeared in *COMPUTIST #1* and *The Best of Hardcore Computing*. An update to *CHECKSOFT* appeared in *COMPUTIST #18*.

If the published checksums accompanying program listings and hexdumps do not match those created by your computer, then you typed the program incorrectly. The line where the first checksum differs has an error.

CHECKSOFT instructions:

LOAD filename
BRUN CHECKSOFT

Get the checksums with: **&** and correct the program line where the checksums differ.

CHECKBIN instructions:

CALL -151
BLOAD filename

Install *CHECKBIN* at an out of the way place

BRUN CHECKBIN, A\$6000

Get the checksums by typing the Starting address, a period and the Ending address of the file followed by a **Ⓢ**.

SSS.EEE **Ⓢ**

Correct the lines at which the checksums differ.
..... RDXed

EXchange



etc... who want all their software backed up and COPYA-able



when
writing a
letter to...

Apple RDEXed

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Bill Wilson

Slightly embarrassed. That's the only way to describe my feelings after reading William Green's crack for *Game Maker*. In a crack I developed, it took 31 steps to do what Mr. Green has accomplished in a five-byte sector edit. Oh well.

However, I have sent in this crack purely for the educational value of it. If anyone wishes to deprotect *Game Maker (GM)*, I heartily suggest they use Mr. Green's crack in COMPUTIST #50. In the following information, you may find various techniques and processes of value for future cracking attempts.

Softkey for...

Game Maker

Activision

Requirements

- Game Maker* disk
- Blank disk
- A formatted DOS 3.3 slave disk
- A sector editor
- Apple IIe with at least 64K
- One disk drive

Game Maker (GM) is a useful utility for creating customized computer games. Using the various editors of *GM*, one can design background hi-res graphics screens, animated sprites, sound effects, musical scores, and program control code. Once a satisfactory game has been designed, it may be saved to disk or a special disk may be created that automatically boots the game. *GM*, however, suffers from a traditional disease that has affected all Activision software. It is copy-protected.

For those of you who are not interested in the mechanics of the crack, you can find the quick fix for *GM* in the cookbook instructions.

On the surface, *GM* is not copy-protected at all. COPYA, the *Locksmith Fast Copier*, or *Copy II Plus*' Copy Disk Option will work fine on *GM*. However, when the copy is booted, the boot will halt and the user will find himself with a locked-up computer.

When this occurred on my Apple, I used my *Wildcard* software and firmware to see where the lockup (actually an infinite loop) occurred. At \$8240, I found the instruction JMP \$8240. This is what was causing the

computer to lock up. My immediate thought was to locate the routine on disk and neutralize it with a well-aimed branch to an instruction to continue loading. I found the code for \$8000-82FF on track \$21, sectors \$05, \$06, and \$07. (I used the "scan for hex bytes" option of *Copy II Plus* to locate the bytes 4C 40 82, thus leading me to the infinite loop.) I tried to put the bytes EA EA EA (no-operation instructions) in the place of the loop. Booting the disk, however, produced the same result as before. The boot would cease and nothing would happen.

Trying various branches proved to be of no avail and only led to the same result with the disk refusing to complete a boot cycle. I was now convinced there was a fairly sophisticated copy-protection routine operating during the boot. It became obvious to me the program needed something loaded by the routine at \$8000 to continue loading the program and start the utility. I pulled the code for \$8000-82FF from the disk with *Copy II Plus* and listed it to my printer.

Using a stripped down version of Don Lancaster's "tearing method", I highlighted all of the jumps (JMP) and jump to subroutines (JSR) in the code. By doing this, along with marking the return from subroutines (RTS), one can follow the general flow of a program without necessarily understanding what it is doing at every step of the way. Analyzing the code brought out these facts: One, the routine exited to \$AD00 whether or not the disk check was OK. Two, if the disk check was not OK, the bytes 4C 40 82 (JMP \$8240) were inserted at \$AD00 prior to jumping there.

At this point, the user should make a COPYA copy of *GM*, as it will be used later in the crack.

Since the disk check produced something that I needed, to boot the disk completely, I decided the best way to capture the code at \$AD00 would be through a boot trace. A boot trace is a way of controlling and redirecting a disk's boot cycle so that you are in control of it at all times. To do this, one must start with Boot0, the code in the disk controller card at \$C600-C6FF. I used these commands to move Boot0 down to page \$9600 so it could be modified.

CALL-151

9600<C600.C6FFM

96FA:98 N 9801:4C 59 FF

9600G

C0E8

enter the monitor
move Boot0 to RAM

redirect boot

boot the disk

turn off disk drive

Now, we have captured Boot1, which is sitting at \$0800-08FF. We will move it to

\$9800 so it can be modified and worked with to meet our wishes.

9800<800.8FFM *move the code*
980E:90 *adjust so it uses our code at \$9600 not the ROM at \$C600*
984A:4C 59 FF *jump to monitor after Boot 2 loads*
9600G *boot the disk*
COE8 *turn off disk drive*

Boot2 is now captured and sits at \$B600-BFFF. Again, it will be moved so we can modify it.

4600<B600.BFFFF *move the code*
984A:4C 00 47 *adjust Boot1 to jump to the new location of boot2*
4741:4C 59 FF *add jump to monitor*
9600G *boot the disk*

Boot3 (the code at \$8000-82FF) has now been loaded at \$8000. Again, a move and modification is in order to further control the boot.

3000<8000.82FFM *move the code*
4741:4C 00 30 *adjust Boot 2 to jump to the new location of Boot 3*
303C:30 *adjust Boot 3 to work at its new location*
30F2:31
313B:32
3227:32
3242:32

3269:4C 59 FF *add jump to monitor*
9600G *boot the disk*

A listing from \$AD00 should now reveal rational code. This routine is what actually loads GM and executes the utility. At this point, the Game Maker disk should be removed from the drive and a DOS 3.3 formatted disk inserted. The DOS 3.3 disk should be a slave disk with the DOS image on it and NOT be a DOS 3.3 master disk. (If you are not familiar with this terminology, a slave disk is simply a disk formatted with the DOS 3.3 INIT command. A DOS 3.3 master disk is made by using the Master Create utility.) Now, execute these commands from the monitor:

1D00<AD00.B5FFM *move code down*
9600G *boot the slave disk*
BSAVE GM.LOADER, A\$1D00, L\$8FF

At this point, the usual thing to do would be to find room for the file on the copied GM disk and to make GM.LOADER the "Hello" file of the disk. That cannot be done here since GM does not use all of DOS 3.3 and since most of the disk is filled with program code and data. What we will have to do is find a place for the file and adjust Boot 1 to load our GM.LOADER instead of the protection routine. A scan of the disk with Copy II Plus' "Track/Sector Map" utility revealed no free space large enough to store the file. However, there are only a few large files on the disk. This means the catalog track will have some free sectors. As it turns out, we can store the file GM.LOADER on track \$11, sectors \$03-B.

Here is what the program to do this looks like.

```
0900 A2 60 LDX #560 X-reg = slot 6
0902 A9 09 LDA #509 write 9 pages
0904 8D E0 B7 STA $B7E0
0907 A9 11 LDA #511 use track $11
0909 8D 15 B7 STA $B715
090C A9 0B LDA #50B start at sct $0B go down
090E 8D 1A B7 STA $B71A
0911 A9 26 LDA #526 start page of memory + 1
                                that the RWTS will
0913 8D E7 B7 STA $B7E7 work down from
0916 4C 00 B7 JMP $B700 write the data to disk
```

Insert the COPYA version of GM into drive 1 enter these commands:

CALL-151 *RWTS write cmd*
B726:02 *any volume # is OK*
B7EB:00
0900:A2 60 A9 09 8D E0 B7 A9
0908:11 8D 15 B7 A9 0B 8D 1A
0910:B7 A9 26 8D E7 B7 4C 00 B7
900G

GM.LOADER will be written to the appropriate sectors of track \$11. We have the captured loader on disk now, but the disk still won't boot. Boot0 must be modified to load GM.LOADER after it has loaded Boot1, and Boot1 must be modified to jump to GM.LOADER instead of jumping to the protection routine. We also need to clean up the catalog track so we won't get a bunch of garbage and disk errors when we catalog the disk. Get your sector editor out and make these edits to the COPYA version of GM:

Trk	Sct	Byte(s)	From	To
\$00	\$00	\$4A	?	4C 80 08
		\$80	?	A9 09 8D E0 B7 A9 11 8D 15 B7 A9 0B 8D 1A B7 A9 B6 8D E7 B7 4C 00 B7
	\$01	\$15	?	11
		\$1A	?	0B
		\$1F	?	B5
		\$E0	?	09
\$11	\$0C	\$01	?	00 00

With these edits, you now have a COPYA, fully functional version of GM. The back side of GM may be copied with COPYA.

Here are the cookbook instructions for deprotecting Game-Maker:

1 Make a COPYA copy of Game-Maker.

CALL-151
9600<C600.C6FFM
96FA:98 N 9801:4C 59 FF

2 Insert the Game-Maker original disk into drive one.

9600G
COE8
9800<800.8FFM
980E:90 N 984A:4C 59 FF

9600G
COE8
4600<B600.BFFFF
984A:4C 00 47
4741:4C 59 FF
9600G
3000<8000.82FFM
4741:4C 00 30
303C:30 N 30F2:31 N 313B:32
3227:32 N 3242:32
3269:4C 59 FF
9600G
1D00<AD00.B5FFM

3 Insert a DOS 3.3 formatted slave disk and save the loader to disk in case you glitch the softkey.

C600G
BSAVE GM.LOADER

4 Insert the COPYA version of Game-Maker.

CALL-151
B726:02 N B7EB:00
0900:A2 60 A9 09 8D E0 B7 A9
0908:11 8D 15 B7 A9 0B 8D 1A
0910:B7 A9 26 8D E7 B7 4C 00
0918:B7
900G

5 Make the following sector edits to COPYA version of Game-Maker:

Trk	Sct	Byte(s)	From	To
\$00	\$00	\$4A	?	4C 80 08
		\$80	?	A9 09 8D E0 B7 A9 11 8D 15 B7 A9 0B 8D 1A B7 A9 B6 8D E7 B7 4C 00 B7
\$00	\$01	\$15	?	11
		\$1A	?	0B
		\$1F	?	B5
		\$E0	?	09
\$11	\$0C	\$01	?	00 00

6 Copy the back side of Game-Maker with COPYA onto another disk and you are done.

Whew! William Green's five-byte sector edit sure beats doing all of that. To understand why the five-byte sector edit worked, it is necessary to examine the protection on Game-Maker. The loader at \$AD00 is necessary to load the main program from the disk. This loader is encrypted on disk and the key to decrypt it is found through a nibble count. No original disk, no decrypted loader.

By using the boot-trace method to coax the decrypted loader from the disk, I captured and used it to load the rest of the program. This can be considered the "infantry wade-in and take no prisoners" brute assault on the nibble count to access the protected information.



Let's look at a documented version of Mr. Green's crack, on track \$21, sector \$05, starting at byte \$54:

```
A9 FF LDA #FFF is the decrypt key
18 CLC clear carry to force branch
90 3D BCC ?? branch to the decrypt routine
```

Mr. Green's tactic was simply to discover the decryption key by whatever means, load the accumulator with it, and branch to the decryption routine. Simple and highly effective. To be candid, I had considered this, but could not decide on where to branch to into the nibble count routine.

I hope this long softkey will provide an example of in-depth disk analysis to beginning disk-busters who read COMPUTIST. It certainly shows how NOT to crack *Game-Maker!* Yet, it also shows there is more than one way to defeat a nibble count, albeit a tedious way.

Softkey Addendum for...

Master Diagnostics IIe

Nikrom

The softkey for *Master Diagnostics IIe* (MDIIE) as printed in COMPUTIST #52 is not complete, and this is my fault. The softkeyed disk will work fine unless the disk drive test routines are invoked.

The reason these routines print garbage on the screen and bomb out is due to a DOS change made by Nikrom. At locations \$BA69 (47721) and \$BA7D (47741), Nikrom inserted routines that swap disk data marks. They had to; otherwise the original MDIIE disk would never be able to read normally formatted disks to conduct the tests. On a disk copied by *Super IOB*, the calls to these locations become logic bombs that stop the Apple cold.

There are several approaches to remedy this problem. One, the locations \$BA69 and \$BA7D could be changed to 60 (Return from Subroutine) on the DOS of the SIOB'd disk. This is not desirable because late versions of DOS 3.3 use these locations for their own purposes and the person cracking the disk should not have to worry about the 3.3 version. Two, all of the Applesoft programs these calls appear in could be loaded, edited to remove the calls, and saved to disk. This would be tedious. Three, the calls can be edited on disk to direct the call to a location in DOS that already has a RTS instruction. This is the best method I found.

The code to call these routines was CALL 47741 and CALL 47721. Since "477" was common to both of these instructions, I used *Copy II Plus* to scan the disk for the hex bytes 34 37 37, which is the way Applesoft stored these three digits on disk in ASCII. This quickly

located the sectors in question. I changed the last two digits of 47741 and 47721 from 41 and 21 to 33. There is an RTS instruction at location 47733 (\$BA75). Here are the edits to make on the SIOB'd version of MDIIE:

Trk	Sct	Byte(s)	From	To
\$05	\$0E	\$5D	?	33 33
\$06	\$05	\$B1	?	33 33
	\$08	\$9D	?	33 33
	\$0E	\$44	?	33 33
\$0E	\$07	\$60	?	33 33
	\$0E	\$2F	?	33 33
\$10	\$06	\$BE	?	33 33
		\$DD	?	33 33
	\$0E	\$21	?	33 33

Editing these nine sectors will make the drive routines fully functional. Sorry about any problems this oversight may have caused! One final note. In case you have a very early version of DOS 3.3, the RTS instruction at \$BA75 may not exist. In this case, you should redo the softkey, this time including a POKE 47733,96 after the POKE 40514,52 prior to the copy disk initialization. This new POKE ensures an RTS instruction will be present at \$BA75.

Joe Walters

Softkey for...

Microzine #24

Scholastic

A REM statement at line number zero of the Applesoft program called HELLO contains a **[D]** followed by FP. This causes the program to be erased in memory if you try to list it. This is easily defeated by removing the offending statement since it performs no useful function (from our standpoint).

Secondly, there is a nibble count program called CP.OPTIONS that is called from line three of the same HELLO program. That too can be defeated by simply REMing it out since I could not detect any other program making use of any output from the nibble count program.

1 Insert side one of Microzine #24 in drive 1.

LOAD HELLO

0 REM

3 POKE (767),2 : REM PRINT CHR\$(4)"BRUN CP.OPTIONS"

SAVE HELLO

The disk is deprotected.

The remainder of this article shows a commented disassembly of CP.OPTIONS so you can become familiar with one type of nibble count program.

Notes:

1. When a RTS (Return from subroutine) instruction is executed the address stored on the stack has 1 added to it in order to obtain the true return address. So, when \$C5FF is stored on the stack and a RTS occurs we will return to \$C600.

2. The disk controller card is the one that actually reads the data from the disk. Location \$C08C is the output of the card. \$C08C is made zero and then the byte is read in a bit at a time starting with disk bit 7 which is initially placed in bit 0 of \$C08C. As each succeeding bit is read in the preceding bit(s) are shifted left one place and the new bit is placed in bit 0. Since all disk bytes must have bit 7 = 1, it follows that when \$C08C shows bit 7 set the byte is complete.

RWTS = \$03D9 Vector address of RWTS
GETIOB = \$03E3 Get RWTS parm list address
MTROFF = \$C088 Drive motor off
MTRON = \$C089 Drive motor on
STROBE = \$C08C Minus when a byte is all in

```
9000 20 E3 03 JSR GETIOB
9003 85 FB STA $FB MSB parm list
9005 84 FA STY $FA LSB parm list
9007 A9 C5 LDA #$C5 MSB of $C5FF to stack. See
9009 48 PHA below for how $FF makes it
900A A9 00 LDA #$00 Init loop counter
900C 85 FC STA $FC
900E A2 03 LDX #$03
9010 BC 35 90 LDY $9035,X Set parm list with zeroes
9013 91 FA STA ($FA),Y at indices from table.
9015 CA DEX X = 3, 2, 1, 0, $FF
9016 10 F8 BPL $9010 Fall through when X = $FF
9018 8A TXA $FF from X -> A -> stack
9019 48 PHA Stack now = $C5FF
901A 20 28 90 JSR $9028 Seek to track zero
901D A0 01 LDY #$01
901F B1 FA LDA ($FA),Y Get slot*16 from
parm list
9021 AA TAX Move slot*16 to X
9022 20 39 90 JSR $9039 Nibble away at it
9025 68 PLA Remove $C5FF from stack
9026 68 PLA
9027 60 RTS Return success
9028 20 E3 03 JSR GETIOB
902B 20 D9 03 JSR RWTS
902E A9 00 LDA #$00
9030 85 48 STA $48
9032 B0 52 BCS $9086 Error on seek = panic time!
9034 60 RTS
```

The following hex data table is used to get the drive head to Track zero.

08 = LSB user's buffer 04 = Track
0C = Command (seek) 03 = Vol.

```
9035 08 04 0C HEX 08040C03
9038 03 HEX 03
```



Here is where the nibble count begins.

```

9039 BD 89 C0 LDA MTRON,X Motor (back) on
903C A9 56 LDA #56 Loop counter for looking
903E 85 FD STA $FD for $FB's
9040 A9 08 LDA #08
9042 C6 FC DEC $FC $FF, $FE, ... 0, $FF, ...
9044 D0 04 BNE H904A
9046 C6 FD DEC $FD $56, $55, ... 0
9048 F0 3C BEQ H9086 Exit failure

```

When a disk is initialized it is with an address header of D5 AA 96, a data header of D5 AA AD and a data block (96 96 96...) full of zeros. This is repeated for 16 sectors. (ADZ ADZ ADZ ADZ... 16 times)

The number of zeros is enough to reserve room for the future data. The nibble counts usually hide after the data before the next Address Header. We will be looking for the sequence of FB FF ff FF ff FF FF, Where the FF's are 10 bit bytes (00 1111 1111) and the ff's are normal 8 bit bytes (1111 1111). The one shot read at S9057 will yield something less than \$08 for 10 bit nibbles and something greater for 8 bit nibbles. (Hard to use Copy II Plus or Locksmith to scan for FB's followed by the above.)

The number(s) in the comment fields give the cycles for that instruction. In the case of numbers like 2/3, the first is for fall through, the second is when the branch is taken.

Each disk byte takes 32µs to read which is 4µs per bit. Since the processor runs at 1µs, 32µs is 32 machine cycles. Thus, each bit on the disk takes 4 machine cycles.

For 8 bit bytes (ff) we have:
µs 4 4 4 4 4 4 4 4 = 32µs
bits 1 1 1 1 1 1 1 1

For 10 bit bytes (FF) we have:
µs 4 4 4 4 4 4 4 4 4 4 = 40µs
bits 0 0 1 1 1 1 1 1 1 1

Ten bit bytes are also known as self synch bytes and are explained at great length in that ever popular tome, "Beneath Apple DOS."

The disk controller card starts reading a byte off the disk by first zeroing \$C08C, then the next byte is shifted in from the right, a bit at a time, every 4µs. Since it takes 16µs to 20µs to go from S904A through S9057 it is clear that Y is greater than \$08 for 8 bit bytes: 1111 (16) or 11111 (32).

It follows that Y is less than \$08 for 10 bit bytes: 0011 (3) or 00111 (7). (Fast disk drives could mess this up)

If the above is unclear then consider both the code below and the note above at length.

```

904A BC 8C C0 LDY STROBE,X4 - Wait for a disk byte
904D 10 FB BPL H904A 2/3 - B/not yet
904F C0 FB CPY #5FB 2 - Was it $FB
9051 D0 ED BNE H9040 2/3 - No/keep looking
9053 F0 00 BEQ H9055 2/3 - Yes Xfer & waste cycle
9055 EA NOP 2 - Waste a couple more
9056 EA NOP 2

```

Note that the LDY STROBE,X below is NOT followed by a BPL This means we will take whatever has been seen by the disk controller card at this point.

```

9057 BC 8C C0 LDY STROBE,X4 - Get partial nibble
905A C0 08 CPY #08 2 - Set carry if Y >= $08

```

'A' starts out as \$08 & each time through is changed:
00001000, 00010000, 00100000, 01000000, 10000000

Last time through the carry is set & we go for final nibble. Note that 'A' will (and is) something different if the carry was set.

This is the real sequence:
00001000, 00010000, 00100001, 01000010, 10000101, 00001010

Init	1st	2nd	3rd	4th	Last	ROL
	FF	ff	FF	ff	A = \$0A	
905C 2A		ROL		2		
905D 00 0B		BCS H906A		2/3 If set, look for final		
905F BC 8C C0		LDY STROBE,X 4				
9062 10 FB		BPL H905F		2/3 Wait partial to cmplt		
9064 C0 FF		CPY #5FF		2 Was it = \$FF (or ff)		
9066 D0 D8		BNE H9040		2 No Start over		
9068 F0 EB		BEQ H9055		3 Always Xfer & Get partial		
906A BC 8C C0		LDY STROBE,X		Look for byte		
906D 10 FB		BPL H906A				
906F 84 FC		STY \$FC		\$FF - trust me		
9071 C9 0A		CMP #50A		Was A = \$0A from above?		
9073 D0 CB		BNE H9040		No, start over		
9075 BD 8C C0		LDA STROBE,X		Another \$FF - trust again		
9078 10 FB		BPL H9075				

Misdirection. A = \$FF and this just keeps it so.

```

907A 38 SEC Going to set LSB of A
907B 2A ROL Keep A = $FF

```

Think about things for a second:

1. The only value A can have before the EOR is \$FF if it is going to be zero so the BNE doesn't take.

2. A must = \$FF before the AND and SFC must contain \$FF since these are the only values that when ANDed together produce \$FF.

```

907C 25 FC AND $FC $FF & $FF = $FF
907E 49 FF EOR #5FF $FF xor $FF = $00
9080 D0 04 BNE H9086 B/if wrong & die
9082 DD 88 C0 CMP MTR0FF,X Shut of disk drive
9085 60 RTS Return Success
9086 A8 TAY
9087 DD 88 C0 CMP MTR0FF,X Off motor
908A 68 PLA Pull return from JSR H9039
908B 68 PLA off so we return to $C600
908C 99 00 90 STA H9000,Y Wipe this routine
908F C8 INY
9090 C0 8B CPY #58B
9092 D0 F8 BNE H908C
9094 60 RTS

```

Phil Goetz

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Electronic Arts Protection Language

I was boot-code tracing *Amnesia*, and I came to S3700. A protection routine starting at S3704 evidently checked for one sector of nothing but \$AFs, but I didn't see where it was called. The tracing became very complicated and indirect, but I noticed that I kept circling back to \$38C3. Then I realized that \$38C3 was the equivalent of Applesoft's GETCHR for EOA's own interpretive language. After much tracing and disassembling, I decoded this language, which I call EOAPL. It is basically a small subset of 6502 machine language, and it is of course much slower, so its only purpose is to confuse crackers.

To see this code, boot *Amnesia*. When it asks you PLAY A SAVED GAME? insert a normal disk into the drive and press **RESET**. All the code is left unaltered.

In *Amnesia*, S3700 jumps to S376A:

```

376A JSR $38E1
376D JSR $38B4
3770 JMP $376A

```

The "JSR \$38B4" is the call to the interpreter. It stores the address 3 bytes beyond the next instruction in the interpreter's program counter (in this case, S3773) and falls through to \$38C3, which starts running the program at \$3773.

\$38C3 is the crucial routine to look for:

```

38C3 B1 52 LDA ($52),Y Get opcode
38C5 C8 INY Advance program counter
38C6 D0 02 BNE $38CA
38C8 E6 53 INC $53
38CA AA TAX
38CB BD D4 38 LDA $38D4,X Get low byte of address
which executes this
instruction
38CE 8D E0 39 STA $39E0 Store it in the JMP
38D1 4C DF 39 JMP $39DF Execute; routine will
return via a JMP $38C3
39DF 4C xx 39 JMP $39xx

```

Each instruction consists of a 1-byte opcode followed by a 0, 1, or 2 byte parameter.

The opcodes are not encoded. Each 1 byte parameter is EORed with \$4C. Every 2 byte parameter is EORed with \$D903 (the low byte is EORed with \$03 and the high byte with \$D9).

EOAPL uses \$56 as the accumulator and \$53,52 as the program counter. \$50-5F are used for various things.



```

MTAB ASC /GOTOJSRVGONELD56LD56GSUBST56
      S56-RTRNJSR INC RTS S56+????/
INSDS1 LDX $3A
      LDY $3B
      JSR $FD96
      JSR $F948
INSDS2 LDA ($3A,X)
      CMP #0D LEGAL OPCODE?
      BCC GETFMT YES
      LDA #0D ???
GETFMT TAY
      STA CODE
      LDA LENTAB,Y
      STA LENGTH
      LDA FMTTAB,Y
      STA FORMAT
      LDY #0
      RTS

```

EOAPL Disassembler hex dump

```

0800: A5 00 85 3A A5 01 85 3B $6CBE
0808: A9 16 85 06 20 1F 08 A5 $82F1
0810: 2F 38 65 3A 85 3A 90 02 $4FC9
0818: E6 3B C6 06 D0 EE 60 20 $78B4
0820: F0 08 B1 3A 20 DA FD A2 $7E59
0828: 01 20 4A F9 C4 2F C8 90 $55BF
0830: F1 A2 03 C0 04 90 F2 A5 $DC50
0838: 02 0A 0A A8 A2 04 B9 B8 $734C
0840: 08 20 ED FD C8 CA D0 F6 $F831
0848: 20 48 F9 A4 2F A2 06 E0 $C68C
0850: 03 F0 2E 06 2E 90 0E BD $EB14
0858: B3 F9 20 ED FD BD B9 F9 $A669
0860: F0 03 20 ED FD CA D0 E7 $AF8B
0868: 60 88 30 E7 86 03 A6 2F $6666
0870: E0 02 B0 05 49 4C 4C 7C $F1AC
0878: 08 59 9A 08 20 DA FD A6 $FB8B
0880: 03 A5 2E C9 E8 B1 3A 90 $A9D0
0888: E0 20 56 F9 AA E8 D0 01 $07EE
0890: C8 98 20 DA FD 8A 4C DA $DB2E
0898: FD 60 03 D9 02 02 02 01 $1283
08A0: 02 02 02 01 00 02 02 00 $AA8F
08A8: 02 00 80 80 80 20 80 80 $9B6F
08B0: 80 20 00 80 80 00 80 00 $AB0F
08B8: C7 CF D4 CF CA D3 D2 D6 $1FD2
08C0: C7 CF CE C5 CC C4 B5 B6 $A30E
08C8: CC C4 B5 B6 C7 D3 D5 C2 $C32C
08D0: D3 D4 B5 B6 D3 B5 B6 AD $9E0C
08D8: D2 D4 D2 CE CA D3 D2 A0 $511A
08E0: C9 CE C3 A0 D2 D4 D3 A0 $F4D2
08E8: D3 B5 B6 AB BF BF BF BF $5048
08F0: A6 3A A4 3B 20 96 FD 20 $A29A
08F8: 48 F9 A1 3A C9 0D 90 02 $3C80
0900: A9 0D A8 85 02 B9 9C 08 $72E1
0908: 85 2F B9 A0 08 85 2E A0 $FF0F
0910: 00 60 $FD41

```

Diskscan:

How to find EOR on disk

I was tired of getting a "HARDWARE FAILURE!" no matter what I tried with *F-15 Strike Eagle*. I searched for the string on disk, but it wasn't there. Knowing Microprose encoded with a simple EOR, I wrote *Diskscan* to scan an entire disk for a string which had been EORed with any value.

To use *Diskscan*: Enter the length of the pattern you want to find in \$300, and the pattern from \$301 on. Then **BRUN SCAN**. It will ask you if you want to **SCAN (U)P OR (D)OWN?** If you choose D (which is usually the best choice), *Diskscan* will scan the disk from track \$22, sector \$0F down to track \$00, sector \$00. More importantly, if it sees the beginning of the string on track \$1A, sector \$07, it will look for the rest of it on track \$1A, sector \$06. If you were scanning up, it would look for the rest on track \$1A, sector \$08.

Every time it finds a match, it will print the track, sector, byte# of the start of the match, and the value which the pattern was EORed with. You may press ESC at any time to halt it.

So to search for **HARDWARE** I enter:

```

CALL -151
300:8 C8 C1 D2 C4 D7 C1 D2 C5
BRUN SCAN
D for read down

```

If you tried this on the original, you would get:

```

T$22 S$0F ERROR #40
T$22 S$0E ERROR #40

```

and so on. But since I am using a normal-format copy, after a few minutes *Diskscan* responds with:

```

T$17 S$0F 65:C0
T$00 S$00
* you're still in the monitor

```

This means that C8 C1 D2 C4 D7 C1 D2 C5 EORed with \$C0 is on track \$17, sector \$0F starting at byte \$65.

Note that Applesoft must be resident, because *Diskscan* calls \$DB3A to print. Also, if your DOS is non-standard or in an unusual location, you should replace the **JMP SA851** with **JMP \$3D0**. \$3D0 will both reconnect DOS and enter BASIC.

Diskscan is written using the *S-C Macro Assembler*. "/LABEL" means the high-byte of LABEL, "#LABEL" is the low-byte. ".BS n" creates n zeroes. Enter the hex dump and save it as "DISKSCAN, A\$2222, L\$1D2".

DISKSCAN source code

```

.LIF
* .....LOCATE EOR-ENCODED STRING
      .OR $2222
      .TF SCAN
SCAN JSR $FE89 derail DOS
      JSR $FE93
      LDY /UOD
      LDA #UOD
      JSR $DB3A
      LDA $C010
      .10 LDA $C000
      BPL .10
      CMP #"U
      BEQ UP
      CMP #"u
      BEQ UP
DOWN LDY #S23 track
      LDX #0 sector
      LDA #FFF inc
      BNE SETUP
UP LDY #FFF track
      LDX #F sector
      LDA #1 inc
SETUP STY TRACK
      STX SECT
      STA INC
      LDA #0
      STA VOL
      STA PTR
      LDA #1
      STA CMND
      STA FLAG tell getbyte to read sector
      JSR $FD8E
      JSR PTS
GO LDX #0
      STX MIND
      LDA LEN
      STA LEN2
      LDA PTR
      STA MSTART
      LDA TRACK
      STA T0
      LDA SECT
      STA S0
      JSR GETBYTE
      .10 BCS .90
      LDX MIND
      BNE .20
      PHA
      EOR STRING
      STA EOR
      PLA
      .20 EOR STRING.X
      CMP EOR
      BNE .30 no match
      INC MIND
      DEC LEN2 matched this char
      BNE .10
* .....Complete match
      LDA T0
      JSR PT

```

Readers Data Exchange

<pre> LDA S0 JSR PS LDA #10 STA \$24 LDA MSTART JSR \$FDDA LDA #": JSR \$FDF0 LDA EOR JSR \$FDDA JSR PTS LDA TRACK JSR PT LDA SECT JSR PS </pre>	<pre> .0 LDA BUFFER,Y INC PTR CLC RTS .1 LDA VTAB STA \$25 JSR \$FC22 LDY #0 STY FLAG LDA SECT CLC ADC INC BPL .3 LDA #\$F INY .3 CMP #\$10 BNE .4 LDA #0 INY .4 STA SECT TYA BEQ .5 LDA TRACK CLC ADC INC BMI .20 CMP #\$23 BEQ .20 STA TRACK JSR PT .5 LDA SECT JSR PS JSR RWTS LDY #0 BCC .0 LDY /ERRMSG LDA #ERRMSG JSR \$DB3A LDA ERR JSR \$FDDA JSR PTS JMP .1 .10 CLC RTS .20 SEC- done RTS RWTS LDA /IOB LDY #IOB JMP \$3D9 UOD .HS 8D .AS -/READ (U)P OR (D)OWN? / .HS 00 .HS 8D .AS -/T\$ S\$/ .HS 00 ERRMSG AS -/ ERR #\$/ 3 spaces before err .HS 00 EOR .BS 1byte which string is EORed with on disk FLAG .BS 1 INC .BS 1 T/S increment: move up or down LEN2 .BS 1 countdown to match MIND .BS 1 match index </pre>	<pre> MSTART .BS 1 match start index PTR .HS 00 pointer into buffer T0 .BS 1 track match started on S0 .BS 1 VTAB .BS 1 * IOB .HS 016001 VOL .HS 00 TRACK .BS 1 SECT .BS 1 .DA DEVTAB .DA BUFFER .HS 0000 CMND .BS 1 ERR .HS 00 .HS FE6001 .HS 0001EFD8 DEVTAB BUFFER * .OR \$300 LEN .BS 1 STRING </pre>
<p>* Go back & start at byte after beginning of last match attempt, see if we need to go back a sector.</p>		
<pre> .30 LDY MSTART INY BEQ .40 OK if getbyte will read in CPY PTR new sector BCC .40 OK if MSTART<PTR LDA PTR BEQ .40 OK if next sector hasn't been read LDA T0 STA TRACK LDA S0 STA SECT JSR RWTS LDY MSTART INY .40 STY PTR JMP GO .90 LDA \$C010 JSR \$FE84 I don't know why, but my Apple goes bad if these aren't both called JSR \$FB2F connect DOS JMP \$A851 PTS LDY /TS LDA #TS JSR \$DB3A LDA \$25 STA VTAB RTS PT LDX #2 .HS 2C PS LDX #7 STX \$24 JMP \$FDDA GETBYTE LDA \$C000 CMP #\$A0 BEQ GETBYTE pause CMP #\$9B Esc exits BEQ .20 LDY PTR BNE .0 LDA MSTART If MSTART=PTR=0, already loaded sector during last comparison ORA FLAG load if 1st sector read BNE .1 new sector </pre>		

DISKSCAN hex dump

	2222: 20 89 FE 20 93 FE	\$6976
	2228: A0 23 A9 AB 20 3A DB AD	\$DF75
	2230: 10 C0 AD 00 C0 10 FB C9	\$914B
	2238: D5 F0 0C C9 F5 F0 08 A0	\$7E77
	2240: 23 A2 00 A9 FF D0 06 A0	\$7638
	2248: FF A2 0F A9 01 8C E3 23	\$DD76
	2250: 8E E4 23 8D D7 23 A9 00	\$74C6
	2258: 8D E2 23 8D DB 23 A9 01	\$23E4
	2260: 8D EB 23 8D D6 23 20 8E	\$3A7B
	2268: FD 20 10 23 A2 00 8E D9	\$1C7D
	2270: 23 AD 00 03 8D D8 23 AD	\$5729
	2278: DB 23 8D DA 23 AD E3 23	\$59E8
	2280: 8D DC 23 AD E4 23 8D DD	\$23E2
	2288: 23 20 27 23 B0 76 AE D9	\$76C8
	2290: 23 D0 08 48 4D 01 03 8D	\$827F
	2298: D5 23 68 5D 01 03 CD D5	\$684E
	22A0: 23 D0 38 EE D9 23 CE D8	\$41E4
	22A8: 23 D0 DE AD DC 23 20 1D	\$004C
	22B0: 23 AD DD 23 20 20 23 A9	\$852A
	22B8: 0A 85 24 AD DA 23 20 DA	\$14BA
	22C0: FD A9 BA 20 F0 FD AD D5	\$4234
	22C8: 23 20 DA FD 20 10 23 AD	\$1D7C
	22D0: E3 23 20 1D 23 AD E4 23	\$4504
	22D8: 20 20 23 AC DA 23 C8 F0	\$CA22
	22E0: 1D CC DB 23 90 18 AD DB	\$93CB
	22E8: 23 F0 13 AD DC 23 8D E3	\$A488
	22F0: 23 AD DD 23 8D E4 23 20	\$9EB5
	22F8: A4 23 AC DA 23 C8 8C DB	\$793B
	2300: 23 4C 6C 22 AD 10 C0 20	\$DA78
	2308: 84 FE 20 2F FB 4C 51 A8	\$10F2
	2310: A0 23 A9 C2 20 3A DB A5	\$8399
	2318: 25 8D DE 23 60 A2 02 2C	\$89EE
	2320: A2 07 86 24 4C DA FD AD	\$C181
	2328: 00 C0 C9 A0 F0 F9 C9 9B	\$27B6
	2330: F0 70 AC DB 23 D0 08 AD	\$0218
	2338: DA 23 0D D6 23 D0 08 B9	\$5CC4
	2340: F4 23 EE DB 23 18 60 AD	\$CF6F

```

2348: DE 23 85 25 20 22 FC A0      $BEE6
2350: 00 8C D6 23 AD E4 23 18      $6B7B
2358: 6D D7 23 10 03 A9 0F C8      $063C

2360: C9 10 D0 03 A9 00 C8 8D      $A8C3
2368: E4 23 98 F0 13 AD E3 23      $43E3
2370: 18 6D D7 23 30 2C C9 23      $1DDF
2378: F0 28 8D E3 23 20 1D 23      $7C1E
2380: AD E4 23 20 20 23 20 A4      $E01F
2388: 23 A0 00 90 B2 A0 23 A9      $E2E9
2390: CB 20 3A DB AD EC 23 20      $744B
2398: DA FD 20 10 23 4C 47 23      $EB6A
23A0: 18 60 38 60 A9 23 A0 DF      $E58F
23A8: 4C D9 03 8D D2 C5 C1 C4      $A6B3

23B0: A0 A8 D5 A9 D0 A0 CF D2      $206C
23B8: A0 A8 C4 A9 CF D7 CE BF      $1519
23C0: A0 00 8D D4 A4 A0 A0 A0      $CF02
23C8: D3 A4 00 A0 A0 A0 C5 D2      $CC2D
23D0: D2 A0 A3 A4 00 00 00 00      $F2C0
23D8: 00 00 00 00 00 00 00 01      $53C0
23E0: 60 01 00 00 00 F0 23 F4      $A1A3
23E8: 23 00 00 00 00 FE 60 01      $B9E1
23F0: 00 01 EF D8                    $B12C
    
```

Jose A. Montano

Raves for the Macintosh Extended Keyboard

I have just purchased Apple's new Macintosh extended keyboard and attached it to my GS to see what would happen. Lo and behold! Nothing happened (nothing wrong, that is). It works great on the GS. The key action is much smoother and you have 21 extra keys to assign whatever functions you want. In addition, the CONTROL, OPTION and APPLE keys are duplicated on the lower right hand side where the GS arrow keys are. The arrow keys are to the right of these (in a more sensible layout, if I do say so myself).

For any of your readers who are interested in using the new keyboard, here are a few things I have found out about it.

Extra Keys and Their ASCII Values

F1 z Chr\$(122)	F12 o Chr\$(111)
F2 x Chr\$(120)	F13 i Chr\$(105)
F3 c Chr\$(99)	F14 k Chr\$(107)
F4 v Chr\$(118)	F15 q Chr\$(113)
F5 ` Chr\$(96)	HELP r Chr\$(114)
F6 a Chr\$(97)	Del u Chr\$(117)
F7 b Chr\$(98)	HOME s Chr\$(115)
F8 d Chr\$(100)	END w Chr\$(119)
F9 e Chr\$(101)	PAGE UP t Chr\$(116)
F10 m Chr\$(109)	PAGE DOWN y Chr\$(121)
F11 g Chr\$(103)	

All extra keys set Bit 4 in the KEYMOD Register at location \$C025 (49189) indicating they were pressed on the numeric keypad.

For most BASIC applications there is no difference between F1 and "z", for example.

To see the difference you must query the KEYMOD Register with suitable assembler instructions such as:

```

LOOP LDA $C025 Get the current key status
BIT #510 Was key pressed on keypad?
BEQ LOOP If not, recheck key status
LDA $C000 If so, load key into
Accumulator
STA $C010 Clear the keyboard strobe
... continue with your code
    
```

One possible Applesoft BASIC differentiation would be:

```

100 GET A$
110 KM = PEEK(49189)
120 IF KM <> 16 THEN PRINT CHR$(13): GOTO 100
130 PRINT A$
...continue with your code...
    
```

For the sake of interest, the following chart shows how the KEYMOD register is bit-mapped.

BIT	VAL	DESCRIPTION
7	1	If [C] was pressed
6	1	If Option key was pressed ([A])
5	1	If the modifier keylatch has data (any key pressed)
4	1	If a key on the numeric keypad has been pressed
3	1	If a key has been held down long enough to engage repeat
2	1	If the Caps Lock key is down
1	1	If the Shift key is down
0	0	Unknown (or Unused)

This keyboard could add whole new dimensions to commercial applications if software designers for the IIGs would program with the new keyboard in mind. You could also enhance your own personal masterpieces by using the function keys for program flow instead of the cryptic keypresses that must be used now. The new keyboard also allows for function key overlays to let you label each function key the way you want to.

Apple's new extended keyboard is a boon not only for Macintosh users, but for Apple IIGs users, as well, and the sooner software companies realize it the better.

Jolly Roger of The Curse

Softkey for...

Microzine #14 Fun House

Scholastic

Requirements

Sector editor

When asked to deprotect this software I first consulted old issues of COMPUTIST and found it was not listed. It was listed in the *Copy*

II Plus parameter list, but a copy made with this program (or any bit copier) wouldn't work. Having exhausted the "easy" methods, it was time to do an original crack.

Too many softkeys give only the step-by-step procedures and not how the crack was done. Fear not - details follow!

The first step is to determine the type of protection. Was an altered DOS or a nibble count used or were other nefarious and sneaky tricks employed?

Upon boot, an Applesoft prompt appeared which would mean DOS is reasonably intact. The disk could be cataloged under normal DOS 3.3 - normal DOS may be used. The disk could be copied with COPYA, but the copy continually reboots. This leads us to a nibble count or some sort of disk signature checking routine as the major protection.

Copy II Plus revealed that the boot program was named HELLO. This was beginning to look too easy. Hmmmm, when DOS 3.3 is booted and then the HELLO program loaded the only thing that appeared with the LIST command is 0 REM.

After a CALL-151 to enter the monitor, a check of \$0067 shows that the listing should begin at \$0801 - all normal. However, looking at the code beginning at \$0801 shows that the authors have screwed around with the BASIC line pointers to prevent us from LISTing the HELLO program and thus discovering the file that is called which contains the CALL to the protection code.

Well, it would have been a simple, but perhaps tedious, task to un-diddle the line pointers but an easier way around this was possible. I simply invoked MONICO and then ran the HELLO program. The first file loaded was W.SPC, a suspiciously short binary file. I went back to *Copy II Plus* and mapped the disk to find the location of the offending W.SPC file. It was located on track \$05, sectors \$02 and \$01. Another way to do this would have been to go to track \$11 (catalog) and read the location from there, but I'm lazy.

Anyway, using the sector editor, I went to track \$05, sector \$02 and found the Track/Sector list for the file which just said that the file was located on sector \$01. Since this was a binary file, the first two bytes at the beginning of track \$01 were the start address of the file in memory and the next two were the file length. The actual code began at byte 5 and was a JSR to wherever. I didn't even look. The code was a series of stack pushes and pulls - pretty obvious this was protection code. I just slapped an 18 60 into bytes 5 and 6 and booted the disk. It worked fine. They didn't even bother to checksum the protection code to see if it was changed. Of course, you could un-diddle the HELLO program and remove the BASIC CALL to the start address of the W.SPC file but that's too much work.



Step-By-Step

1 Copy the disk with COPYA or any disk copy program.

2 Make the following sector edit:

Trk	Sct	Byte(s)	From	To
\$05	\$01	\$05-06	20 XX	18 60

John Wulfken

Softkey for...

Hardball IIgs

Accolade

Requirements

- Apple IIgs with 512K
- A blank 5 1/4" disk
- A sector editor like *Copy II Plus*

I found a simple approach to deprotecting *HardBall GS* by first removing all references to the reset vector, and loading in all values changed by the protection. The protection itself starts at hex address \$2C00 with two calls to hex address \$6B5D. If you would like to trace the protection, I recommend that you purchase a copy of Apple IIgs Firmware Reference the official publication. Chapter 7 contains a wealth of information on deprotecting GS software.

The code at \$6B5D is a nice piece of work by Accolade. It loads in as a JSR FFFF and is changed during program execution to a JSR C50D. This is a smartport call much like the ProDOS call JSR BF00 call.

Step-By-Step

1 Make a copy of your original disk. Then format a 5 1/4" disk. Move the file *HARDBALL/SYSTEM/START* from your copy disk to your 5 1/4" disk.

2 Using a sector editor search for 8F F3 03 00 and replace with EA EA EA EA.

3 Copy this file back to your disk and reformat your 5 1/4" disk. Copy the file *HARDBALL/HARD.CODE* to your 5 1/4" disk and search for 9C F3 03 9C F4 03 and replace with EA EA EA EA EA EA. You will now be able to **RESET** and the disk will not reboot.

4 Search for 08 8B 0B C2 20 A9 5D 6A 5B E2 20 AD ? and replace with 08 28 A9 35 8D 78 03 A9 1E 8D 79 03 A9 D0 8D 3B 00 A9 12 8D F0 00 A9 01 8D F4 00 A9 B0 8D F6 00 A9 0D 8D F7 00 A9 22 8D F8 00 8D EC 00 A9 19 8D EA 00 A9 0B 8D EB 00 A9 A8 8D ED 00 A9 03 8D 02 95 A9 F8 8D 04 95 A9 48 8D 05 95 A9 41 8D 06 95 8D 0A 95 A9 52 8D 07 95 A9 44 8D 08 95 A9 42 8D 09 95 A9 4C 8D 0B 95 8D 0C 95 A9 00 8D F5 00 8D F1 00 8D EE 00 8D 00 95 8D 01 95 8D 03 95 8D 05 8D 0E 95 A2 E3 A0 1F 60 EA EA EA

5 Now copy the file back to your 3 1/2" disk and that is it.

Winter Games GS also uses the same type of protection.

Doug Parrish

Softkey for...

Typewriter

Channelmark

Requirements

- Typewriter original
- 1 blank disk side
- Sector editor (*Copy II Plus* is fine)

Jim Hart, *COMPUTIST* #52, page 23, did the work on *Grid Designer* and I applied it to another one of Channelmark's disks.

A friend badly needed *Typewriter* backed up, so he gave it to me. Channelmark had always caused me trouble, but Jim Hart's crack for *Grid Designer* suddenly gave me new hope.

Before I go further, I'd like to pass on a tip I have picked up while working with deprotecting schemes. There is definitely a difference between a "blank" disk and one you're going to reuse. Blanks have no leftover code from a previous program, while "used" disks do. Although I don't know the ins and outs of disk code deleting that well, I suspect that the code left on a disk can cause deliberate misreads when the copy procedure is trying to lay down accurate timing and epilog bytes.

Ⓜ Unless special hardware was used to record an extra strong pattern on a disk, initializing will erase whatever was on a disk by writing new patterns. However, deleting all the files on a disk does not remove the data from that disk. It only deletes part of the pointer to that data so that the catalog command will show no files. If you need a blank, unformatted disk, use a bulk tape eraser.....RDEXed

1 Use *Copy II Plus* to copy the program side of *Typewriter* to the blank disk.

2 Using the sector editor, make the following two changes to the code on the copy:

Trk	Sct	Byte(s)	From	To
\$11	\$0E	\$3E-40	AD E9 C0	18 90 4C
\$1E	\$0C	\$3E-40	AD E9 C0	18 90 4C

One other Item

Ⓜ On Three puts out a program called *Graphics Manager*. It reduces and enlarges clip art and allows it to be placed anywhere on a page, or so the flyer says. Over the past year and a half, I have tried to get the

program to work with my setup: Apple IIe (unenhanced), RamWorks II with 1 meg, 2 Disk II's and a parallel Okidata 92 printer. I even photocopied the parallel Grappler Plus manual and sent it to them in hopes they could rewrite the code. They tried. So far, nothing. I finally gave up and I guess they did too after the third or fourth disk got here.

Can anybody explain to me why this won't work, what I have to do, what code I could change? They say it's the parallel interface. But the Grappler Plus works just fine on everything else, except their disk. Do I have to reset the DIP switches under the printer's housing? Has anyone out there solved this one yet?

Keep up the fantastic format! It's superb. *COMPUTIST* has helped me so many times, it has more than paid for the subscription price.

Keith Parker

Softkey for...

Bard's Tale II

Electronic Arts

Requirements

- A blank disk
- A sector editor
- Copy program that will ignore errors (*Locksmith's Fast Backup*)
- Bard's Tale II: Destiny Knight* original

When I heard about the release of *Bard's Tale II*, I couldn't believe it would have better graphics than *Bard's Tale*. I told all of my friends, "Different graphics maybe, but better ones? No way!". I was definitely wrong! *Bard's Tale II* does have better graphics. *Bard's Tale II* also has new magic spells, more towns, dungeons, and monsters.

The protection used on this game is very similar to the protection used on *Boulderdash*. It seems that Electronic Arts is starting to repeat their protection schemes.

To start off, I copied the disk with *Locksmith's Fast Backup*. This told me that track \$06 was the error track. I then booted up my copy to see how far it would get. After the EA logo came up the program did it's first check. I jumped into the monitor using *Senior Prom* and looked at \$A000. I wrote down the first 3 bytes and then searched my disk for the sequence. I found it on track \$01, sector \$0F starting at byte \$00. I changed the jump code by putting a 60 in place of the 4C. Now I had to correct the checksum by changing byte \$FF of track \$10, sector \$07 from 0F to 02.

I then booted up my disk. The program started to load exactly like the original, until it tried to load in the player screen (the main part of the game). The grinding noise, that came

from my drive, was enough to give anybody a heart attack. I jumped into the monitor using *Senior Prom* to see what was going on. I looked at the softkey for *Boulderdash* again. In that softkey, the protection code started with the byte sequence A9 14 48. I used the Search Memory function with the *Senior Prom* to scan for the sequence. No luck. So I decided to scan for the byte sequence A9 = 48 (The "=" is a wildcard, meaning any byte can be there.). The *Senior Prom* found the sequence in four locations. Since one of the locations was in my computers ROM, that eliminated that choice. I listed the other three locations and found that two of them were identical. EA is known for making such routines. Here is what the routine looks like:

```
2E44 A9 00 LDA #00
2E46 48 PHA
2E47 A5 44 LDA $44
2E49 D9 A4 B3 CMP $B3A4,Y
2E4C 90 12 BCC $2E60
2E4E F9 A4 B3 SBC $B3A4,Y
2E51 85 44 STA $44
2E53 A5 45 LDA $45
2E55 E9 00 SBC #00
2E57 85 45 STA $45
2E59 68 PLA
2E5A 69 00 ADC #00
2E5C 48 PHA
2E5D 4C 47 AE JMP $AE47
2E60 68 PLA
2E61 09 B0 ORA #B0
2E63 20 ED FD JSR $FDED
2E66 88 DEY
2E67 10 DB BPL $2E44
2E69 60 RTS
```

The same routine was found at location \$3144. I then pulled out my sector editor and searched for the byte sequence A9 00 48. I found it at track \$0F, sector \$01 and track \$10, sector \$0E. I replaced the jump with 18 60 40 and then booted up the copy. It worked like a charm!

1 Copy the disk with a copier that will ignore errors.

2 Boot up your sector editor and make the following changes (Be sure to write the sectors back to disk.):

Trk	Sct	Byte(s)	From	To
\$01	\$07	\$FF	0F	02
		\$0F	00	60
\$0F	\$01	\$44	A9 00 48	18 60 40
\$10	\$0E	\$44	A9 00 48	18 60 40

Go out and destroy the evil Archmage Lagoth Zanta.

Greg Poulos

How To Modify All Infocom Games For Lower-case

Many years ago, there was a file floating around that explained how to modify Infocom games to produce lower case characters during game play. The procedure outlined in that file worked beautifully on Infocom's first releases.

But, alas, times changed and Infocom moved things around on the disk. In the newer versions on their games, you are able to select 40 or 80 column output. Anyone who has tried the well-known old techniques to get lower-case has probably come up with zero success.

Well, I did some searching around and found that although the location of the code may have jumped around a bit, the code that changes the output is the exact same on all Infocom games.

The reason Infocom makes all the 40 column output upper-case, is because they think there are still people that have no lower-case chip in their Apple. Somebody ought to tell them that 99% of Apple owners have lower-case.

There are three chunks of code that must be altered to create a nice looking lower-case output. The first routine prints the ever-familiar inverse bar at the top of the screen. This contains your location and either your score/number of moves or the time. This routine must be altered to not print in inverse, for as we all know, inverse lower-case characters don't agree with the Apple, although in 80 columns you get inverse/lower-case. This is the only thing you'll lose if you decide to modify your Infocom games to lower-case, there'll be no pretty inverse bar, not even in 80 columns.

The next routine is a big one. This is the routine that actually converts all the characters to upper case. This is eleven bytes long (decimal) and will have to be completely NOPed out with eleven EA's.

The final routine determines the size of the window at the top of the screen for the text to scroll under. This is currently one line (the inverse bar). For easier readability, you'll want to change this to two lines, so there's a blank line in between the location description, score, etc., and the actual game text itself.

So with all the explanation out of the way, let's go to work. You must first have a cracked copy of the game. Nowadays, Infocom only protects their two-sided, 128K games like *Trinity*, but in case you have an old *Zork* or something, deprotect it first. (See Book of Softkeys Vol. 1 for *Zork*).

Run a sector editor like the one in *Copy II Plus* that has search capability. Insert your Infocom disk.

The Inverse Routine

Search for hex bytes A9 3F 85 32 A9 10. Once you find these (somewhere on the first two or three tracks, probably), change the 3F to FF.

The Window Routine

Search for hex bytes A9 01 85 22 85 E0. Once you find these, change the 01 to an 02. Note: 02 is recommended. You may change this to a higher number to get a wider gap. NOTE: If you cannot find the "Window" routine, search for A9 01 85 22 instead.

The Upper Case Routine

Search for hex bytes C9 60 90 0B C9 80 B0 07. Once these are found, put the cursor on the first byte (the first C9) and enter eleven EA's.

That's all there is to it. Something you might try doing is allowing the inverse bar in 80 columns, but making it normal in 40 columns. I haven't been able to do this as of yet.

David Burns and Brian Sparks

Softkey for...

California Games Championship Wrestling The Movie Monster Game

Epyx

Requirements

- A blank DOS 3.3 formatted disk (double sided)
- Fast copier (that ignores errors)
- A sector editor (I used Copy II plus)

California Games is a really rad game from Epyx that enhances the Summer games line. After about an hour of playing, you will start using words like gnarly, tubular, and awesome as part of your everyday vocabulary. Just follow these instructions for a deprotected copy:

1 Fast copy both sides of *California Games* with any fast copier that ignores errors.

2 Make the following sector edits:

Trk	Sct	Byte(s)	From	To
\$00	\$05	\$F0-F7	00 00 00 00 00 00 00 00	FC EE EE FC E7 EE FC E7
		\$5E-60	BD 8C C0	AD F1 BB
		\$6E-70	BD 8C C0	B9 F0 BB

3 Write these changes back to disk. Side 2 is not protected. This softkey also works with two other Epyx games I recently bought, *Championship Wrestling* and *The Movie Monster Game*.

Robert Wilson

Softkey for...

Deep Space

Sir-Tech

■ Requirements

- Apple II series with 64K
- COPYA
- Sector editor
- Blank disk

Deep Space is a space-combat simulator that features smooth, convincing 3-D graphics as you fly four different missions in an area of the astroid belt that lies between the orbits of Mars and Jupiter.

The disk is virtually unprotected and can be copied with any copier that will ignore the read error on track \$22. The resulting copy will not work however, even though track \$22 contains no useful code. To make a long search short, a little detective work led me to the entry point for the protection routine. I found it on track \$0C, sector \$09.

Step by step

- 1** Boot your DOS 3.3 system disk.
- 2** Tell DOS to ignore checksum and epilog errors and use COPYA to copy the disk.

POKE 47426,24
RUN COPYA

3 Make the following sector edits to the copy you just made.

Trk	Sct	Byte(s)	From	To
\$0C	\$09	\$8B-8C	A9 0D	18 60

That's it. The copy should now work and is COPYA-able.

A.P.T. for...

Deep Space

Sir-Tech

Now here are some A.P.T.s that may make your new copy of *Deep Space* a bit more interesting.

Unlimited fuel:

Trk	Sct	Byte(s)	From	To
\$1B	\$0E	\$E2-E3	C6 4F	EA EA

Unlimited hyperspace drive:

Trk	Sct	Byte(s)	From	To
\$21	\$08	\$E7-E8	E5 03	38 EA

Unlimited missiles:

Trk	Sct	Byte(s)	From	To
\$1C	\$02	\$66-67	F0 28	EA EA
		\$BD-BF	CE 8F 60	EA EA EA

To stop those irritating attacks on your bases while flying the Outpost Mission:

Trk	Sct	Byte(s)	From	To
\$21	\$04	\$8C-8D	C6 55	EA EA

An indestructible shield is available by changing the following:

Trk	Sct	Byte(s)	From	To
\$1C	\$01	\$EE-FF	E5 10	EA EA

Also, a dot of transparent tape punched out with a hole punch while the tape is still stretched out on the dispenser, then placed at the right spot on the screen, makes an excellent gun sight for the missiles and laser.

A co-author of *Deep Space*, has an excellent new flight simulator in the stores. It is being sold as *Chuck Yeager's Advanced Flight Trainer*, this one can teach you to master other flight simulators, and allows you to fly 14 different airplanes ranging from the Sopwith Camel F-1 to experimental rocket planes that can take you to the edge of space.

While *Advanced Flight Trainer* is published by Electronic Arts, it contains none of their well published locks. Headers that change with every sector, and a few other goodies too, it looks like a challenge for the advanced hacker.

How about it, ladies and gentlemen, is there anyone out there who can crack this one?

Zorro

Softkey for...

Arcticfox

Electronic Arts

A friend of mine asked me to try and crack his original of *Arcticfox* before it goes "kaputt". I tried several of the softkeys from COMPUTIST, but none were able to crack it.

Knowing that Electronic Arts uses their nibble check routine on track \$01, and that this basic type of protection is used on most EA games, I looked at the softkey for *The Bard's Tale* in COMPUTIST #51 to find some similarities.

As I expected, some of the bytes were the same as in the *Bard's Tale* softkey, so I changed them to the values following them and it worked. Here's how it goes:

Trk	Sct	Byte(s)	From	To
\$01	\$0B	\$47-49	20 ?? ??	18 60 42
	\$0E	\$47-49	20 F8 A0	18 60 40
		\$4C-4E	20 03 A0	18 60 4B
	\$0F	\$00-02	4C 69 A0	18 60 DD
		\$6F-71	4C 69 A0	18 60 DD

Playing Tips for...

Arcticfox

Here is something that may be useful to new ArcticFox gamers, unless you know about this already. Ever notice the two little boxes with the numbers in them on the lower-right of the screen? Those are for Latitude and Longitude. The main fortress lies around the following numbers (in order, top to bottom on the screen):

053 06
83 01

From there you should be able to see the main fortress, and destroy it with a missile. Be careful, the alien base is highly fortified all around. Also DO NOT get too close to the fortress or else it will deploy homing mines (similar to floating mines, but bigger and more ominous) that will come out in waves and destroy you. The fortress has a limitless supply of these, so be wary.

Jim S. Hart

Softkey for...

BoulderDash Construction Set

Epyx

■ Requirements

- Boulder Dash Construction Set* (BDCS)
- An initialized DOS 3.3 disk
- COPYA
- Disk searcher/sector editor (I used *Copy II Plus*)
- Nibble editor
- Disk scanner (like *Locksmith's* Quick Disk Scan, used for determining format of disk)
- Optional Recommended reading: *Beneath Apple DOS (BAD)* by Don Worth and Pieter Lechner

This is a softkey which I have extended a bit to help out those of you who are just beginning the art of deprotection. I've read the complaints readers have about softkeys either being too short or not explaining what has been changed. I will go through several steps that I usually follow which will culminate in a softkey.

Before we start off, let's get something straight. If terms like prolog, epilog, disk formatting, checksums, and direct disk accessing are foreign to you, then I suggest you go out and pick up a copy of *Beneath Apple DOS (BAD)*. It really is an excellent book on the subject of disk input/output and covers the structure of DOS 3.3 quite well. After you have bought your copy, there are three things to do: read, read, and read more. Don't expect the material to make sense at first. It takes a lot of work and studying before 'the light comes on'. If it's worth learning, it's worth working at.

Another thing that helps tremendously is back issues of *COMPUTIST*. Sure, a lot of the softkeys are short, but many are not and several go in depth into the protection schemes. In addition, one of those softkeys may be for the same type of protection scheme that is on your disk! Learn as much as you can about protection schemes in general. This is the process I went through when I started out in the deprotection business, and today I think I am quite proficient at it. It just takes diligence and hard work.

The Softkey Process

The first thing I do is to find out what kind of protection the disk has. There are two basic types of protection schemes: signature checking and format alterations.

Signature Checking

A disk protected with a signature check can usually be copied with any whole disk copying program, such as the Locksmith fast copier or *COPYA*. You are able to copy the disk, but for some reason the copied disk will not work.

What happens is that when the original disk was written, special disk drive hardware was used to write a specific byte or bytes to the disk. The Apple disk drive would be able to read these bytes but not write them.

Types of signature checking include the infamous nibble count, bit insertion, and phantom bits. All are *COPYA*-able (to a large extent) but differ in the way they check for things. Again, special drive hardware is used to put data on the disk in such a way that a regular disk copy will leave out the bytes the protection routine is looking for.

A nibble count looks on the disk for a certain byte sequence and then starts counting bytes until another special byte sequence is found. If the number of bytes between the two sequences is out of a certain tolerance range (determined by the protection scheme), then the protection scheme 'knows' that the disk is a copy and takes appropriate measures. Usually this results in a reboot, but other things can happen too. For example, say you need to get the magic scroll in order to get through a certain room, and if you do not have the scroll then you can not advance in the game. The protection

scheme 'finds out' that the disk is a copy and alters some code so that you can never find the magic scroll, ergo you can never get past that certain room and you are stuck, unable to go any further. Keep this in mind when you supposedly deprotect a game: make sure you have removed the protection entirely.

Bit insertion and phantom bits (sometimes referred to as weak bits) are beyond the scope of this article. I suggest you bone up on chapter 3 in *BAD* and go through lots of old *COMPUTIST*s for help on these.

Format Alterations

Format alterations are some of the easier (to me) types of protections to deal with, if they are the only protection a disk has. A format alteration is one in which the actual format of the disk has been changed from the normal. One of the following generally has been changed on these disks: address prolog, data prolog, address epilog, data epilog, address checksum, data checksum, or the nybble translate tables.

There are some disks, like the *Essential Data Duplicator* and the *Flight Simulator II*, that have drastic format changes which may or may not include the above items. These nasty disks deviate away from standard 16 sector format and I will not go over how to deprotect them since each one must be individually examined.

Changes that have been made to either the prologs, epilogs, or the checksums are found out easily with the help of a nibble editor. A nibble editor disregards the format of the disk and just reads in an entire track at a time and then displays it in raw nibble format.

Looking at the display, you should find the following: a large group of bytes in normal text, 15-20 bytes in inverse text (usually with the value of \$FF), 13-16 bytes in normal text, and 5-10 bytes of inverse text. This pattern should repeat itself 16 times on the track since there are 16 sectors per track.

The large group of normal bytes is the data area. The data area's first three bytes compose the data prolog. The third byte from the end is the checksum. The last two bytes compose the data epilog. The 15-20 bytes of inverse text are the sync gap between the data and address areas.

The next group of 13-16 bytes are the address header which is broken up into address header (3 bytes), volume # (2 bytes), track # (2 bytes), sector # (2 bytes), checksum (2 bytes), and the address epilog (2 bytes). The value of the checksums, non-prolog, and non-epilog data depend on the information contained within the sector.

The values of the prologs and epilogs on a normal DOS 3.3 disk are:

```
Address prolog.....D5 AA 96
Address epilog.....DE AA
Data prolog.....D5 AA AD
Data epilog.....DE AA
```

Go ahead and try a nibble editor out on a normally formatted DOS 3.3 or ProDOS disk and hunt for the above bytes. Get proficient at finding them and when it comes time to find them on a protected disk, you will generally not have a problem.

Another tool to use is a disk scanner, such as *Locksmith's Quick Disk Scan*. What this shows you are the sync gaps and sectors on a track. The sync gaps are represented by white dots and the sectors are represented by no dots. Looking at the output, you can count the number of sectors and if it is around 16-17 then you have a 16 sector format disk. Again, try the disk scanner on a normal DOS 3.3 or ProDOS disk to see what a 16 sector disk's display looks like. DOS 3.2 disks have larger sector sizes and less sync gaps and with some experience it becomes easy to distinguish between 13 and 16 sector format.

Other types of format alterations include track synchronization and non standard tracking (half tracks, quarter tracks). Half tracking is used by Electronic Arts quite frequently. Tracks \$5, \$5.5, and \$6 are all formatted the same way and the Apple drives can read half tracks with (usually) no problem. The bug is when it comes to writing half tracks, the drive does not have the reliable precision to write a half track without writing over the data a half track away on both sides.

Track sync involves writing data to a disk in such a way that when the protection scheme moves the drive head from one track to another, it expects to find the correct data immediately. I will not go over format alterations that involve anything other than 16 sector disks because once again, each disk must be handled individually.

Disks protected with alterations to their prologs or epilogs are generally easier to deprotect. Often, all you have to do is read the disk using their format and then write to another disk using normal 16 sector format. *Super IOB* is ideal for this and I refer you to Ray Darrah's article in *COMPUTIST #32* for directions on what it does and how to write a controller for it. After the disk has been converted to normal format, all that is required is to either put a normal DOS onto it or edit the disk's read routines so that it can now read in the normal format. DOS 3.3's disk read routines are located around \$B800-\$B950 or so. Boot DOS 3.3 and look at them sometime using the monitor list (L) command.

The routine looks something like this:

```
B8E1- BD 8C C0 LDA $C08C,X
B8E4- 10 FB BPL $B8E1
```

What these 5 bytes of code do is to read a byte off of the disk. Usually, right after these bytes is a *CMP* statement that compares what was read to a value. If that value is anything other than the normal prolog or epilog bytes, it is immediately suspicious.

For example, say you deprotected a disk with a data prolog of D5 AA CD. You've already converted the disk to normal 16 sector format. Now, you have to find where it was reading in that CD value. Using your disk searcher/sector editor you searched through the disk, starting at track \$00 sector \$00, for the byte sequence 8C C0. You found it and a disassembly of the code around it looked something like this:

```
E80- BD 8C C0 LDA $C08C,X
E83- 10 F8 BPL $E80
E85- C9 CD CMP #$CD
E87- D0 03 BNE $E8C
```

Well, there is the code that read in the CD byte. All you have to do is to change the C9 CD to C9 AD and the disk should now have the ability to read itself.

NOTE: disks protected with format alterations may also have signature checks too, so don't forget to thoroughly check your deprotected disk.

Now, to the Main Attraction

Now that we have gone over several different types of protections, it is time to deal with the title program: BDCS. Interestingly enough, BDCS is protected with the EXACT same protection scheme as *California Games*. In fact, I tried my *California Games* deprotection in COMPUTIST #52 and it deprotected BDCS perfectly!

Step One

First of all, the disk is protected with a format alteration. COPYA doesn't work and the Locksmith fast copier comes up with lots of inverse characters (not a good copy). So, it's time to load up the trusty disk scanner. This reveals a 16 sector format. A quick check with the nibble editor reveals that the alteration is not a prolog alteration. Back in my *Information Master* softkey (COMPUTIST #43, page 23), I listed what bytes to change to ignore certain bytes and errors. POKE 47426,24 (or B942:18 from the monitor) disables DOS 3.3's epilog and checksum error checking. This is what we need. After typing in the POKE, I then typed RUN COPYA and copied the BDCS disk onto a blank. Try to boot the disk up and you are rewarded with a reboot a few seconds after the disk boots. Ah hah! Another protection!

Looking for the Other Protection

When looking for a signature check, you can either boot code trace the disk (if the check is early in the boot) or search the disk for the byte sequence 8C C0 (direct disk access code). Since the reboot occurs fairly early in the boot process, I decided to boot code trace the disk, but not in the normal fashion. I used my sector editor to read in track \$00 sector \$00 and then

disassembled the code in the sector starting with relative byte \$01. Refer to pages 5-6 to 5-8 and 8-1 to 8-3 in BAD for more information on the booting process. Looking down the disassembly, I was only interested in JMP commands. At relative byte \$4A, there is a JuMP to \$BB00. Now, if you look at track \$00 sector \$00 of a normal DOS 3.3 disk, there should be an indirect JuMP to \$8FD (which finally ends up JuMPing to \$B700) at relative byte 4A. In fact, up to that point the BDCS and normal boots are the same. Hmm. Could it be that a signature check of some sorts is at \$BB00, and when it is done it will JuMP to \$B700? Well, let's take a look. On the disk, \$BB00 corresponds to track \$00 sector \$05. Read in that sector using your sector editor and you will see the following disassembly. I have commented the code a bit in the hopes that you might better understand the protection.

Main Protection Code (\$BB00)

```
00 LDA #$00 Zero locations $F0-F7.
02 LDX #$F0
04 TXS
05 STA $00,X
07 INX
08 BNE $BB05
0A LDA #$0A set up # of retries
0C STA $FC retries location
0E LDX $2B get slot #
10 LDA $C089,X turn drive on
13 LDA $C08E,X enable READ mode
16 LDA #$80
18 STA $FD
1A DEC $FD
1C BEQ $BB98 Bad
1E JSR $BBF5 find correct track
21 BCS $BB98 Bad
23 LDA $F9
25 CMP #$0A
27 BNE $BB1A
```

Check the disk for a certain sequence of header bytes.

```
29 LDY #$00
2B LDA $C08C,X
2E BPL $BB2B
30 DEY
31 BEQ $BB98 Bad
33 AND #$00
35 BNE $BB2B
37 LDA #$00
39 LDA $C08C,X
3C BPL $BB39
3E DEY
3F BEQ $BB98 Bad
41 AND #$00
43 BNE $BB39
45 LDA $C08C,X
48 BPL $BB45
4A AND #$00
4C BNE $BB98 Bad
4E LDA $C08C,X
```

```
51 BPL $BB4E
53 AND #$00
55 BNE $BB98 Bad
57 LDA $C08D,X
5A LDY #$10
5C BIT $80
5E LDA $C08C,X
61 BPL $BB5E
63 DEY
64 BEQ $BB98 Bad
66 AND #$00
68 BNE $BB5E
6A NOP
6B NOP
6C LDY #$07 Start at $F7, go down to $F0
6E LDA $C08C,X
71 BPL $BB6E Correct sequence of header
73 STA $00F0,Y bytes found, so load $F0-$F7
76 NOP with sequence of bytes found
77 DEY after header byte sequence.
78 BPL $BB6E
```

Decode next stage (\$B700-B9FF) & execute.

```
7A LDX #$03
7C LDA #$00
7E TAY
7F STA $F8
81 LDA $B7 Page to start decoding.
83 STA $F9
85 LDA $F0,X Get value from $F0-$F3.
87 EOR ($F8),Y EOR byte
89 STA ($F8),Y Put decoded byte back.
8B DEY
8C BNE $BB85
8E INC $F9 New page to decode.
90 DEX
91 BPL $BB85
93 LDX $2B Get slot#.
95 JMP $B700 Jump to decoded next stage.
```

Come here if something bad was detected.

```
98 DEC $FC decrement # of tries loc.
9A BEQ $BB9F have we used up our tries?
9C JMP $BB16 no, try again.
9F INC $03F4 yes, alter RESET vector to
reboot.
A2 JMP $BB95 next stage not decoded, so
crash.
```

Seek correct track subroutine.

```
A5 LDY $FD # of tries to find D5 AA 96.
A7 STY $F0 store it.
A9 INY increment # of tries.
AA BNE $BBB0 more tries?
AC INC $F0 no, increment bad result
location.
AE BEQ $BBED correct track not found.
```

Look for D5 AA 96 sequence.

```
B0 LDA $C08C,X
B3 BPL $BBB0
B5 CMP #$D5
B7 BNE $BBA9
B9 NOP
```



```
BA LDA $C08C,X
BD BPL $BBBA
BF CMP #$AA
C1 BNE $BBB5
C3 LDY #$03
C5 LDA $C08C,X
C8 BPL $BBC5
CA CMP #$96
CC BNE $BBB5
```

Found correct track.

```
CE LDA #$00
D0 STA $F1
D2 LDA $C08C,X
D5 BPL $BBB2
D7 ROL
D8 STA $F0
DA LDA $C08C,X
DD BPL $BBBA
DF AND $F0
E1 STA $00F8,X
E4 EOR $F1
E6 DEY
E7 BPL $BBB0
E9 TAY
EA NOP
EB CLC good result
EC RTS
ED SEC bad result
EE RTS
```

What happens is that the code from \$BB00 to \$BB79 searches the disk for a certain sequence of bytes. When it finds them, it loads the next 8 bytes after the sequence into memory locations \$F0-\$F7. \$BB7A to \$BB97 uses these bytes to decode the next stage of the boot code at \$B700-\$B9FF. After decoding, the next boot stage at \$B700 is JuMPed to at \$BB95. What we have to do here is to load the correct values into \$F0-\$F7 and then jump to the decode routine. The following code will do that nicely:

```
A9 FC LDA #$FC
85 F0 STA $F0
A9 EE LDA #$EE
85 F1 STA $F1
A9 EE LDA #$EE
85 F2 STA $F2
A9 FC LDA #$FC
85 F3 STA $F3
A9 E7 LDA #$E7
85 F4 STA $F4
A9 EE LDA #$EE
85 F5 STA $F5
A9 FC LDA #$FC
85 F6 STA $F6
A9 E7 LDA #$E7
85 F7 STA $F7
4C 7A BB JMP $BB7A
```

I discovered what the correct bytes were by breaking into the monitor early in the boot process and displaying what was in \$F0-\$F7. After making these changes to track \$00 sector

\$05, I found that the program (to my knowledge) works perfectly.

I hope that this softkey will help out those of you who are just starting out in the art of deprotection. It is a fascinating hobby and you really learn a lot from your computer, contrary to what many people say.

Step by Step

1 Boot up DOS 3.3 and disable error checking:

POKE 47426,24

2 Copy the BDCS disk:

RUN COPYA

3 On the copied disk, make the following changes:

Trk	Sct	Byte(s)	From	To
\$00	\$05	\$00-?	?	A9 FC 85 F0 A9 EE 85 F1 A9 EE 85 F2 A9 FC 85 F3 A9 E7 85 F4 A9 EE 85 F5 A9 FC 85 F6 A9 E7 85 F7 4C 7A BB

A. Evans

A.P.T. for...

Moebius

Origin Systems

Requirements

- Sector Editor
- Moebius Realm* disk (sides C & D)

This APT is contributed in response to Dennis Gaunt's request in *COMPUTIST #52* and also as a guide to those of you who are still struggling with this game.

It seems Origin Systems is consistent in its design of games where detailed character information resides on an unprotected second disk. With this in mind, I found saved character information on disk sides C and D (depending on which realm your character was last saved).

1 Boot *Moebius* and make note of your character name(s) and the realm(s) associated with each character "on an adventure".

2 Remove *Moebius* disk and boot your sector editor.

3 Search *Moebius* disk side C (Earth and Water realms) or side D (Air and Fire) for the sector that contains the name of your character. (I have found some of my character names at various locations such as tracks \$16, \$17, \$1A, \$22, \$23, and \$26 with varying sector locations.)

4 Use the following table to enhance your character. Maximum value at these locations is 255 (\$FF) unless noted by '*'.
If, for example you found the character name that you were looking for on track \$17, sector \$05, you would find the following information:

Use the following table to enhance your character. Maximum value at these locations is 255 (\$FF) unless noted by '*'.
If, for example you found the character name that you were looking for on track \$17, sector \$05, you would find the following information:

ATTRIBUTE	BYTE
Name	\$00-\$0F
Experience	\$12,\$13 (\$13 * 256 + \$12)
Level	\$14
Body points	\$15 (limit), \$16 (current)
Mind points	\$19 (limit), \$1A (current)

Possessions and magic items are found on the next consecutive sector. (IE. Track \$17, sector \$05 — track \$17, sector \$06 or track \$16, sector \$0F — track \$17, sector \$00.)

POSSESSIONS	BYTE	MAGIC ITEMS	BYTE
Food	\$44	Tiger teeth	\$64
Water	\$45	Beetle pincers	\$65
Torches	\$46	Soil sample *	\$66
Whetstones	\$47	Fish scales	\$67
Body Elixirs	\$48	Condor feathers	\$68
Mind Elixirs	\$49	Panda hair	\$69
Shovel *	\$4A		
Amulet *	\$4B		
Lives	\$4E		
Shurikens	\$4F		

* Value should be \$01 if you have it, or \$00 if you don't.

Paul R. Wilson

A.P.T. for...

H.E.R.O.

Activision

Using the crack for *H.E.R.O.* on page 22 of *COMPUTIST #52*, before doing step 6, add the following self modifying code patch.

```
300:A9 38 20 A8 FC AD 00 C0 C9 D0 F0 F9
30C:C9 C6 D0 08 A9 05 8D 8D 60 4C E2 60
318:C9 D3 D0 05 A9 00 8D B5 60 4C E2 60
60B4:20 05 03 was 20 E2 60
```

Then do step #6 and add
BSAVE PATCH,A\$300,L\$28

Be sure to **BLOAD PATCH** along with *H.E.R.O.* when loading the game into memory.

Now *H.E.R.O.* has three additional keyboard commands.

- F - normal speed
- P - pause (missing in original game)
- S - slow speed (essential for some very tight spots that almost always take a game Life when negotiated at normal speed)



Playing Tips for...

Castle Wolfenstein

Muse

1 Copy your cracked disk and label the "original" Disk 1. Label the copy Disk 2.

2 Play on disk 1 to a good point (Like you have 10 bullets, 3 grenades, a vest, a uniform and the war plans and swap to disk 2. Press **ESC** to "save" (there is no true save feature on the game and if you resume and get caught or shot on the resumed game, it's back to room 1 with only 10 bullets. Worse, if you blow yourself up with a grenade, you lose the entire castle map! If you were playing a terrific game and getting near the exit, bye-bye progress and all your maps are now waste paper as the map is re-randomized.)

3 Resume on disk 1 and upon finishing the room, swap to disk 2 and exit. Play until you get caught or killed. Resume on disk 1.

4 Now comes the fun part! You will have all the ammo and stuff you started with, but your damage is still there! Rooms full of dead men, rifled trunks, grenade holes (rare) and only an occasional S.S. man will show up. Hold them up with a gun or grenade. In this reality warp, bullets shot or grenades used, or even the loss of vest and disguise will be repaired, but the damage (progress) remains. You can resave to disk 1 to avoid a long sequence of leaned out Nazi rooms (and Confronting S.S. men), and it'll only be a matter of an hour at most before you reach the coveted exit, and perhaps a promotion!

5 If a room proves intractable, siccing an S.S. man on you before you can even get into it, warp reality by swapping to disk 1 before entering this room.

WARNING: Switch back to disk 2 should that replacement room get too hot. Lest it get saved to disk 1 as you get offed and your progress is erased.

This A.P.T. requires a new line of strategy, but it makes *Castle Wolfenstein* playable, instead of frustrating.

Sometimes you may suffer a drop in rank should you get shot. This is not fair and you should use A.P.T.s from *COMPUTIST* to undo this.

Remember:

Disk 1 - Boot and Start Game on this
Disk 2 - Play game on this

At higher levels, vest wearing Nazis increase in frequency.

I've gotten to level 6 this way.

Steven Heckler

? I have a technical question concerning the Apple IIc. How do you run quarter tracked programs like *Karateka* (original version), *Choplifter*, *Starblazer*, and the old *One-on-One*?

I noticed in your listing of back issues that you had an article titled "Playing *Karateka* on a IIc (*COMPUTIST* #37, I believe). I know I must sound like a mooch since I do not subscribe to your magazine, but no one I have talked to has had any idea how to run the quarter tracked programs on the IIc.

I According to Christopher Dean (*COMPUTIST* #52) the problem with II plus and IIe programs that don't boot on a IIc is caused by the different *Boot0* code in ROM. Programs that use the ROM *Boot0* code directly will not work on the IIc without modifications. He goes on to show how to make these changes using *Drol*, *Hardball*, *Orge* and *Arctic Fox* as examples. RDEXed

James E. Bulman

As a new subscriber to *COMPUTIST*, I would like to express my thanks for an excellent magazine. I was especially pleased with my first issue, *COMPUTIST* #52. With it, I was able to copy two of my copy protected programs (*Ultima I* and *Shanghai*). With that said, I would like to offer some constructive criticism.

1) Clearly list the softkeys in your back issues. I ordered several back issues only to find the softkeys were for the Apple IIgs (I have a IIc). Softkeys in back issues that require information from other back issues should also be noted. (The *Carmen Sandiego* softkey in *COMPUTIST* #25 requires information from *COMPUTIST* #19. I have ordered #19 praying that the modified F8 ROM is NOT a hardware modification!)

2) When softkeys in current issues refer to previous issues, re-list the information from those issues. (The softkey for *Math Blaster* in *COMPUTIST* #53 is an example.) I realize this would cut down on back issue orders but it would also reduce reader frustration.

Thank you again for a fine computer magazine. I am learning more and more with each issue.

I The modified F8 ROM is hardware, but you could get the same effect using Senior PROM on your IIc.

We usually don't reprint softkeys because of the wealth of new material that arrives here every day. It is difficult to justify reprinting old material when the next issue is already full and letters recieved today must wait for the issue

after next. Our focus is to get your letters printed as quickly as possible. . . . RDEXed

Alex Lee

Playing Tips for...

Conan

- The bat on the first board can be killed without losing a sword.
- Stay on the bubble for as long as you can.
- Collect swords and a jewel on the fourth level.
- You have to kill six dragons before the door will unlock on the fifth level.
- The eyes will help you build a ladder on the sixth level.
- If you run into trouble on the seventh level, you can always drop back one.

I have a suggestion. How about someone starting a beginner's column. You could explain some of the more common protection schemes, how to find what protection is being used and how to break the schemes once you find them.

? I have a Pineapple brand Apple compatible. Several keys can be pressed down but nothing is registered in the CPU the broken keys are: 1, ESC, Ctrl-A, 5 (on the numeric keypad) and shift Z. Does anyone know if this can be fixed or, if it's not fixable, where I can get a replacement keyboard? My address is P.O. Box 265, Claverack, NY 12513

David M. Widman

Softkey for...

Hacker II: The Doomsday Papers

Activision

■ Requirements

- Apple II series with 64k (minimum)
- Hacker II* disk
- A blank disk
- COPYA

Hacker II is a very good program, as well as *Hacker*. This time the government needs a little favor; as a computer wizard you must hack your way through Siberian hazards in a maximum security complex. About the protection, it is almost the same as *Hacker*, there is a subroutine that checks track \$00 from the disk and puts a FF at location \$FC and a 55 at another special location that is verified by the program.



Step-by-Step

1 Copy the *Hacker II* disk with *COPYA*.

2 Put your *COPYA*ed disk in drive 1 and enter:

```
BLOAD HACKER II HELLO,D1
CALL-151
63C9:A9 FF 85 FC A9 55 4C 10 64
BSAVE HACKER II HELLO,A$6000,L$589
```

You are done!

Softkey for...

Labyrinth

Activision

■ Requirements

- Apple IIe or IIc with 128k (minimum)
- Labyrinth* disk
- A blank disk
- COPYA*

Labyrinth is an animated adventure game with double hi-resolution animation and a very attractive scenario. About the protection, it is almost the same as *Hacker* and *Hacker II*, there is a subroutine that checks track \$00 and puts an FF at location \$FC and puts a 55 at another special location that is verified by the program.

Step-by-Step

1 Copy the two sides of the *Labyrinth* disk with *COPYA*.

2 Put your *COPYA*ed disk side one in drive 1 and enter:

```
BLOAD BOOT2,D1
CALL-151
8B9:A9 FF 85 FC A9 55 4C 00 09
BSAVE BOOT2,A$800,L$279
```

Now you have a *COPYA*-able version of *Labyrinth*.

UNK, Prince George, Canada

Softkey for...

Arctic Fox

Electronic Arts

After reading my first issue of *COMPUTIST* which was #53, I found a much easier way of deprotecting *Arctic Fox* than doing all the sector edits proposed in Scott M. Simon's softkey. After reading the softkey for *Earth Orbit Station*, I noticed that it also, when copied, showed many errors in track \$06. Since *Arctic Fox* was also an EA disk, I tried it. To my relief, it worked. Since I had already typed

in *Earth Orbit Station* it was much easier than doing all those sector edits. I wouldn't be surprised if it worked on other EA wares. Many thanks to Bob Wilson! For any of you who missed Bob Wilson's controller, here it is.

Controller

```
1000 REM EOS/ARCTIC FOX
1010 TK=0:LT=35:ST=15:LS=15:CD=WR:FAST
=1:MB=55
1020 GOSUB 490:GOSUB 610:IF TK=1 THEN T1=
TK:TK=PEEK(TRK):GOSUB 310:TK=T1
1030 GOSUB 490:GOSUB 610:IF PEEK(TRK)=LT
THEN 1050
1040 TK=PEEK(TRK):ST=PEEK(SCT):IF TK=6
THEN TK=7:MB=151
1045 GOTO 1020
1050 HOME:PRINT "COPYDONE":END
5000 DATA 6*CHANGES
5010 DATA 1,10,82,24
5020 DATA 1,10,83,96
5030 DATA 1,10,84,72
5040 DATA 1,15,0,24
5050 DATA 1,15,1,96
5060 DATA 1,15,2,221
```

Controller Checksums

1000	- \$356B	5000	- \$3661
1010	- \$990D	5010	- \$5711
1020	- \$17C5	5020	- \$3260
1030	- \$5B83	5030	- \$5F61
1040	- \$24C3	5040	- \$0AEA
1045	- \$A200	5050	- \$5B72
1050	- \$9FA4	5060	- \$C15F

Jim S. Hart

Softkey for...

Math Blaster

Davidson and Associates

■ Requirements

- Math Blaster* original disk
- 2 blank disk sides
- SUPER IOB* v1.5 with both NEWSWAP, CON and FAST.CON controllers (from Starter Kit)
- Word Attack/Classmate* softkey from *COMPUTIST* #28 for reference

■ Optional

- "Beneath Apple DOS" for an explanation of what format changes are
- A fast DOS such as *Diversi-DOS* or *ProntoDOS* (not necessary but helpful)

Math Blaster is a user-friendly math tutorial and drill that emphasizes the fundamentals. Students and teachers alike have applauded the

effort that Davidson & Associates put into making the programs as well written as possible. They came up short, however, in the ease of making backups. Parents, once finding out that the disks cannot be copied, usually will not let their kids use the program unless they are around for fear of the disk crashing. Never fear, *COMPUTIST* is here to alleviate your worries (and keep money in your pocketbook). Below are the steps to follow to get rid of the annoying format protection along with a nasty secondary protection scheme.

1 Boot up DOS 3.3, initialize the two blank disk sides, and delete both hello programs. I have only tried *Diversi-DOS*, *ProntoDOS*, and standard DOS 3.3, so you take your chances if you use some other type.

INIT HELLO
DELETE HELLO

2 First of all, we must convert the *Math Blaster* disk to normal format. The easiest way to do this (usually) is to capture the perverted disk's RWTS, and then use the NEW SWAP controller with *Super IOB* v1.5 to read the disk in with it's own RWTS and then write it out to a normal disk using normal RWTS.

The problem is how to get the RWTS. It turns out not to be too hard. Boot up the *Math Blaster* disk and when the Applesoft prompt (>) appears, open your disk drive door. There will be some rattling and then you get an I/O ERROR message. At this point, I discovered that you cannot type in any commands. This means that the BASIC RUN flag at \$D6 has been set to a value greater than 127. This causes BASIC to interpret all commands typed in at the keyboard as 'RUN'.

A little known fact is that DOS commands still work. The DOS command 'FP' resets all pointers to their defaults, even the BASIC RUN flag!

Ah ha! If you try this, you will discover that the DOS commands have been altered a la Beagle Bros *DOS BOSS*.

To make a long story short, I went a-huntin' through memory via a copy card and discovered that FP had been renamed PF. Type this in and you can now execute all other commands such as CATALOG, LIST, etc:

PF

3 Now we need to move the RWTS to a safe area so a normal DOS disk can be booted. Move the RWTS and then boot the blank initialized disk:

CALL -151
1900<B800.BFFFM

Insert the blank initialized disk.

C600G



4 Save the RWTS.

BSAVE RWTS.MATH,AS1900,LS800

5 Load *SUPER IOB V1.5* and install the NEW SWAP controller. Then add the following lines to copy *Math Blaster*.

```
LOAD SUPER IOB
EXEC NEWSWAP.CON
1015 TK = 3
10010 PRINT : PRINT CHR$(4) "BLOAD
RWTS.MATH"
RUN
```

6 Now clear memory, load *SUPER IOB V1.5* again, install the FAST controller into it, add two lines, and RUN the result to copy the *Math Blaster* data disk onto the second blank initialized disk:

```
FP
LOAD SUPER IOB
EXEC FAST.CON
1020 POKE 47426,24 : GOSUB 490 : GOSUB
610
1030 POKE 47426,56 : GOSUB 490 : GOSUB
610 : IF PEEK (TRK) = LT THEN 1050
RUN
```

(Note: this altered FAST controller can convert a surprising number of older educational disks into normal format.)

7 Put away your original *Math Blaster* disk. We're done with it.

8 Boot up normal DOS and then insert the copied *Math Blaster* program disk into the drive.

9 Rename their boot program so we can add our own:

RENAME HELLO, MATH

10 Type in the one line BASIC program below and then save it to the *Math Blaster* program disk:

```
10 TEXT : HOME : HTAB 15 : PRINT "MATH*BLASTER"
: PRINT : POKE 47721,96 : POKE 47741,96 :
POKE 40222,87 : POKE 40223,255 : PRINT CHR$(4) "RUN" MATH "
```

SAVE HELLO

11 Write protect the disk and you are done!

For the adventurous (or curious) among you, I suggest reading Dave Stanton's "Word Challenge/Classmate" sofkey in *COMPUTIST #28*. He talks about programs hidden within programs which is exactly what the situation with *Math Blaster* is.

Throughout the programs, there is a nasty secondary protection that will, upon discovering normal DOS 3.3 present, initialize your disk. Calls are made to the start of the DOS 3.3 INIT routine which in the *Math Blaster* DOS has a Return from Subroutine (RTS) command. I

found this out quickly when, upon first booting the supposedly softkeyed disk, it reinitialized the disk! Other checks are made and if things are not what they are 'supposed' to be, an indirect call is made to the INIT command.

I found a few occurrences of these two checks, but since there were programs hidden within programs, I decided to fix the INIT routine in normal DOS so that it would mimic *Math Blaster's* original DOS.

This entailed putting two RTS's at the INIT entry points (line #40 in our new HELLO program) and changing the pointer which the second check uses to call INIT into a harmless call to monitor RTS at \$FF58 (line #50). For a simple lesson, copy the softkeyed *Math Blaster* program disk onto another blank disk which we'll call the "DUMMY" disk. Now DELETE the HELLO program on the DUMMY AND RENAME MATH, HELLO. This returns the disk to it's original volatile state. Boot this disk and listen closely. BINGO. The disk reinitializes itself!

The moral to this is to write protect any newly softkeyed disk to prevent much frustration until you are absolutely sure there is no secondary protection lurking around.

Enjoy your deprotected *Math Blaster*!

Softkey for...

Tuesday Morning Quarterback

Automated Simulations

■ Requirements

- 64K Apple II+ or the ability to RESET into the monitor at will
- Tuesday Morning Quarterback* original
- A blank disk
- File copy program such as FID
- Fast DOS (not necessary but helpful)

When the football season rolls around, I get to watch plenty of action on the field. Football is my favorite sport and I can never watch enough of it. After the season is over and football is no more for 4-5 months, I satisfy my football cravings with Automated Simulations' *Tuesday Morning Quarterback*.

It is an excellent simulation even though the screen graphics are a bit slow and sparse. The game cannot really be enjoyed, however, unless there is no chance of the original crashing. This is so you will not have to wait for the backup to arrive via the mail (which takes time and \$\$\$).

Deprotecting the disk is one way to prevent those fears. Follow along with the steps in this article and when you are done your program will be *COPY*-able which translates to "No more hassles!"

NOTE: Folks who have the ability to reset into the monitor should ignore instructions

pertaining to the 16K RAM card.

1 Initialize the blank disk, preferably with a fast DOS such as *ProntoDOS* or *Diversi-DOS*, and delete the hello program:

**INIT HELLO
DELETE HELLO**

2 After the blank has been initialized, drop down into the monitor and set up the 16K RAM card so that it contains an image of BASIC and the monitor in it. We also need to change the reset vector (i.e. where the computer goes when the reset key is pressed) so that it points to the monitor. This emulates those Non-Maskable Interrupt cards that allow you to go into the monitor at will. Capturing the protected (and encrypted) Applesoft files requires that we have this ability. For more information regarding RAM cards, check out Wes Felty's "More ROM Running" article in *COMPUTIST #34*.

CALL-151

C081 C081

D000<D000.FFFFM

FFFC:59 FF

C080

*go into monitor
assumes slot 0 RAM card
move ROM image
change reset vector
enable RAM card*

3 Insert the *Tuesday Morning Quarterback* (TMQ from now on) original into drive #1 and boot it:

C600C

4 When the first screen comes up, press **RESET** to go into the monitor.

5 What we must do now is move part of the Applesoft program to a safe place so that a boot will not wipe it out. This involves checking out where the program end is, writing it down for future reference, and then doing the actual memory move. First let's see where the program end is:

AF.B0

Write down the two hex digits that show up after you press **RETURN** - we'll need them in a moment. Now move the section of the Applesoft code that would be destroyed by a boot to a safe place:

7000<800.8FFM

6 Now boot up the blank initialized disk. You will get a "FILE NOT FOUND" error when there isn't a program named 'HELLO' found on the disk. For right now that is fine because nothing will be loaded into memory which would cause us to move more memory (yuch). We now have to move the beginning of the program back in place and then inform DOS and BASIC of its length:

800<7000.70FFM

AF:xx yy

*put the two bytes you wrote
down earlier in place of xx and yy*

3D0G



7 We will now save the program to disk then set the computer back up so that another protected BASIC file may be loaded.

SAVE STARTUP

CALL -151

C080

insert the *TMQ* original disk into the drive

C600G

8 For the rest of the BASIC files on the *TMQ* original you will have to follow the steps from 5 to 7 using the different file names and RESEtting into the monitor at the different times shown in the list below.

The list order is — Filename — end of program value (from SAF-B0) — when to press **RESEt** —.

For example, to get the file "MENU", you have to wait until a menu showing the different choices, such as play football or practice kicking, comes up before you press **RESEt** to go into the monitor. From there on follow steps 5 to 7 and save the file with the name "MENU" in place of "STARTUP".

9 When you are done with the above steps, you will have five BASIC programs on the copy disk with the names STARTUP, MENU, KICK PRACTICE, TEAM FILE EDIT, AND TUESDAY MORNING QUARTERBACK. Now the text files, containing the team's information, must be copied from the *TMQ* original to the copy. We are fortunate that Automated Simulations decided not to protect these files. FID, or any file copier, should be used now to copy the text files named NFL.DATA, SUBS, and the TEAM## (## = the numbers from 1 to 30, inclusive) files to the copy. When you finish copying these text files, there should be five BASIC programs and approximately 32 text files on the copy disk.

10 The final thing to do is to rename the STARTUP file so that it will automatically run upon booting:

RENAME STARTUP, HELLO

You now possess a deprotected copy of *Tuesday Morning Quarterback*. The files are now open for inspection and customization. Enjoy!

List #1

STARTUP (EF 08) at first screen.

MENU (B8 09) when menu with 'PLAY FOOTBALL' and 'PRACTICE KICKING' options appear. Shows up right after the first screen.

KICK PRACTICE (49 18) Go to menu and choose 'PRACTICE KICKING' option. Go into monitor when drive stops.

TEAM FILE EDIT (CD 0E) Go to menu and choose 'UPDATA TEAM ROSTERS' option. Go into monitor when drive stops.

TUESDAY MORNING QUARTERBACK (F0 6C) Go to menu and choose 'PLAY FOOTBALL' option. Go into monitor when drive stops.

Dr. Leigh Rowan-Kelly

I sent a short version of the method to remove the protection from *Softswitch* and a few other programs. I have now found that, with regard to *Softswitch*, my version was grossly inadequate. Another disk had the code in another place, so I have now expanded my coverage of the softkey to include a full explanation.

Softkey for...

Softswitch

Roger Wagner

Essentially *Softswitch* is an outstanding program, made poor by virtue of some very sneaky protection. It writes a special byte to the battery backed-up RAM (at address \$FB) the first time you install the program on any disk using your system. This RAM has been designated as one of the reserved areas by Apple. When you boot a disk containing *Softswitch*, the program then checks for this special signature byte in the RAM, and won't install unless the low bits of the byte are "10", or else it requires the original protected disk to be on line somewhere.

What this means in simple terms is that if you replace or disconnect your battery, or have your Motherboard replaced during repair or upgrading, you lose that signature byte and *Softswitch* hence will then work only with the original disk online. Given the additional complication that *Softswitch* will only install once (by inserting that stupid byte), then effectively you have a useless disk and program!

It is possible, however, to make an alteration to the file /SS.SYSTEM.DISK/SYSTEM/SYSTEM.SETUP/TOOL.SETUP.2 to correct this. You can BLOAD this file at \$2000 and by typing 48 A2 03 0C 22 00 00 E1 68<2000.8800P you can locate the code that reads the byte. It was at \$2BA9 on this disk. If you then replace that code with 48 A2 03 0C 68 68 A9 FE 00 and then BSAVE the file back to the disk (naturally using a copy of your original!), then *Softswitch* no longer checks for the signature byte in the battery-backed RAM. You can even copy the file to other disks and have them install *Softswitch* in memory without going through the full installation procedure.

If you can't be bothered doing it this way, then you can, of course, simply search the disk (using *Copy II Plus* v8.2 or *Zap* from *Bag of Tricks 2* or any sector editor with search facilities) for that same sequence of bytes and

change it accordingly. I found it at block \$112, starting at byte \$3D on one disk, and at block \$11D, byte \$4A on another. I might add that this was based rather heavily on a letter that appeared in *Open-Apple*, and I am indebted to Peter Stubbs for writing that letter.

I The letter in question is in the September issue of *OPEN-APPLE*, a publication that we heartily recommend. One year subscriptions are available for \$28 from: *Open-Apple*, P.O. Box 11250, Overland Park, KS 66207

..... RDEXed

Softkey for...

Hardball gs

Accolade

I see you have another crack for *Hardball gs* in *COMPUTIST* #53. My edits also seem to produce a working copy, but I only used the two byte changes, at block \$32C, bytes \$1EE-1EF (from C2 20 to 18 60) and block \$32F, bytes \$FF-100 (from DA C2 to 18 60).

Anyway, keep the softkeys coming.

Jan Recourt

Playing Tips for...

Ultima IV

Origin

I have the solution regarding the Stigian problem I asked about. When you are in the big room with the altar in the middle, use stones. After that answer the questions and the rest is simple.

⊗ Is there anyone who can give me more lives in *Moebius*?

⊗ Why can't I put Baudville's *Video Vegas* on a hard disk or 3 1/2" disk with *Unidos Plus* by Microsparc. This seems to be the same problem with *Ultima IV* and *Auto Duel*.

When you put them on a 3 1/2" diskette after the startup, it searches in the 5 1/4" drive for the rest of the game. I think there must be a change for the drive searching. It would be nice to have *Ultima* or *Moebius* on one 3 1/2" diskette.

Alan Sheppard

I have recently inquired about backing up *EDD 4* v4.4 and was advised that *COMPUTIST* #49 had the program required. I was also told that the library disk contained the program as well. Because of this I ordered both the disk and magazine and started a one year subscription.

I have some problems and need a little help.



\$27 1st nibble 16's place (16¹)
 2nd nibble 1's place (16⁰)

\$28 1st nibble 4,096's place (16³)
 2nd nibble 256's place (16²)

\$29 1st nibble 1,048,576's place (16⁵)
 2nd nibble 65,536's place (16⁴)

\$2A 1st nibble 268,440,000's place (16⁷)
 2nd nibble 16,777,216's place (16⁶)

My example of the math part of the APT was nearly unreadable. The numbers should have been printed in a column like this:

i.e. You have 1,694,834 experience points, thus:

byte \$27 = \$72	$7 \times 16 = 112$
(7x16)(2x1)	$2 \times 1 = 2$
byte \$28 = \$DC	$13 \times 4096 = 53248$
(13x4096)(12x256)	$12 \times 256 = 3072$
byte \$29 = \$19	$1 \times 1048576 = 1048576$
(1x1048576)(9x65536)	$9 \times 65536 = 589,824$
total = 1,694,834	

I really like the new RDEX, keep up the good work.

I Sorry for the confusion. The way a file is typeset is strongly dependent on which volunteer is sitting at the typesetter when your file comes across. Some people are just a little more experienced with the machinery and it shows.RDEXed

Scott Lloyd

Softkey Addendum for...

Ikari Warriors

Data East

When I was modifying the *Ikari Warriors* for unlimited men, bullets and grenades, the sector edits were not where they were listed in COMPUTIST #53. I found them in sector \$0E instead of sector \$09.

On a side note, the place where I work has a big problem with changing to side B on the disk. With the protection removed, the disk works fine although I had to edit my disk for "unlimited everything" to find this out.

Carl D. Purdy

I have unlocked several pieces of software which I would like to share with you at this time. These are Milliken math series, copyright 1980, the Micro-Computer Learning games from Learning Well Co., Morning Star Math, and Reading Comprehension Main Idea and Details from Milton Bradley.

Softkey for...

Milliken Math series

Milliken

■ Requirements

- Demuffin Plus*
- A way to break into the monitor
- DOS 3.3 or a Fast DOS (*Pronto DOS* from Beagle Bros.)

1 INIT a blank disk with DOS 3.3 or a fast DOS. Have a slave disk handy to save the RWTS.

INIT HELLO

2 Insert the Milliken disk and boot it.

PR#6

3 Break into the monitor and move the RWTS to a safe location.

1900<B800.BFFFM

4 Insert a slave disk and boot it.

C600G

5 Insert your *Demuffin* disk and save the Milliken RWTS.

BSAVE RWTS.MILLIKEN,A\$1900,L\$800

6 Fiddle with DOS and use *DEMUFFIN PLUS* to copy some files.

BLOAD RWTS.MILLIKEN,A\$6800

CALL - 151

B800<6800.6FFFM

803G

Starts Demuffin

From here follow the prompts to save the files on the Milliken disk to your INITed disk. The files are as follows:

```

BOOT
A.LOGO
MAT.D
MANAGER
CHR SETS YZ
INIT
SD.ADDITION (SD.MULTIPLICATION,
SD.DIVISION, SD.SUBTRACTION)
B.TEXT POINTERS
B.TEXT
ANIMATION
DIVISION (MULTIPLICATION, DIVISION,
SUBTRACTION)
B.ALL 9
  
```

7 Once all the files are copied, rename the BOOT program "HELLO" and you are finished.

RENAME BOOT,HELLO

Softkey for...

Micro-Computer Learning Games:

Race Track/Reading for Detail

Time Capsule/Reading Skills

Chief of Detectives/Drawing Conclusions

Mountain Climbing/Cause & Effect

School Days/Inference

Galaxy Search/Predicting Outcomes

Learning Well Co.

■ Requirements

- DOS 3.3 or a Fast DOS (*Pronto DOS* from Beagle Bros.)
- CopyA
- A file copy utility such as *Copy II Plus* or FID

The *Micro-Computer Learning Games* are a series of reading games that are really neat to use in the classroom, however, I hesitate to put originals in the hands of my students. Thankfully, it is quite simple to copy these.

1 Boot your DOS 3.3 system disk.

2 Tell DOS to ignore checksum and epilog errors and use *COPYA* to copy the protected disk.

POKE 47426,24

RUN COPYA

3 INIT a disk.

INIT HELLO

4 Use a copy utility such as *Copy II Plus* or FID to copy all of the files from the *COPYA* disk to your INITed disk.

5 Determine which file is the boot program. It will be something like BOOT, or BOOT1. Rename this file to HELLO.

RENAME BOOT,HELLO

Softkey for...

Reading Comprehension

Main Idea & Details

Milton Bradley

■ Requirements

- A way to break into the monitor
- DOS 3.3 or a Fast DOS (*Pronto DOS* from Beagle Bros.)
- Super IOB* and a *Swap Controller*



1 INIT a Blank Disk.

INIT HELLO

2 Boot *Reading Comprehension*.

3 Break into the monitor and move the RWTS.

1900<B800.BFFFM

4 Boot a slave disk.

C600G

5 Save the RWTS.

BSAVE RWTS.READING,A\$1900,L\$800

6 Insert your *Super IOB* disk.

LOAD SUPER IOB

EXEC SWAP.CON

7 List line 10010 and change it to use your RWTS, i.e. RWTS.READING. Place slave disk in drive and run *Super IOB*.

RUN

8 Follow the prompts to copy the disk. DO NOT reINIT the disk.

9 When the copy process is done, boot the copied disk and catalog it. Determine which program is the boot program and rename it to hello. That is all there is to it.

Softkey for...

Morning Star Spelling

1 Boot your DOS 3.3 system disk.

2 Tell DOS to ignore checksum and epilog errors and use COPYA to copy the protected disk.

POKE 47426,24

RUN COPYA

No other changes are necessary.

Stephen J. Scalia

As my subscription ended last month, I thought I might drop you a few lines to tell you why I did not renew.

Although I am not a novice Apple user, I have owned my IIc for over four years now, I have yet to be able to utilize one softkey or feature program from your publication.

I have typed in almost 200 programs from such magazines as "Nibble", "Compute", "Incider" and "A+". I have gotten all of the programs to run and have been able to modify them to suit my personal needs.

"Date/Time Without a Clock Card" by Steve Marvin in COMPUTIST #49 is an example of the problems I encountered. There

is absolutely no way a non-assembly language programmer could decipher how to make this program run. Surely the appropriate changes for each version could have been published so us BASIC programmers could make use of the program.

I enjoy my Apple and try to subscribe to any publication that will broaden my knowledge. I must say that after 12 issues of COMPUTIST, I don't know anymore about copy protection than I did before I spent the \$32.00 for the subscription.

Perhaps you are only interested in writing for people with a vast knowledge of assembly language but you are missing a lot of readers by not making your publication understandable to the 95% of us Apple owners who never will own an assembler.

I'll use my COMPUTIST subscription renewal money for something that talks my language. "Open-Apple" maybe.

Our writers are people just like you. Non-professionals who just want to let others know what they've done or something they've found out. Their letters are sometimes short and cryptic. But we're all friends here. If you need help with something, all you have to do is ask.

..... RDEXed

Dr. George Sabeh

I have enjoyed your publication over the past couple years. I have purchased most of the available back issues. It has helped me understand and enjoy my Apple. I would like to contribute two short softkeys which may help some of your readers.

Softkey for...

Ski Crazyed

Baudville

Requirements

- Locksmith Fast Copy or a similar copy program such as CopyA
- Sector editor
- Blank disk

1 Copy the original using any copy program, such as *Locksmith Fast Copy*.

2 Sector edit the following:

Trk	Sct	Byte(s)	From	To
\$00	\$04	\$A5-A6	D0 F7	EA EA
	\$06	\$11-12	D0 F7	EA EA
		\$2E-2F	D0 D5	EA EA
	\$0F	\$08-09	D0 F7	EA EA

Make sure you write the sectors back to disk.

Softkey for...

Earth Orbit Stations

Electronic Arts

Requirements

- Locksmith Fast Copy or other copier that ignores errors.
- Sector editor such as *Copy II Plus*
- Blank disk.

1 Copy the original using *Locksmith* or similar copy program.

2 Sector edit the following:

Trk	Sct	Byte(s)	From	To
\$01	\$0A	\$52-54	6C 54 00	18 60 48
	\$0F	\$00-02	4C 69 A0	18 60 DD
		\$6F-71	4C 69 A0	18 60 DD

Make sure to write the sectors back to disk.

These two softkeys would not have been possible if it was not for the help gained from reading the back issues of COMPUTIST. Keep up the good work.

Name withheld by request

Advertising Pirate BBS's and Encouraging Piracy

I am a COMPUTIST subscriber and I love the new RDEX, and ZOXCOPYES, however, COMPUTIST #53 has raised grave concerns. On page 37 you printed a letter from Chad Baker querying about the new user password to a large and infamous Pirate BBS in southern California called Motherboard West. Chad also advertises another BBS called Alien Nation. These boards exist primarily to trade cracked copies of software.

I hate copy protection and I have become an intermediate cracksmith through practice and some help from COMPUTIST. I am NOT A PIRATE and I fear that if you continue the practice of printing this type of letter your magazine will suffer from just, legal action from the Software Publishers Association. Chad, I assume, is a young man and you cannot blame him for his ignorance in making this type of query. However, I hope you will develop a standing editorial policy to prevent future incidents.

By the way, it might be a good idea to give Bill Bennett's BBS at 415-349-8245 a few words next month. Bill's board is dedicated to project STOP, the Software Theft Opposition Project. The board functions as a forum where interested parties can discuss the software piracy issue. Many pirates as well as rep's from Electronic Arts and other software publishers



are currently active on the board. You may also write to Project STOP, P.O. Box 3142, San Mateo, CA 94403.

I The problem is that we just don't know which Bulletin Board Systems carry what kind of information. When it comes to BBSs, we aren't very active or knowledgeable. We just print what you write. This whole magazine is just a readers data exchange. It would be frivolous for the SPA to pursue us on that issue. (No pun intended.).....RDEXed

Leh-Wen Yau

Iigs Softkey for...

Marble Madness

Electronic Arts

I purchased Electronic Arts' Iigs version of *Marble Madness* a few days ago. It is, of course, copy-protected. However, I came up with the following steps to make it bypass the copy-protection scheme:

CALL-151
RENAME DOS8.SYSTEM,DOS8.SYS
BLOAD DOS8.SYS,TSYS
2083: EA EA EA 80
CREATE DOS8.SYSTEM,TSYS
BSAVE DOS8.SYSTEM,TSYS,A\$2000,L7054

This in effect nullifies the instruction "JSR \$3700", which performs the copy-protection detection.

The unprotected game, however, is not hard-disk installable due to its hard-coding of the volume name /MusicGs.

UNK, Sask, Canada

Softkey for...

The American Challenge

Mindscape

■ Requirements

- Apple II/64K
- COPYA or Disk Muncher (DM)
- Blank Disk
- Sector Editor

1 Boot your DOS 3.3 system disk.

2 Tell DOS to ignore checksum and epilog errors and use COPYA to copy the protected disk.

POKE 47426,24
RUN COPYA

3 Make the following sector edit to the copy you just made.

Trk	Sct	Byte(s)	From	To
\$00	\$00	\$2C	4C 00 4A	4C DB 43

That's it.

Greg Poulos

Softkey for...

Sub Mission

Mindscape

Sub Mission, by Tom Snyder Productions (distributed by Mindscape) is not copyable with a fast copier. So I loaded, COPYA and modified it so it would ignore some data marks. The *Sub Mission* disk was copied into a normal format.

Then I booted my modified COPYA version of *Sub Mission*. It seemed to boot fine, but after the screen says "Game: Approved", it would load the screen with your ship, read about three tracks and then hang, with the drive spinning. Apparently it was looking for a nibble count.

So I opened up my drive and booted it again, this time watching what the last three tracks that it read were. They were \$04, \$03, and \$02 (if my memory serves correctly). Not possessing an incredible amount of assembly language knowledge, I looked around those tracks and put a JMP into the monitor (\$FF59, or 4C 59 FF) in various places where other JMPs were.

What I discovered was that the disk seemed to read the tracks backwards, because if I put a JMP to the monitor on track \$04, the program would crash earlier than if I put it on track \$02.

But so far, I still was rather lost. So I searched the disk for hex bytes 89 C0. These are used whenever the drive is turned on and are good bytes to search for when looking for nibble counts. I found a bunch of JSRs on track \$05, sector \$0B. I thought that the instructions for reading tracks \$04, \$03, and \$02 were on track \$05. I was right. So I counted down three JSRs on track \$05, sector \$0B (where bytes 89 C0 were found) and NOPed out the third or fourth JSR, booted the disk and — no problem. It booted fine, and didn't hang.

1 Load COPYA from your system master.

LOAD COPYA

2 Next, enter the monitor and make some changes to the machine language part of COPYA so it ignores data and address epilogs, read errors, and the third byte of the data header.

CALL-151
B925:18 60
B988:18 60

BE48:18
B8FE:00
3D0G
RUN

3 Follow the prompts to copy your original *Sub Mission* disk.

4 Get out a sector editor and make the following changes to track \$05, sector \$0B of your copy.

Trk	Sct	Byte(s)	From	To
\$05	\$0B	\$A6-A8	20 AF 5B	EA EA EA

Sub Mission is now fully deprotected.

If you're interested in changing the title pages, you can find them on tracks \$0E and \$18 with a hi-res picture searcher.

Jack Nissel

Softkey for...

Mickey's Space Adventure

Sierra On-Line

■ Requirements

- The original *Mickey's Space Adventure* disks
- 4 blank disks
- Sector editor
- DOS 3.3 system disk
- COPYA

The softkey in COMPUTIST #25 had several errors in it. One was corrected in COMPUTIST #27, but the other was not. Here is the softkey with all corrections made.

1 Boot your DOS 3.3 system disk and copy all 4 sides of your original disk.

RUN COPYA

2 When you are finished copying the disks, answer N to the "DO YOU WANT ANOTHER COPY? Y/N" prompt.

3 At the Applesoft prompt put disk 1, side 1 of your copy in the drive and enter:

NEW
BLOAD MICKEY - CODE

4 After the file has loaded, enter:

CALL-151
4014:EA EA EA
BSAVE MICKEY - CODE,A\$4000,L\$2600

You're done



Softkey for...

Where in Europe is Carmen Sandiego

Broderbund

■ Requirements

- The original disk
- A blank slave disk
- 2 blank disks
- COPYA
- Copy II Plus

If you are interested in finding out how I deprotected this title read the following, if not skip down to the step-by-step, at the end of this letter.

The first thing I did when I got this game was to load *Copy II Plus* and catalog it. On side 1, the head banged and then I got a VOLUME 001 and the usual I/O error. On side 2, it was a ProDOS disk with the volume name /SIDE2 and one file named DATA.

I decided to try a simple approach. I booted my DOS 3.3 system disk, typed POKE 47426,24, RUN COPYA and tried to copy side 1. I was somewhat surprised to see it copy with no problems.

I tried to boot this copy but every time it tried to read track \$00 it rebooted.

I loaded *Copy II Plus* so I could look through the sectors and decided to CATALOG the disk first. I could not believe what I saw. When I tried to catalog side 1 of the original disk and view VOLUME 001, I figured that the side was DOS 3.3, but on the copy of side 1 was ProDOS, CSA.SYSTEM, and 25 other files, each named for a letter of the alphabet, except for the letter Z.

Since COPYA had INITED the disk DOS 3.3, I decided to format a disk in ProDOS and copy the files from the COPYA copy to my ProDOS disk. I was hoping that the only protection on the original disk was what Broderbund was using to mask this side and make it look like DOS 3.3.

I At the disk format level, both DOS 3.3 and ProDOS are identical. That is, there are 35 tracks (\$00-34) and each track has 16 sectors (\$00-0F). Each address block begins with D5 AA 96 and ends with DE AA. Each data block begins with D5 AA AD and ends with DE AA. The differences are in the kind of data that is stored in each sector. (IE, DOS 3.3 stores it's disk usage map and directory on track \$11, whereas ProDOS starts it's map and directory on track \$00.) That is why COPYA can copy both DOS 3.3 and ProDOS disks. COPYA is a whole-disk, sector-level copier. It only sees the sectors and doesn't pay attention to what kind of data is stored in which sectors.....RDEXed

After copying the files, I used disk copy

to copy side 2 of the original disk.

I booted this copy and I am happy to say I played the game all the way through, three times, without any problems.

I then booted the original disk. After the disk read started, the "ProDOS 1.4" screen came up. If I had done this first, instead of trying to catalog it, I would have known side 1 was ProDOS based. However, if I had known it was ProDOS based I would not have tried COPYA on it and I would not have deprotected it as quickly, if at all.

1 Boot your DOS 3.3 system disk and enter:

**POKE 47426,24
RUN COPYA**

2 Copy side 1 of your original disk to your slave disk.

3 Load *Copy II Plus* and format your first blank disk ProDOS with the VOLUME NAME A.

4 Use the COPY FILES mode to copy all of the files from your slave disk to your ProDOS disk.

5 Use the RENAME mode to change the VOLUME name on the ProDOS copy you just made from A to CARMEN.EUROPE

6 Use the COPY DISK mode to copy side 2 of your original disk to your second blank disk.

7 You're now all set to get Carmen back to jail.

Softkey for...

Dr. Ruth's Computer Game of Good Sex

Avalon Hill

■ Requirements

- The original *Dr. Ruth's Computer Game of Good Sex*
- 3 blank disks (1 disk to be used as a slave disk)
- Swap controller
- Super IOB v1.5
- DOS 3.3 system disk

The softkey in COMPUTIST #49 did not work for my disk. After the drive would start to read side 1 of my copy a second time I would get a DISK ERROR message. I made sure that my modified HELLO program was typed in right, and tried some changes in it, but it didn't do any good. I have had luck in the past by using the *Swap Controller* to deprotect some Avalon Hill games so I thought I would give it a try. The copy that I made would crash into the monitor when I tried to boot side 1. Deleting

line 25 from the HELLO program, as the softkey in COMPUTIST #49 said to do, made the program run fine. Just to see what would happen at the Applesoft prompt, I did the POKE that line 25 did before I deleted it and it crashed into the monitor just as my copy did before I modified the HELLO program.

1 Boot your DOS 3.3 system disk.

2 INIT your blank disks HELLO and then delete the HELLO program. Label these disks 1, 2, and slave.

**INIT HELLO
DELETE HELLO**

3 Boot the original *Dr. Ruth* disk and after your drive reads the first 3 tracks reset into the monitor.

4 Move the RWTS to a safe location.
1900<B800.BFFF

5 Put your slave disk in the drive and boot it.

C600G

6 At the Applesoft prompt enter:

BSAVE RWTS.DR.RUTH, A\$1900, L\$800

7 Install the controller listed below into *Super IOB* and copy side one of the original disk to disk number 1.

8 When side 1 is finished copying and you are at the Applesoft prompt, turn your original disk to side 2, take out disk number 1 and put in disk number 2, type RUN and press return to restart the controller to copy side 2.

9 When asked, press N, so as not to format either disk 1 or 2 while running the controller.

10 Boot disk 1 of your copy and when you get the Applesoft prompt, press **RESET** to stop the boot and enter the following:

**UNLOCK HELLO
LOAD HELLO**

11 After the HELLO program has loaded, enter the following:

**25
SAVE HELLO
LOCK HELLO**

Controller

```
1000 REM DR. RUTH CONTROLLER
1010 TK = 3:ST = 0:LT = 35:CD = WR
1020 T1 = TK:GOSUB 490:GOSUB 360:ONERR GOTO 550
1030 GOSUB 430:GOSUB 100:ST = ST + 1:IF ST < DOS
    THEN 1030
1040 IF BF THEN 1060
1050 ST = 0:TK = TK + 1:IF TK < LT THEN 1030
1060 GOSUB 490:TK = T1:ST = 0:GOSUB 360
```



```
1070 GOSUB 430 : GOSUB 100 : ST = ST + 1 : IF ST < DOS
  THEN 1070
```

```
1080 ST = 0 : TK = TK + 1 : IF BF = 0 AND TK < LT THEN
  1070
```

```
1090 IF TK < LT THEN 1020
```

```
1100 HOME : PRINT "COPY DONE" : END
```

```
10010 IF PEEK (6400) <> 162 THEN PRINT CHR$ (4)
  "BLOOD RWTS. DR. RUTH, AS1900"
```

Checksums

1000 - \$356B	1060 - \$90D8
1010 - \$3565	1070 - \$98DD
1020 - \$E1E8	1080 - \$7422
1030 - \$F7E9	1090 - \$2DB2
1040 - \$D35A	1100 - \$1A55
1050 - \$EB5B	10010 - \$BF60

Les Minaker

Creatures of Might & Magic

The monster data in *Might and Magic* is contained on track \$12, sector \$07 to track \$13, sector \$0F. There are up to 8 monsters per sector. Unlike the character data, the monster data is stored in a standard, repeating manner. The data for the last monster on each sector, however, overflows onto the next sector. Assuming that the authors of *Might and Magic* wanted to maximize the disk usage, each monster is represented by 32 bytes. I haven't discovered what all the data is and it is unlikely that I will. However, I have learned what some of the data represents.

The information starts in exactly the same relative position for each sector. This table gives those starting positions and what some of the other locations are for. The number in parenthesis is the number of bytes used by that characteristic. This table is for all but the very first. In that sector, the data is still in the same format but the beginning of it is slightly advanced. The first monster (Flesh Eater) starts as if it was monster #5. The last monster on the disk is Lord Archer and there is no more monster data after it.

Monster#	.....	1	2	3	4	5	6	7	8
Name (\$0F)	.....	0C	2C	4C	6C	8C	AC	CC	EC
Speed (\$01)	.....	21	41	61	81	A1	C1	E1	01
# of attacks (\$01)	.....	20	40	60	80	A0	C0	E0	00
Max damage (\$01)	.....	1F	3F	5F	7F	9F	BF	DF	FF
Armour class (\$01)	.....	1E	3E	5E	7E	9E	BE	DE	FE

Here are the individual characteristics that I have been able to figure out so far for each monster.

Monster name	Speed	Attacks	Damage	Armour Class
12-Headed Hydra	16	12	10	10
16-Headed Hydra	12	16	12	15
5-Headed Hydra	12	5	8	7
8-Headed Hydra	13	4	8	10
Acidic Blob	8	2	8	1
Air Elemental	20	1	15	7
Algae Beast	1	1	6	
Alien	15	2	20	15
Arch Devil	14	1	100	16
Arch Druid	16	2	8	10
Arch Mage	25	2	8	12
Assasin	19	1	6	4
Basilisk	14	1	15	5
Banshee	12	1	10	10
Barbarian	15	2	12	8
Barbarian Chief	18	3	12	10
Barracuda	16	1	20	5
Battle Rat	12	1	3	3
Black Dragon	16	3	18	12
Black Knight	20	3	50	10
Blue Dragon	13	3	10	8
Caryatid Guard	15	1	10	5
Cave Giant	10	3	16	10
Cave Troll	10	3	11	7
Celestial Stag	19	3	10	14
Centaur	12	4	4	4
Chaotic Knight	16	3	15	14
Chimera	14	6	5	8
Cleric	12	1	8	5
Cockatrice	8	1	8	4
Crocodile	12	2	10	5
Cyclops	10	2	15	6
Dark Rider	14	4	50	15
Deadly Spores	10	1	1	2
Demon Dog	14	2	10	3
Demon King	35	5	50	30
Demon Lord	14	2	50	20
Diamond Golem	12	3	60	15
Dino Beetle	8	1	50	10
Dino Lizard	12	1	10	5
Dinosaur	6	1	200	10
Druid	14	2	8	4
Dung Beetle	8	1	8	6
Dust Demon	15	3	10	9
Earth Elemental	18	1	20	8
Electric Eel	15	1	8	5
Enchantress	15	24	6	6
Evil Eye	10	2	10	10
Executioner	14	2	12	8
Fire Ant	7	1	6	5
Fire Beetle	6	1	15	7
Fire Elemental	20	1	30	9
Fire Lizard	12	3	10	7
Flesh Eater	7	1	6	2
Frost Giant	12	1	24	10
Gargantu Ant	9	1	12	8
Gargoyle	12	4	4	5
Ghost	10	1	10	10
Ghoul	13	3	5	4
Giant Centipede	9	8	4	5
Giant Crab	12	2	10	9
Giant Leech	3	1	8	2

Giant Scorpion	13	3	8	7
Giant Sloth	14	4	8	5
Giant Spider	18	1	8	5
Giant Squid	14	8	6	5
Gnoll	10	1	8	5
Gnome	10	1	6	5
Goblin	10	1	6	4
Gold Dragon	16	5	20	10
Gorgon	12	1	12	8
Gray Dragon	16	3	15	8
Gray Minotaur	20	4	30	13
Great Sea Beast	30	1	100	12
Greater Demon	19	7	8	15
Greater Devil	19	4	15	12
Green Dragon	12	3	8	8
Gremlin	4	2	3	3
Griffin	14	3	8	7
Guardian Spirit	16	6	6	8
Guardzman	14	1	6	2
Hag	8	2	4	1
Harpy	15	3	5	3
High Cleric	18	3	16	14
Hill Troll	11	3	12	8
Hippocampus	18	4	10	12
Hippogriff	14	3	8	5
Invisible Thing	25	3	10	14
Killer Bees	16	10	2	10
Kirin	22	4	40	15
Kobold	6	1	4	4
Lamprey	15	1	8	2
Lava Beast	9	2	12	5
Lesser Demon	16	4	8	10
Lesser Devil	16	5	6	8
Lich	20	2	10	10
Locust Plague	17	10	1	5
Lord Archer	21	3	80	15
Mage	20	3	6	10
Magician	15	1	8	5
Man Eating Mare	14	3	8	6
Manticore	12	4	6	6
Mantis Warrior	16	4	12	8
Master Archer	18	8	16	10
Master Thief	20	2	8	12
Medusa	9	1	4	5
Militiaman	9	2	10	9
Minor Demon	16	2	8	5
Minor Devil	15	2	4	4
Minotaur	15	1	35	7
Mummy	7	2	20	7
Mutant Larva	2	1	3	
Naga	15	1	8	8
Natives	10	2	6	
Necromancer	17	2	8	7
Ogre	12	2	10	7
Ogre Chief	15	2	15	9
Orc	12	1	8	5
Orc Chieftain	15	2	12	10
Orc Leader	14	1	8	5
Panthro Mist	18	4	8	7
Paul Pead	19	1	30	10
Pegasus	20	3	8	4
Phantom	10	2	8	7
Phoenix	24	3	8	13
Pirate	17	1	20	8
Pirate Captain	18	3	20	10
Poltergeist	16	2	2	



Pyro Hydra	12	5	8	7
Rabid Jackal	15	1	2	3
Rabid Leper	11	1	3	
Rakshasha	14	3	5	14
Red Dragon	15	3	20	12
Rhino Beetle	7	1	20	7
Roc	14	3	50	10
Rotting Corpse	3	2	4	2
Sand Worm	8	1	200	7
Satyr	10	2	8	5
Savage Shrew	13	3	5	3
Scorpion	20	2	60	12
Sea Dragon	32	4	50	15
Sea Hag	12	3	6	8
Sea Serpent	20	1	100	10
Shadow Beast	18	1	5	3
Shark	24	2	14	6
Silver Dragon	16	4	16	8
Siren	13	2	8	8
Skeleton	9	1	6	3
Slither Beast	10	1	8	4
Snake	17	1	3	2
Specter	12	1	12	8
Sphinx	18	3	10	11
Sprite	20	1	2	10
Steel Golem	10	2	25	15
Stone Giant	12	4	10	10
Stone Golem	6	1	40	7
Storm Giant	14	2	30	9
Strangling Vine	6	4	3	3
Succubus Queen	20	3	30	20
Swarming Wasps	17	10	2	4
Swordsman	18	2	10	6
Thief	16	1	8	3
Titan	30	2	60	13
Troglodyte	11	3	4	5
Troll	12	3	9	6
Unicorn	22	3	10	8
Vampire	14	2	12	9
Vampire Bat	14	1	3	2
Volcano God	32	6	40	30
Warlock	16	1	8	8
Warrior	14	2	12	12
Warrior Cat	17	4	6	6
Water Elemental	14	1	50	12
Water Rat	6	1	6	1
Werebear	14	4	8	8
Werewolf	35	2	20	20
Werewolf	14	2	8	7
White Dragon	15	3	12	8
White Wolf	14	3	2	10
Wicked Witch	14	2	6	4
Wight	12	1	10	6
Wild Boar	14	1	12	3
Winged Beast	14	1	120	12
Wizard	18	2	6	8
Wolverine	12	3	5	5
Wood Golem	5	2	15	5
Wraith	9	2	6	6
Wyvern	12	2	18	7
XX!XX!XX!XX!XX	18	1	1	20
Yeti	13	2	10	4
Zombie	2	1	8	2

Aaron Schoeffler

Softkey for...

Rings of Zilfin
Roadwar 2000
SSI

Requirements

- Super IOB v1.5
- Roadwar 2000 and/or Rings of Zilfin
- A sector editor (optional for APT's)
- A couple blank disks

The Scheme

Being the game enthusiast I am, I had gone out and bought myself a couple of good adventure games. I sat down to play *Rings of Zilfin* first. After two hours of frustrating deaths, I decided to try my luck at deprotecting it.

After booting up my *Copy II Plus v5.5*, I snooped around using the sector editor. After examining some tracks, I found that the even tracks would read in with normal parameters, while the odd tracks would not. I tried getting rid of the checksums, but to no avail. This forced me to get my nibble copier out and get a raw dump. Looking around on track \$01, I found that the address prologue was changed from D5 AA 96 to D4 AA 96. Nothing else seemed to be different, so I wrote this down and tried it on my sector editor. To my surprise, it read in beautifully and I tried it on the rest of the odd tracks. Every one read in and I knew it was time to make a controller.

With the controller installed, I booted up my fresh backup and found it worked fine! Seeing this, I put it away and started playing *Roadwar 2000*. The same thing happened, my guys kept getting burnt by the sadists and never got anywhere. With a sigh, I got my *Super IOB* out and jokingly tried my *Rings of Zilfin* controller on it. My laughter subsided as it started to read and write it accordingly. With disbelief, I watched it do the entire disk. I tried to boot up the copy of *Roadwar* and again, it worked just like the original. Realizing my luck, I quickly renamed my controller and set about finding some APT's.

The Procedure

All you need to do is type in the controller at the end of this article and install it in *Super IOB*. Be sure to format your blank disk and write protect your backup of *Roadwar 2000*. The other sides of *Rings of Zilfin* are already copyable, and may I add, contain some interesting information. You may also want to

delete the first two lines of the hello program and move all of the files to a Pronto-DOS disk. This would let you break out of the program whenever you want and load the files in a fraction of the time.

Controller

```
1000 REM ROADWAR 2000 & RINGS OF ZILFIN
1010 TK = 0:ST = 0:LT = 35:CD = WR
1020 T1 = TK:GOSUB 490:POKE 47405,24:POKE
      47406,96:POKE 47497,24:POKE 47498,96
1030 POKE 47445,213:IF TK/2 < > INT(TK/2)
      THEN POKE 47445,212
1040 GOSUB 430:GOSUB 100:ST = ST+1:IF ST < DOS
      THEN 1040
1050 IF BF THEN 1080
1060 ST = 0:TK = TK+1:JK = 212:IF TK/2 = INT
      (TK/2) THEN JK = 213
1070 POKE 47445,JK:IF TK < LT THEN 1030
1080 GOSUB 490:TK = T1:ST = 0:GOSUB 230
1090 RESTORE
1100 POKE 47405,208:POKE 47406,19:POKE
      47497,208:POKE 47498,183
1110 GOSUB 430:GOSUB 100:ST = ST+1:IF ST < DOS
      THEN 1110
1120 ST = 0:TK = TK+1:IF BF = 0 AND TK < LT THEN
      1110
1130 IF TK < LT THEN 1020
1140 NORMAL:TEXT:HOME:PRINT "DONE^ WITH^
      COPY":END
```

Checksums

1000	- \$356B	1080	- \$88BC
1010	- \$3266	1090	- \$B829
1020	- \$2F76	1100	- \$A4E3
1030	- \$659E	1110	- \$9AE2
1040	- \$7598	1120	- \$4176
1050	- \$E19B	1130	- \$68B7
1060	- \$B8A7	1140	- \$20B5
1070	- \$6D24		

A.P.T. for...

Roadwar 2000
SSI

I immediately noticed that this was not normal DOS. It used a late version of RDOS, which is a pain to sort out (there is a company that puts out a program which removes the RDOS protection), so I contented myself with finding out where my gang information was stored. I saved my character on a save disk I had just made, and turned off my game. Using my sector editor to snoop around my save disk I came across my gang's name. I wrote down the sector it was on, track \$03, sector \$0B, loaded up my gang stats and wrote them all down. I then went back to that sector and searched where everything was placed. I found almost everything, but discovered it wasn't



enough to make a program out of. Anyway, here is the information I found on track S03, sector \$0B.

Name of gang	\$23-26
Food	\$39-3A
Tires	\$3B-3C
Fuel	\$3D-3E
Ammo	\$3F-40
Guns	\$41-42
Medical supplies	\$53

Here is the information for the first car. The information for the rest of the cars follows in the same order.

Type of car	\$64 (see chart)
Structure	\$66-67
Manueverability	\$68-69
Braking	\$6A
Acceleration	\$6B
Protection (L/R/F/B/T)	\$72-76
Int. crew quality	\$80-84
Top. crew capacity	\$85
Top. crew quality	\$86-8A
Speed	\$91-92

Chart of vehicles

Type	Byte
Motorcycle	\$00
Sidecar	\$01
Compact Conv.	\$02
Compact H.T.	\$03
Midsize Conv.	\$04
Midsize H.T.	\$05
Sports Car Conv.	\$06
Sports Car H.T.	\$07
Station Wagon	\$08
Limousine	\$09
Van	\$0A
Pickup Truck	\$0B
Offroad Conv.	\$0C
Offroad H.T.	\$0D
Bus	\$0E
Tractor	\$0F
Construction Veh.	\$10
Flatbed Truck	\$11
Trailer Truck	\$12

A.P.T. for...

Rings of Zilfin

SSI

I found on the second disk side that there was a file called "SA". This tiny file contained all of the information about my man. I wrote down some of my man's information and found all of it contained in different places in this file. I quickly constructed a program that loads your player file. It then asks you to confirm changes to your character. It edits every aspect of your character and saves it to disk. The place you

are is also contained in this file for whom it may concern.

```

10 REM *
11 REM * RINGS OF ZILFIN
15 REM * EDITOR - BY
17 REM * AARON SCHOEFFLER
18 REM *
19 DC = 1:DS = CHR$(4):TEXT:HOME
20 TIS = "RINGS OF ZILFIN CHARACTER EDITOR"
30 PRINT SPC(40 - (LEN(TIS))) / 2:TIS
40 POKE 34,2
50 VTAB 10:PRINT "PLEASE INSERT SIDE " :;
  INVERSE:PRINT "TWO" :;NORMAL:PRINT "OF
  RINGS"
60 PRINT "OF ZILFIN, PRESS ANY KEY TO
  CONTINUE=>" :;GET AS
65 PRINT AS
70 PRINT DS "BLOOD SA"
80 HOME
90 VTAB 5:PRINT "CHANGE NAME?(Y/N)" :;GET
  AS:IF AS = "Y" THEN GOTO 110
100 GOTO 160
110 HTAB 1:VTAB 7:PRINT "ENTER FOUR LETTERS
  -" :;
115 NAMES = ""
120 NAMES = "":FOR Y = 0 TO 3:HTAB 22 + Y:VTAB
  7:GET AS:PRINT AS:NAMES = NAMES + AS:NEXT
140 VTAB 10:PRINT "ARE YOU SURE?(Y/N)" :;GET
  ES:IF ES <> "Y" THEN GOTO 120
150 FOR DC = 1 TO LEN(NAMES):POKE 16497 + DC,
  ASC(MID$(NAMES,DC,1)):NEXT
160 HOME:VTAB 15:PRINT "* FATIGUE,
  ENDURANCE, MAG. SKILL," :PRINT "SWRD
  SKILL, STRENGTH"
165 VTAB 5:PRINT "CHANGE ALL SKILLS TO 9999?(
  Y/N)" :;GET AS
167 PRINT AS
170 IF AS <> "Y" THEN GOTO 200
180 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:IF AS <> "Y" THEN GOTO 160
190 FOR I = 1 TO 2:POKE 16385 + I,99:NEXT I:FOR
  I = 1 TO 2:POKE 16388 + I,99:NEXT:FOR I =
  1 TO 2:POKE 16390 + I,99:NEXT:FOR I =
  1 TO 2:POKE 16397 + I,99:NEXT I:FOR I = 1
  TO 2:POKE 16401 + I,99:NEXT I:FOR I = 1
  TO 2:POKE 16393 + I,99:NEXT
200 HOME:VTAB 5:PRINT "CHANGE 8 PLANTS TO
  9999?(Y/N)" :;GET AS:PRINT AS:IF AS <
  > "Y" THEN GOTO 230
210 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 200
220 FOR I = 1 TO 16:POKE 16411 + I,99:NEXT I
230 HOME:VTAB 5:PRINT "CHANGE FOOD TO 9999?(
  Y/N)" :;GET AS:PRINT AS:IF AS <> "Y"
  THEN GOTO 260
240 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 230
250 FOR I = 1 TO 2:POKE 16391 + I,99:NEXT
260 HOME:VTAB 5:PRINT "CHANGE GOLD TO 9999?(
  Y/N)" :;GET AS:PRINT AS:IF AS <> "Y"
  THEN GOTO 300
270 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 260

```

```

280 FOR I = 1 TO 2:POKE 16387 + I,99:NEXT
290 HOME
300 HOME:VTAB 5:PRINT "CHANGE ALL ITEMS TO
  99?(Y/N)" :;GET AS:PRINT AS:IF AS <>
  "Y" THEN GOTO 350
310 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 300
320 FOR I = 1 TO 27:POKE 16428 + I,99:NEXT
330 HOME
340 HOME
350 HOME:VTAB 5:PRINT "CHANGE BOW?(Y/N)"
  :;GET AS:PRINT AS:IF AS <> "Y" THEN
  GOTO 410
360 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 350
370 HOME:VTAB 7:PRINT "A - ASH BOW":PRINT
  "B - BROM BOW":PRINT "PICK ONE"
  :;GET AS:IF AS <> "A" AND AS <> "B"
  THEN PRINT CHR$(7):GOTO 370
380 IF AS = "A" THEN POKE 16408,18
390 IF AS = "B" THEN POKE 16408,19
400 POKE 16409,99
410 HOME:VTAB 5:PRINT "CHANGE SWORD?(Y/N)"
  :;GET AS:PRINT AS:IF AS <> "Y" THEN
  GOTO 500
420 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 410
430 HOME:VTAB 7:PRINT "A - SHORT SWORD":
  PRINT "B - PELA SWORD":PRINT "C -
  SLICER":PRINT "D - SLAYER":PRINT "E -
  GRANDSWORD"
440 VTAB 13:PRINT "PICK ONE" :;GET AS:PRINT
  AS:IF AS <> "A" AND AS <> "B" AND AS
  <> "C" AND AS <> "D" AND AS <> "E"
  THEN PRINT CHR$(7):GOTO 430
450 IF AS = "A" THEN POKE 16406,13
455 IF AS = "B" THEN POKE 16406,14
460 IF AS = "C" THEN POKE 16406,15
465 IF AS = "D" THEN POKE 16406,16
470 IF AS = "E" THEN POKE 16406,17
480 POKE 16407,0
500 HOME:VTAB 5:PRINT "CHANGE ARMOUR?(Y/N)"
  :;GET AS:PRINT AS:IF AS <> "Y" THEN
  GOTO 600
510 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 500
520 HOME:VTAB 7:PRINT "A - LIGHT ARMOUR":
  PRINT "B - MEDIUM ARMOUR":PRINT "C -
  HEAVY ARMOUR"
530 VTAB 11:PRINT "PICK ONE" :;GET AS:PRINT
  AS:IF AS <> "A" AND AS <> "B" AND AS
  <> "C" THEN PRINT CHR$(7):GOTO 530
540 IF AS = "A" THEN POKE 16404,20
550 IF AS = "B" THEN POKE 16404,21
560 IF AS = "C" THEN POKE 16404,22
570 POKE 16405,99
600 HOME
610 VTAB 5:PRINT "CHANGE # OF ARROWS TO
  9999?(Y/N)" :;GET AS:PRINT AS:IF AS <> "Y"
  THEN GOTO 700
620 VTAB 7:PRINT "ARE YOU SURE?(Y/N)" :;GET
  AS:PRINT AS:IF AS <> "Y" THEN GOTO 610
630 POKE 16396,99:POKE 16397,99

```




```

700 HOME : VTAB 5: PRINT "PLEASE RE-INSERT SIDE"
" : INVERSE : PRINT "TWO" : NORMAL : PRINT
" OF RINGS" : PRINT "OF ZIF IN DISK." :
PRINT "PRESS ANY KEY TO CONTINUE" ==> "
: GET AS
705 PRINT AS
710 PRINT DS "BSAVE SA, AS4000, L$77"
720 TEXT : HOME : PRINT "GOODBYE" : END

```

Checksums

10	- SBADD	300	- \$B750
11	- \$E622	310	- \$D2CC
15	- \$15FA	320	- \$B024
17	- \$4D46	330	- \$89C3
18	- \$CC01	340	- \$42E3
19	- \$9A55	350	- \$090A
20	- \$7132	360	- \$60A8
30	- \$6564	370	- \$66B3
40	- \$C087	380	- \$35E2
50	- \$77FA	390	- \$5CCB
60	- \$2A27	400	- \$6D07
65	- \$E448	410	- \$E446
70	- \$63D2	420	- \$539E
80	- \$5588	430	- \$4E23
90	- \$0AC1	440	- \$F8E4
100	- \$C15C	450	- \$56B4
110	- \$D0AA	455	- \$2914
115	- \$955B	460	- \$D5D1
120	- \$9180	465	- \$956F
140	- \$ACF0	470	- \$C74B
150	- \$2617	480	- \$35DB
160	- \$0702	500	- \$1097
165	- \$675A	510	- \$0982
167	- \$0186	520	- \$410D
170	- \$8E99	530	- \$C1C0
180	- \$2148	540	- \$4959
190	- \$598C	550	- \$1D15
200	- \$0032	560	- \$92BA
210	- \$17DA	570	- \$59C1
220	- \$4A77	600	- \$FF6A
230	- \$1364	610	- \$5C2E
240	- \$0E7F	620	- \$74E4
250	- \$5FF3	630	- \$6E1A
260	- \$E7D0	700	- \$82FE
270	- \$38B4	705	- \$0C40
280	- \$E9C2	710	- \$9398
290	- \$9FD6	720	- \$391B

Klaus Iden

Put your Print Shop graphics all on one data disk

For the many *Print Shop* enthusiasts who have sworn softly to themselves when the graphic they wanted could not be found by the program because you had the wrong side inserted, here's a hint that I've found quite useful.

I often use the *Print Shop* and one day wondered why Broderbund had not done the

logical and put all the graphics on one side of the Graphics Library Disk. Examining the files on a disk revealed that there were a number of "show" files that served no purpose other than for advertisement (and taking up room). These could easily be eliminated. But would that leave enough room? There were 120 graphics on a Graphics Library Disk. Each graphic used four sectors. A DOS 3.3 disk was divided into 560 sectors. Tracks \$00-02 were used by DOS and track \$11 normally consisted of the catalog. Since I wanted the graphics disk for data only, DOS could be eliminated. That would gain 32 sectors for data (Tracks \$01 and \$02). Track \$00 was not available without extensive changes to the *Print Shop* DOS, so I decided to leave it alone.

Turning to track \$11, sector \$00, I found this was reserved for the VTOC (Volume Table Of Contents). That left me with 543 sectors for data and the catalog. Each graphic occupies four sectors and each catalog sector can list seven file names. A little arithmetic showed that I should be able to get up to 131 graphics files onto one side of a disk, however I would need 19 catalog sectors rather than the 15 regularly allocated.

I recalled an article by Clay Ruth in Call -A.P.P.L.E.'s *All About DOS*. It turned out that allocating extra catalog sectors was quite simple. In the VTOC (track \$11, sector \$00), bytes 1 and 2 pointed to the first catalog sector. Normally this was track \$11, sector \$0F. If I were to change this to track \$12, sector \$02, then I should have an extra 3 sectors for a total of (18 x 7) 126 files, more than I needed. All that required doing was to change bytes 1 and 2 of each of these new catalog sectors starting with track \$12, sector \$02, such that they would each point to the next lower catalog sector.

Trk	Sct	Byte(s)	From	To
\$12	\$02	\$01-02	?	12 01
\$12	\$01	\$01-02	?	12 00
\$12	\$00	\$01-02	?	11 0F

The final step would then be to change the VTOC to indicate that tracks \$01 and \$02 were available for data and sectors \$00-03 of track \$12 were not. Checking through my well worn *Beneath Apple DOS* manual, I came up with the appropriate changes.

Trk	Sct	Byte(s)	From	To
\$11	\$00	\$3C	?	FF
		\$3D	?	FF
		\$40	?	FF
		\$41	?	FF
		\$81	?	F8
		\$01	?	12
		\$02	?	02

I booted up my sector editor and went to work. So far so good. I could CATALOG the disk, SAVE and LOAD files. Now for the real test. I transferred the graphic files using FID, and held my breath as I booted *Print Shop*. To my delight, the program was able to find all of the 120 graphics, although I found that I was unable to display them all by using the *Print Shop* CATALOG option. The ones that didn't show up were those on track \$12. It is possible to patch the *Print Shop* program to read these extra sectors, but more on that later. If you initialize the data disk within the *Print Shop* program, you even get a message on track \$00, sector \$00 that will tell you that you have a data disk that cannot be booted. My final touch was to use Beagle Bros. *Fatcat* program and organize my catalog alphabetically.

I had to use FID to transfer the files, even though it is slow and somewhat inconvenient, because I found that *Copy II Plus* did not like the unusual catalog format and would try to change it back to normal while transferring files, defeating the purpose of the exercise.

I used a sector editor to make the changes to my data disk, then thought, why not do this using the *Super IOB*. So, for those readers without access to a sector editor, here's a quick way to make your special graphics disk.

Step By Step

- 1 Initialize a new data disk using the *Print Shop* program.
- 2 Type in the controller and run *Super IOB*.
- 3 When asked how many drives, indicate only 1 and insert your newly initialized data disk. Use it for the original and target disk.
- 4 Transfer the graphics using FID or any other file mover you wish (beware of the problem with *Copy II Plus*).

Controller

```

1000 REM PRINT SHOP GRAPHICS DATA DISK MAKER
1010 TK = 17:LT = 19:ST = 15:LS = 15:CD = WR:FAST
= 1
1020 GOSUB 490:GOSUB 610
1030 GOSUB 499:T1 = TK:TK = PEEK (TRK):GOSUB
310:TK = T1:GOSUB 610
1100 HOME : PRINT "FINISHED" : END
5000 DATA *13*CHANGES
5010 DATA *17,0,1,18
5020 DATA *17,0,2,2
5030 DATA *17,0,129,248,17,0,60,255
5040 DATA *17,0,61,255,17,0,64,255
5050 DATA *17,0,65,255
5060 DATA *18,0,1,17,18,0,2,15
5070 DATA *18,1,1,18,18,1,2,0
5080 DATA *18,2,1,18,18,2,2,1

```

Checksums

1000	- \$356B	5020	- \$E70B
1010	- \$6A0D	5030	- \$50C3
1020	- \$8DFC	5040	- \$B092
1030	- \$3CCB	5050	- \$A3A0
1100	- \$C526	5060	- \$DF93
5000	- \$5336	5070	- \$7A50
5010	- \$4E4F	5080	- \$652D

Print Shop Catalog Patch

Requirements

- Apple II+, IIe or IIc
- Modified Graphics Library Data Disks
- Deprotected *Print Shop* Program

The problem I had with *Print Shop* not locating the extra graphics on my modified graphics disk led to this patch that I discovered after several hours of snooping and head scratching. What had caused my original confusion was that the graphic files could be displayed under DOS with a catalog command. So why didn't *Print Shop* display them? After all, the program could load the graphics when requested.

The answer came to me late one evening after I had been searching the disk for anything that smacked of a catalog routine. Perhaps the *Print Shop* didn't use the DOS catalog routine! Perhaps the program used its own RWTS (Read/Write/Track/Sector) routine to read in the catalog sectors. I searched the disk again, this time for 20 D9 03 (JSR \$03D9), a call to the RWTS. I found several of these, one in HELLO and two in MENULIB. Examining the second call in MENULIB, I came across some interesting code starting at \$8032:

```
8032 LDA $B7F7 Last slot accessed by DOS
8035 STA $811F Store in IOB (present slot)
8038 STA $812D Store in IOB (last slot)
803B LDA #$0F ←
803D STA $8123 Store in IOB(sector)
8040 LDA $95F4 Second drive for data disk?
8043 STA $8120 Store in IOB (drive to use)
8046 LDA #$00
8048 STA $8004 Counter for files found
804B LDA #$00
804D STA $81C2 Counter for files displayed
8050 LDA #$81 hi-byte of IOB address
8052 LDY #$1E lo-byte of IOB address
8054 JSR $03D9 RWTS call
```

The \$0F caught my eye. Sector \$0F is usually the start of the catalog sectors. I quickly located an IOB (Input/Output Block) at \$811E.

An IOB is a table of 17 parameters that are used by the RWTS.

```
811E 01 Table type, must be $01
811F 60 Slot times 16 (= 6)
8120 01 Drive = 1
8121 00 Volume number expected ($00
      matches any)
8122 11 Track = 11
8123 00 Sector = 0
8124 2F DCT (Device Characteristics
      Table) LO byte
8125 81 DCT HI byte of address = $812F
8126 00 Buffer address LO byte
8127 82 Buffer address HI byte = $8200
8128 00 Not used
8129 00 Byte count ($00 = 256 bytes or 1
      sector)
812A 01 Command code ($00 = seek, $01 =
      read, $02 = write, $03 = format)
812B 00 Error code ($00 = no error)
812C 00 Volume number of last disk accessed
812D 60 Slot of last disk accessed
812E 01 Drive last accessed
```

Finally, it became obvious why extra sectors were never accessed. When doing a catalog under DOS, the VTOC is read and the first catalog sector is determined from bytes 1 and 2. *Print Shop* never looked at the VTOC on a graphics disk. It assumed use of only track \$11 and starting sector \$0F. Code at \$80D5 decremented the sector count, while a value of 00 at \$8201 (sector buffer) indicated the last sector thus terminating the routine.

```
80D5 DEC $8123 Decrement sector
80D8 LDA $8201 Load byte #1 of buffer
80DB BNE $80E8 if = 0 continue reading
80DD LDA $8004 Load # of files found
80E0 BEQ $80EB branch here if = 0
80E2 LDA $81C2 Load # of files on screen
80E5 BNE $80F4 if = 0 wait for keypress
80E7 RTS Return
80E8 JMP $8050 Continue reading sectors
```

The changes needed in order for the program to operate as I wanted it to would include an initial reading of the VTOC and use of bytes 1 and 2 of each sector to point to the next directory sector, rather than the decrementing routine at \$80D5.

I couldn't add the additional code to the end of this file as there wasn't room. The file ends at \$81F8 and the buffer starts at \$8200. I had to find unused memory that was not occupied by program code, graphics, or used as storage areas. I filled memory from \$800 to \$9AA5 (HIMEM is \$9AA6) with \$FF's and started the HELLO program. I stopped the program with my Wildcard after using all parts of *Print Shop* and examined the memory for possible unused areas.

There wasn't much! However, there appeared to be some memory from \$98F8 to

\$9AA5 that looked okay. The second problem was how to get my code there. I finally decided to alter the HELLO program and append my patch and a memory move routine to the end of it and have this routine run before any other code was executed. I've used this extensively and found it to work quite satisfactorily.

Step By Step

1 Load HELLO and make some changes.

```
BLOAD HELLO
CALL-151
0800:4C 00 10
1000:A2 20 BD 0D 10 9D FF 98
1008:CA D0 F7 4C 34 08 A9 11
1010:8D 22 81 A9 00 8D 23 81
1018:A9 81 A0 1E 20 D9 03 B0
1020:0C AD 01 82 8D 22 81 AD
1028:02 82 8D 23 81 60 00 00
BSAVE HELLO, A$800, L$82E
```

Here is what this code looks like

```
0800 JMP $1000 Jump to our move routine
1000 LDX #$20 Load # bytes to move
1002 LDA $100D,X Load data from here and
1005 STA $98FF store here
1008 DEX Count down
1009 BNE $1002 if < 0 then loop back
100B JMP $0834 Back to original program
100E LDA #$11 Initialize
1010 STA $8122 IOB
1013 LDA #$00 to
1015 STA $8123 read
1018 LDA #$81 the
101A LDY #$1E VTOC
101C JSR $03D9 RWTS call
101F BCS $102D Branch if error occurred
1021 LDA $8201 Load track and
1024 STA $8122 store in IOB
1027 LDA $8202 Load sector and
102A STA $8123 store in IOB
102D RTS Return
```

2 Now change MENULIB.

```
BLOAD MENULIB
803B:AD F4 95 8D 20
8040:81 20 00 99 20 13 99
BSAVE MENULIB, A$6000, L$21F8
```

Here's what we did.

```
803B LDA $95F4 Get drive # to use
803E STA $8120 Store in IOB
8041 JSR $9900 Go to patch and read VTOC,
      then get sector and track
      for first directory sector
80D5 JSR $9913 Go to patch and get next
      sector to read
```

That's it. The program will now catalog your *Print Shop Graphics* disks.



Jeff Hurlburt

The

PRODUCT MONITOR

Ratings

☆☆☆☆☆	SUPERB
☆☆☆☆	EXCELLENT
☆☆☆	VERY GOOD
☆☆	GOOD
☆	FAIR
☹	POOR
☹☹	BAD
☹☹☹	DEFECTIVE

System Saver IIgs

Line conditioner/ cooler/ power organizer
\$99.95, from Kensington for Apple IIgs



Were you to take a poll of hardware types on the question: "What is the major threat to micro-computer health?" it's likely that "line glitches" or "over-heating" would account for the overwhelming majority of responses. For some time IIgs owners have met these threats with line conditioner strips and fan installations—'workable' solutions, which left us wishing for some less cumbersome, less noisy alternative. Like, "why doesn't someone put all that cooling and AC line stuff in a nice, compact case?" Finally, someone has!; and the result is a product called "System Saver IIgs".

Perfectly matched in color and styling to your IIgs, "System Saver" fits like a glove between computer and monitor. It actually looks like part of the computer, with the nice side-benefit of raising the monitor to a more comfortable viewing level. Two slant-mounted push-bar switches complete the match, each being illuminated by twin green LED's to mimic the IIgs power-on indicator.

The switches, one labeled "MASTER" and the other "AUX", each control two grounded power outlets mounted on back of the case. "MASTER" switches sockets labeled "Computer" and "Monitor" and also turns on

the fan; "AUX" switches "Printer" and "Aux". In case you need to power a plug-in transformer (as used with some modems), Kensington will supply a short extension cord free (!), when you return the warranty card.

To squelch those nasty power line gremlins, you get a hefty LC filter (two 1" toroid inductors plus capacitor) with a metal oxide varistor ("MOV") surge suppressor connected between the AC lines. Similar MOV's run from AC 'hot' (black line) and 'neutral' (white line) to 'ground'. The devices appear to be GE V130L20A equivalent types, a good long-life choice for the typical 120 VAC installation. Finally, "System Saver" adds a back-panel-mounted circuit breaker to protect against "... a particularly large power surge" as well as shorts on any of the outputs. Oddly, an internal fuse on the between-lines MOV is not mentioned in the documentation. If my circuit-tracing is accurate, its function is to interrupt current flow to the "MASTER" LED's to provide a visible indication of possible MOV failure.

Boasting a 10 amp rating, "System Saver" can easily handle the power-control/line-conditioning chores for your entire system. Still, while it rates a solid "good" on this score, there is room for improvement. For instance, since there is space for five sockets on the back panel, there should be five; and protection during non-use would be better if both AC lines were switched, instead of just 'hot'. As to control, I suspect most IIgs owners would prefer that "Computer" have its own switch, with "AUX" for monitor, printer, etc. and "MASTER" to enable everything. This way, a single bar-press could power-up the system; and one could turn the computer on and off without switching the monitor as well.

Like many IIgs types I've put off adding the recommended in-case fan. With just memory and stereo boards, it hasn't been necessary; and I wonder about the cooling efficiency of an approach that relies chiefly upon blowing air around inside the case while taking in relatively little air from the outside. In addition to which— let's face it— Apple's fan sounds like a mainframe blower! (Whether jamming with "Instant Music" or playing "Bard's Tale", who needs hurricane sound effects?!) "System Saver", on the other hand, uses its 3", 17 CFM muffin fan to pull air through the top of the computer, QUIETLY drawing fresh air through other vents, slot openings, etc..

In order to get some idea as to whether "System Saver" cooling makes any difference, I sampled in-case temperature change with and without the unit in place over two two-hour periods. Without forced-air cooling, in-case temperature rose about 18 degrees vis-a-vis outside temperature. With "System Saver" in place, the change was only 2 degrees. In a case

packed with an internal modem, co-processor board, and other goodies, this sort of difference could be a life-saver for IC's and other components which must dissipate heat.. The lesson seems clear, if you plan to expand your IIgs, something on the order of "System Saver" cooling is a necessity.

Granted, one doesn't invest in "System Saver" just to provide cooling and de-glitching; there are less expensive alternatives. But, if you're after good line protection, quiet cooling, and a solid boost in operating convenience, all in a very classy package, then Kensington's "System Saver IIgs" is THE way to go.

Lane Mastadon VS. The Blubbermen

Comic Book

\$12.00

Infocom



Requires:

- 64K Apple II series
- one 5 1/4" drive
- second drive recommended (copy side 2 of diskette)

Perhaps it was inevitable that, barely a year after release of the first computer novel ("Portal"), the first true computer comic book would 'hit the stands'. Unlike Accolade's "Comics", Infocom's "Infocomics" editions are picture-text read-only affairs, not games. Once the story begins, you can just sit back and watch the story unfold. At the fastest of three speed settings, this provides about an hour of 'reading'.

"What?!", you gasp, 'no 'user interaction?'" Fear not. Recognizing that computer types are not well disposed to hands-off entertainment, Infocom lets you 'rewind', 'fast-forward', or pause the presentation, and insert a bookmark (do a GAME SAVE). Best of all is an option to branch the presentation at numerous key points. For example, in "Lane Mastadon vs. the Blubbermen", a "tattered bikini"-clad beauty and her kid brother become the companions of our hero on a mission to stop the blubbermen of Jupiter from conquering earth. Branching options let you stay with Lane from start to finish, follow his companions when they become separated, and/or take a look at things from the blubbermen's viewpoint. Following every branch (recommended) can easily double the presentation's duration.

Granted, any space adventure featuring curvacious cuties, evil aliens, and a stalwart hero (to say nothing of his elephant-shaped



craft, the mighty "Mastadon") is almost a guaranteed winner. But story line is only part of the Infocomics secret. Employing simple animation and fractal techniques, each frame, in effect, becomes several, with panned scenery, in-out zooms, fades, etc.. Add sound effects and music, PLUS a chance to grom-up on "Lane Mastadon" #1 (!), and you have a quality, super-comic-book value.

VENDORS

Infocom 125 Cambridge Park Drive, Cambridge, MA 02140 (800-262-6868)

Kensington Microware 251 Park Avenue South, New York, NY 10010 (800-535-4242, in NY call 212-475-5200)

Marshall P. Brown

Softkey for...

Mind Prober

Human Edge Software Corporation

■ Requirements

- Any copy program
- A sector editor
- 1 blank disk
- An Apple II is useful

Mind Prober is billed as "innovative expert systems software" to "let you see people as they really are" and, within the limitations imposed by the speed and memory of the Apple II series of computers does a surprisingly good job.

The limitations, of any expert system, are the skill of the programmer in providing the right expertise for the system and his ability to have the program ask the right questions. There are, of course, a number of other technical factors relating to both the software and hardware but without the right questions and the right expert data base the attempt fails.

Mind Prober succeeds! It is dreadfully slow, spends forever in disk reads and only has a limited data base, but on the whole is a good example of an expert system in action.

It goes without saying that it is protected. Any standard disk copy utility will copy it, it just won't run. Being a relatively sane person, I found this unacceptable.

The softkey for *Mind Prober* is simple to implement, consisting of a disk edit of a single byte and, as is often the case, was found only after long hours of looking and a little luck.

Since the disk looked so standard, I started with *Locksmith's Fastcopy* to make my work disk.

The next step was to boot my favorite utility, *Locksmith 6.0's* auto boot code tracer.

For those of you who haven't used this utility, I can only say it is worth the price of the entire disk. It is as close to a full blown 6502-65C02 emulator as I have ever seen. It won't read all protected disks but I am really impressed with what it will read and track.

Step three was to boot the *Mind Prober* work copy using the emulator and then to watch for the place where things went wrong with the boot.

After much watching I noticed a stange bit of code being executed at \$6060. It was only called once and didn't spend much time there but it did look worth examining in more detail. I dropped out of the emulator and listed the code. It looked like mostly trash but you never know. I jumped back to the emulator and instructed it to stop when the program counter equaled \$6060.

Rebooting the program from the emulator to start everything off right, I sat back and waited for the break and then single stepped through the code. What do you know, no more trash. The program uses conditional jumps to skip over sections of bad code. The most simple approach seemed to be a **RETURN** at \$6060. That was too simple, so I followed through again, a step at a time, and found a disk read called via some code hidden at \$03D9 which JMPs to \$B7B5. On the return to \$608A, an examination is made of the results of the disk read. This seemed like a good place for a **RETURN** and as they say "the rest is history".

A search of the disk found the code in a file named HUMAN.OBJ.

1 Make a copy using any standard disk copy utility.

2 Using a disk search utility search for A0 01 B1 10 A8 D0 01 and change the A0 to 60.

Michael Javorka

Softkey for...

Xevious

Mindscape

■ Requirements

- Xevious* original disk
- 2 blank disk sides
- DOS 3.3 System Master
- A file copier

1 Boot your DOS 3.3 system disk.

2 Tell DOS to ignore checksum and pig errors and use *COPYA* to copy the disk.

POKE 47426,24
RUN COPYA

This procedure will copy the entire disk.

But when the copy is booted it resets on itself. I INITED a disk with *ProntoDOS* (probably any fast DOS will do) and then copied all the files from the deprotected disk to this disk. It worked perfectly.

3 Boot up your fast DOS, put your blank disk in the drive, then type the following:

NEW
INIT HELLO

4 Use a file copy program to copy all the files from the deprotected copy to the fast DOS disk.

Paladin

Playing Tips for...

Donkey Kong

Atari

My thanks to John Baeuer's and Paul R. Wilson for their APT's on extra lives and a super Mario for *Donkey Kong*. I would like to add some extra info on super Mario.

As Paul Wilson stated, by pressing "2" we now have a super Mario. You can have Mario become super Mario at any level, not just the Elevator level. While on the Elevator level, have your super Mario walk on the ground to where the springing I beams are falling. If you position yourself just right, the I beams will push you down through the bottom of the screen and you will appear on the top of the screen to rescue your sweetheart. If you are pushed off the bottom of the screen and don't appear at the top, then walk to the left and you should drop in on your sweetheart and Kong.

Lewis J. Shireman

† Softkey for...

Dome Simplified Bookkeeping System

Accounting By Computer

■ Requirements

- Super IOB modified to read/write every other track (COMPUTIST #53)
- Copy program to copy DOS 3.3
- Blank disk

This is a computerized version of the widely used Dome system. I picked up a copy at what I considered a reasonable price, until I discovered what they were up to in the system. The Dome System, like other paper systems of it's kind, is built around the idea that you will



buy a new set of books each year. Well, their program is set up to make you do the same!

The disk is copy protected, using several techniques, but the real catch is that once you enter the accounting year, it can't be changed! Rather upset at this device, I set out to deprotect the disk prior to using any copy. Two of the copy protection schemes, once identified, were removed by using Bill Jetzer's Modify Super IOB to Read/Write Every Other Track in COMPUTIST #53. These were altered epilogs values, and altered address markers on alternate tracks (D4 AA 96 instead of D5 AA 96). I used Super IOB with Bill's controller for Colonial Conquest/Blue Powder, Grey Smoke and it worked just fine for removing these problems.

There was at least one additional problem (probably a nibble count) that is removed by copying a unmodified DOS from the DOS 3.3 Master onto the copy. After that, the program worked fine.

Klaus Iden

Softkey for...

The Factory

The Pond

M-ss-ng L-nks

Sunburst Communications

Requirements

- Apple II Plus
- Super IOB v1.5

In recent issues, (COMPUTIST #30 and #39), methods for softkeying several Sunburst software programs were described. These depended on either a way to reset into the monitor or a machine with 128K. In either case, the authors captured the Sunburst RWTS and used a swap controller.

For people without a means of setting into the monitor or a IIc or IIc with only 64K memory, there is another way of deprotecting these excellent educational programs. My method uses a controller that changes the third byte of both the address and data headers as needed for each track. This is fairly simple because these bytes are changed in the same sequence as the write translation table found in normal DOS 3.3 (\$BA29 - \$BA68). See Beneath Apple DOS, by Don Worth and Pieter Lechner, and the two previous articles for more information on this subject.

Tracks \$11 to \$22 are written on half-tracks on the originals and are relocated on the softkeyed versions. This method will only work for DOS 3.3 programs so check the labels. Note: Copy II Plus v6.0 will also make good backups of the originals.

1 INIT a blank disk, preferably with a fast DOS.

INIT LOGO

2 Load Super IOB 1.5 and enter the following controller:

Controller

```
1000 REM SUNBURST COMMUNICATIONS CONTROLLER
1010 TK = 3 : ST = 0 : LT = 35 : CD = WR
1020 T1 = TK : GOSUB 490 : POKE 47426,24 : REM
      IGNORE EPILOGS
1022 IF TK > 16 THEN CD = 0 : GOSUB 100 : POKE BUF,
      PEEK (BUF) - 1 : CD = RD : PH = TK * 2 : S = 1 :
      GOSUB 130 : REM READ HALF TRACKS AFTER TRACK
      16
1030 GOSUB 430 : POKE 47466, PEEK (47657 + TK) :
      POKE 47356, PEEK (47668 + TK) : GOSUB 100 : ST
      = ST + 1 : IF ST < DOS THEN 1030 : REM CHANGE
      ADDRESS AND DATA PROLOGS EVERY TRACK
1040 IF BF THEN 1060
1050 ST = 0 : TK = TK + 1 : IF TK < LT THEN 1022
1060 GOSUB 230 : GOSUB 490 : TK = T1 : ST = 0
1070 GOSUB 430 : GOSUB 100 : ST = ST + 1 : IF ST < DOS
      THEN 1070
1080 ST = 0 : TK = TK + 1 : IF BF = 0 AND TK < LT THEN
      1070
1090 IF TK < LT THEN 1020
1100 HOME : PRINT "FINISHED" : END
```

Checksums

1000	- \$356B	1050	- \$D907
1010	- \$3565	1060	- \$6860
1020	- \$B078	1070	- \$6065
1022	- \$0823	1080	- \$CCAA
1030	- \$ED95	1090	- \$F5AA
1040	- \$7992	1100	- \$36EF

MOST WANTED Softkeys

ABM Muse
 Agent U.S.A. Scholastic
 Airheart Broderbund
 Algebra 1 Davidson & Associates
 Algebra I Intelligent Tutor
 Apple Super Pilot ?
 Artificial Intelligence Scholastic
 Balance of Power Mindscape
 Bandits Sirius Software
 Bank Street Filer Broderbund
 Bank Street School Filer Sunburst Communications
 Barron's Computer SAT ?
 Battlegroup SSI
 Battlezone Atarisoft
 Brain Bank The Observatory
 Burgertime ?

Calendar Crafter IIgs MECC
 Captain Goodnight ?
 Certificate Library Vol. I ?
 Championship Baseball ?
 Chuck Yeager's Advanced Flight Trainer Electronic Arts
 Colossus IV Firebird
 Creature Venture Softsmith Co.
 Cross Clues Science Research
 Cross Country Rally Softsmith Co.
 Crossword Magic Mindscape
 David's Midnight Magic ?
 DB Master V4.0 Stoneware
 Deathlord Electronic Arts
 Dome Bookkeeping Systems Dome Accounting
 Fay: The Masked Woman Didatech Software
 Fay's Word Rally Didatech Software
 Fun Bunch Unicorn
 Galaxian Atarisoft
 Game Show Advanced Ideas
 Garfield Deluxe Edition DLM
 Gemstone Healer SSI
 GoldFinger Mindscape
 GradeBusters 1-2-3 Gradebusters
 Gutenberg Jr. Micromation LTD
 Handicapping System Sports Judge
 J & S Grade Book J & S Software
 Jigsaw Microfun
 Joust Atarisoft
 Legacy of the Ancients Electronic Arts
 Little Computer Peoples House on a Disk Activision
 Lollipop Dragon: Cursor Control Adventures Society for Visual Ed
 Lollipop Dragon: Plotting & Programming Adventures Society for
 Visual Ed
 Lollipop Dragon: Letter & Number Key Adventures Society for
 Visual Ed
 Lollipop Dragon: Function Key Adventures Society for Visual Ed
 Magic Spells The Learning Company
 Maxi Golf Thunder Mountain
 Micro League Baseball Micro-league Sports
 Microzine #25 Scholastic
 Mr. Do Datasoft
 Mr. Pixel's Cartoon Kit Mindscape
 Ms. Pac-Man Atarisoft
 Never Ending Story Datasoft
 Odin Odesta
 Peeping Tom Microlab
 Pensate Penguin
 Personal Finance Manager (PFM) Apple Computer
 PFS File & Report IIgs Software Publishing Corp.
 Pirates Microprose Software
 Prime Plotter Primesoft Corp.
 Principals Assistant Library Mindscape
 Print Master Unision World
 Pro-Football Sports Judge
 Publisher Springboard
 Puzzles & Posters MECC
 Quiz Castle Didatech Software
 Rescue On Fractalix Epyx
 Ruski Duck Softsmith Co.
 Scrabble Electronic Arts
 Snoggle Broderbund
 Space Eggs Sirius
 Space Journey Mindscape
 Stellar 7 Penguin Software
 Success with Typing v1.2 Scholastic Software
 Super Factory Sunburst
 Think Tank Living Video
 Tower of Myraglen II (IIgs) ?
 Toy Shop Broderbund
 Ultima V Origin Systems
 Universe Omnitrend

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35 September 1986 ■ *Softkeys*: •Olympic

Decathlon •Hi-res Cribbage •Revisiting F-15 Strike Eagle •Masquerade •The Hobbit •Pooyan •The Perfect Score •Alice in Wonderland •The Money Manager •Good Thinking •Rescue Raiders ■ *Feature*: Putting a New F8 on Your Language Card ■ *Core*: •Exploring ProDOS by installing a CPS Clock Driver

34 August 1986 ■ *Softkeys*: •Crisis Mountain •Terripin Logo •Apple Logo II •Fishies I.O •SpellWorks •Gumball •Rescue at Rigel •Crazy Maze •Conan •Perry Mason: The Case of the Mandarin Murder •Koronis Rift ■ *Feature*: •More ROM Running ■ *Core*: •Infocom Revealed

33 July 1986 ■ *Softkeys*: •Word Juggler •Tink! Tonk! •Sundog v2.0 •G.I. Joe & Lucas Film's Eidolon •Summer Games II •Thief •Instant Pascal •World's Greatest Football Game •Graphic Adventure #1 •Sensible Grammar & Extended Bookends •Chipwits •Hardball •King's Quest II •The World's Greatest Baseball Game ■ *Feature*: •How to be the Sound Master ■ *Core*: •The Mapping of Ultima IV

32 June 1986 ■ *Softkeys*: •Revisiting Music Construction Set •Cubit •Baudville Software •Hartley Software •Bridge •Early Games for Young Children •Tawala's Last Redoubt •Print Shop Companion •Cracking Vol II •Moebius •Mouse Budget, Mouse Word & Mouse Desk •Adventure Construction Set ■ *Feature*: •Using Data Disks With Microzines ■ *Core*: •Super IOB v1.5 a Reprint

31 May 1986 ■ *Softkeys*: •Trivia Fever •The Original Boston Computer Diet •Lifesaver •Synergistic Software •Blazing Paddles •Zardax •Time Zone •Tycoon •Earthly Delights •Jingle Disk •Crystal Caverns •Karate Champ ■ *Feature*: •A Little Help With The Bard's Tale ■ *Core*: •Black Box •Unrestricted Ampersand

30 April 1986 ■ *Softkeys*: •Millionaire •SSI's RDOs •Fantavision •Spy vs. Spy •Dragonworld •King's Quest •Mastering the SAT •Easy as ABC •Space Shuttle •The Factory •Visidex I.IE •Sherlock Holmes •The Bards Tale ■ *Feature*: •Increasing Your Disk Capacity ■ *Core*: •Ultimaker IV, an Ultima IV Character Editor

29 March 1986 ■ *Softkeys*: •Threshold •Checkers v2.1 •Microtype •Gen. & Organic Chemistry Series •Uptown Trivia •Murder by the Dozen •Windham's Classics •Batter Up •Evelyn Wood's Dynamic Reader •Jenny of the Prairie •Learn About Sounds in Reading •Winter Games ■ *Feature*: •Customizing the Monitor by Adding 65C02 Disassembly ■ *Core*: •The Animator

28 February 1986 ■ *Softkeys*: •Ultima IV •Robot Odyssey •Rendezvous •Word Attack & Classmate •Three from Mindscape •Alphabetic Keyboarding •Hacker •Disk Director •Lode Runner •MIDI/4 •Algebra Series •Time is Money •Pitstop II •Adventure to Atlantis ■ *Feature*: •Capturing the Hidden Archon Editor ■ *Core*: •Fingerprint Plus: A Review •Beneath Beyond Castle Wolfenstein (part 2)

27 January 1986 ■ *Softkeys*: •Microzines 1-5 •Microzines 7-9 | Microzines (alternate method) •Phi

Beta Filer •Sword of Kadesh •Another Miner 2049er •Learning With Fuzzywomp •Bookends •Apple Logo II •Murder on the Zindemeuf ■ *Features*: •Daleks: Exploring Artificial Intelligence •Making 32K or 16K Slave Disks ■ *Core*: •The Games of 1985: part II

26 ■ *Softkeys*: •Cannonball Blitz •Instant Recall •Gessler Spanish Software •More Stickybears •Financial Cookbook •Super Zaxxon •Wizardry •Preschool Fun •Holy Grail •Inca •128K Zaxxon ■ *Feature*: •ProEdit ■ *Core*: •Games of 1985 part I

25 ■ *Softkeys*: •DB Master 4.2 •Business Writer •Barron's Computer SAT •Take I •Bank Street Speller •Where In The World Is Carmen Sandiego •Bank Street Writer 128K •Word Challenge •Spy's Demise •Mind Prober •BC's Quest For Tires •Early Games •Homeward Speller ■ *Feature*: •Adding IF THEN ELSE To Applesoft ■ *Core*: •DOS To ProDOS And Back

24 ■ *Softkeys*: •Electronic Arts software •Grolier software •Xyphus •F-15 Strike Eagle •Injured Engine •Mr. Robot And His Robot Factory •Applecillin II •Alphabet Zoo •Fathoms 40 •Story Maker •Early Games Matchmaker •Robots Of Dawn ■ *Feature*: •Essential Data Duplicator copy parms ■ *Core*: •DOS-Direct Sector Access

23 ■ *Softkeys*: •Choplifter •Muplot •Flashcalc •Karateka •Newsroom •E-Z Draw •Gato •Dino Eggs •Pinball Construction Set •TAC •The Print Shop: Graphics Library •Death In The Caribbean ■ *Features*: •Using A.R.D. To Softkey Mars Cars •How To Be The Writemaster ■ *Core*: •Wheel Of Money

22 ■ *Softkeys*: •Miner 2049er •Lode Runner •A2-PBI Pinball •The Heist •Old Ironsides •Grandma's House •In Search of the Most Amazing Thing •Morloc's Tower •Marauder •Sargon III ■ *Features*: •Customized Drive Speed Control •Super IOB version 1.5 ■ *Core*: •The Macro System

20 ■ *Softkeys*: •Sargon III •Wizardry: Proving Grounds of the Mad Overlord and Knight of Diamonds •The Report Card VI.1 •Kidwriter ■ *Feature*: •Apple II Boot ROM Disassembly ■ *Core*: •The Graphic Grabber v3.0 •Copy II+ 5.0: A Review •The Know-Drive: A Hardware Evaluation •An Improved BASIC/Binary Combo

19 ■ *Softkeys*: •Rendezvous With Rama •Peachtree's Back To Basics Accounting System •HSD Statistics Series •Arithmetick •Arithmekicks and Early Games for Children ■ *Features*: •Double Your ROM Space •Towards a Better F8 ROM •The Nibbler: A Utility Program to Examine Raw Nibbles From Disk ■ *Core*: •The Games of 1984: In Review-part II

16 ■ *Softkeys*: •Sensible Speller for ProDOS •Sideways •Rescue Raiders •Sheila •Basic Building Blocks •Artsci Programs •Crossfire ■ *Feature*: •Secret Weapon: RAMcard ■ *Core*: •The Controller Writer •A Fix For The Beyond Castle Wolfenstein Softkey •The Lone Catalog Arranger Part I

1 ■ *Softkeys*: •Data Reporter •Multiplan •Zork ■ *Features*: •PARMS for Copy II Plus •No More Bugs •APT's for Choplifter & Cannonball Blitz •Copycard' Reviews •Replay •Crackshot •Snapshot •Wildcard

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18 ■ *Softkeys*: •Scholastic Version of Bank Street Writer •Appewriter IIe •SSI's Non-RDOS Disks ■ *Readers' Softkeys*: •BPI Accounting Programs and DesignWare Programs ■ *Features*: •Installing a Free Sector Patch Into Appewriter IIe •Simple Copy Protection ■ *Core*: •The Games of 1984: In Review •65C02 Chips Now Available •Checksoft v2

17 ■ *Softkeys*: •The Print Shop •Crossword Magic •The Standing Stones •Beer Run •Skyfox •and Random House Disks ■ *Features*: •A Tutorial For Disk Inspection and the Use Of Super IOB •S-C Macro Assembler Directives (reprint) ■ *Core*: •The Graphic Grabber For The Print Shop •The Lone Catalog Arranger Part Two

15 ■ *Softkeys*: •Mastertype •Stickybear BOP •Tic Tac Show ■ *Reader's Softkeys*: •The Financial Cookbook •Escape from Rungistan •Alien Munchies •Millionaire •Plato ■ *Features*: •MREAD/MWRT Update ■ *Core*: •A Boot from Drive 2 •DB Master's Data Compression Techniques ■ *Whiz Kid*: •DOS and the Drive - Part One ■ *Adventure Tips*: •Time Zone •Mission Asteroid •Enchanter •Zork I •Ultima •Ultima II •Death in the Caribbean •Gruds in Space •Zork III •Starcross

14 ■ *Features*: •Super IOB v1.2 Update •Putting Locksmith 5.0 Fast Copy Into a Normal Binary File •Batman Decoder Ring •A fix for DiskEdit ■ *Softkeys*: •Seadragon •Rocky's Boots •Knoware •PFS Software •Computer Preparation SAT •MatheMagic ■ *Review*: •Boulder Dash

13 ■ *Softkeys*: •Laf Pak •Beyond Castle Wolfenstein •Transylvania •The Quest •Electronic Arts •Snooper Troops (Case 2) •DLM Software •Learning With Leeper •TellStar ■ *Core*: •CSaver: The Advanced Way to Store Super IOB Controllers •Adding New Commands to DOS 3.3 •Fixing ProDOS 1.0.1 BSAVE Bug ■ *Review*: •Enhancing Your Apple ■ *Feature*: •Locksmith 5.0 and Locksmith Programming Language.

12 ■ *Softkeys*: •Zoom Graphix •Flip Out •Lion's Share •Music Construction Set ■ *Reader's Softkeys*: •Hi-Res Computer Golf II •Suicide •Sabatage •Millionaire •Time is Money •Type Attack ■ *Features*: •Pseudo-ROMs on the Franklin Ace ■ *Core*: •Psychedelic Symphony •The CORE Disk Searcher •The Armonitor ■ *Adventure Tips*: •Cranston Manor •Enchanter •Kabul Spy •Colossal Caves •The Witness •Pirate Adventure •Ultima III-Exodus •Adventureland

11 ■ *Softkeys*: •Sensible Speller •Exodus: Ultima III ■ *Readers' Softkeys*: •SoftPorn Adventure •The Einstein Compiler v5.3 •Mask of The Sun ■ *Features*: •Copy II Plus v4.4C: Update Of An Old Friend •Parameter List For Essential Data Duplicator ■ *Core*: •Ultimaker III •The Mapping of Ultima III •Ultima II...The Rest Of The Picture

10 ■ *Softkeys*: •Arcade Machine •Bank Street Writer •Minit Man ■ *Reader's Softkeys*: •Sensible Speller IV •EDD IV •*Krell LOGO •Canyon Climber ■ *Features*: •The Controller Saver •Examining Protected Applesoft BASIC Programs •Crunchlist II ■ *Core*: •Applear - Voice Aynthesis •Introducing the 65SC802 and 65SC816 Chips •Review - Dino Eggs ■ *Adventure Tips*: •Cranston Manor •Zork I •Planetfall •Mission Asteroid •Time Zone •Suspended •Critical Mass •Zork II •Castle Wolfenstein

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This patch will remove the copy-protection completely, as well as let TK! run as a stand alone program as was done with VISICALC.

First of all when I refer to the "B:" drive, if you have a hard disk you can substitute the appropriate drive letter for the "B:" drive. I also assume that the original "TK!" is in the "A:" drive.

1 Format one System Disk under DOS 2.0 or 2.1. Label it according to the original 'TK!' diskette.

2 Copy the (unhidden) files from the original diskette to the corresponding 2.X formatted diskette.

3 Put the original 'TK!' diskette in the "A:" drive

Copy con: B:SOFTARTS.(C)

Enter: That's all folks!

Press **[Z]** then **[ENTER]**

You should see one file(s) copied message. This takes care of the hidden files.

I won't tell you how to use debug or any 'patcher' programs, I assume you have a basic understanding. I assume you have DEBUG.COM on a RAM or C: or CB: drive.

4 Now for some DEBUGing.

DEBUG

N A:TK.COM

F CS:100 L EFFF 0

L

N B:TK2.COM

R CX

:EFFF

W

Q

B:DEBUG B:TK2.COM

E 951 90 90 90 *This disables break point*

E 957 90 90 90 *and single step overrides*

Note: The original TK! should now be in the "A:" drive

G

Note: Program should stop at CS:511

What we did was let TK! read all the other pieces of itself from the various disk sectors (the good and bad sectors), do all the decrypting and set up all areas.

In otherwords we let it do all the work for us. We didn't even have to fool with bad tracks, or any decrypting ourselves. The reason for writing TK2.COM with a length

of "EFFF" was to reserve this program area size so when TK! ran it would build all of its routines in "our" protected program area. We can then save TK2.COM as Tk3.COM with all of TK! safely stored in our protected TK2 memory area.

E 511 E8

E 57C CC

G

E 57C FF

T

R

Note: At this point copy down all the registers and flag settings. (A shift PRtSC will do it for you.)

R AX 0

R BX 0

R CX EFFF

R DX 0

N B:TK3.COM

W

R AX 0

R BX B230

R CX A000

R DX 5898

Note: at this point "BP" register had better be zeros.

G

Press **[ENTER]** since TK! is waiting on it.

Note: TK! should now come up as it normally would.

5 Now reboot the system with a DOS system disk in A drive.

B:DEBUG B:TK3.COM

E 951 E8 46 FF *Restore CNTL-BREAK breakpoint.*

E 957 E8 51 FF

6 What we will do next is bypass all the sector read code/decrypt logic since TK! has already done that once and put it in our protected program area that we saved as TK3.COM.

Code that should be generated.

A 252 MOV SI,1230

MOV DI,0100

MOV AX,0

MOV BX,B230

MOV CX,A000

MOV DX,5898

MOV SP,B2AD

MOV BP,0

JMP BX

N B:TK4.COM

W

Q

BE3012

BF0001

B80000

BB30B2

B900A0

BA9858

BCADB2

BD0000

FFE3

7 Place your original TK! in a safe place since we will no longer need it. Place disk with TK4.COM in "A:" drive or run from hard disk.

TK4

You should see the original copyright screen and the program will just sit there. You must press **[ENTER]** since the message "PRESS ENTER TO START" is now being bypassed. If all went well you now have an unprotected, decrypted, stand alone version of TK! solver.

Note: all of the "TK!" copy protection is removed, and you may diskcopy (or copy) and rename TK4.COM to TK.COM to anywhere in the system your little heart desires.

Other Notes:

1. Checks for specially formatted tracks are completely removed.

2. You may load all the files on the newly formatted and unprotected diskette directly to hard or RAM disk, in any sub-directory you set up.

Softkey for...

SYMPHONY ver 1.00
?

Here how to wean SYMPHONY from it's master disk craving.

Rename SYMPHONY.CMP SYMPHONY.XXX
DEBUG SYMPHONY.XXX

R *Find the segment where loaded and add 1000 to it.*

DS = 0DFA -xxxx = 1DFA

(0DFAH + 1000H = 1DFAH)

E xxxx:3A05 75 *change INT 13 to INT 75H (see label SYMINT below)*

W *save changed file*
Q *exit DEBUG*

Rename SYMPHONY.XXX SYMPHONY.CMP

SYMPH execute this program (it modifies the changed interrupt back to 13H since SYMPHONY does a checksum of itself)

; assemble, link, EXE2BIN

;

Execute this program before using SYMPHONY. There is no need to re-execute this program after exit from SYMPHONY, in order to use the SYMPHONY again, since it is a resident program.

To further examine the symphony for possibly other ways to solve this, using DEBUG, do:

DEBUG SYMPHONY.EXE

G2

T3

G8A40

T

At this point you will find the subroutine that fills location ds:8735 with n and int 13 (the second one) which reads the serial number from floppy disk in A. Zeroing 8735 fools Symphony, and prevents it from testing

for special track/sector structure on the floppy. If location 8735 is not zeroed, debugging will not be possible after IP 8A4D, since INT 3 will be modified by Symphony.

```

SYMINT EQU    75H interrupt to use
SYMFLG EQU    8735H see above for
              info
CSEG  SEGMENT
        Assume CS;CSEG,
        DS:CSEG
        ORG    100H
PROGRA: XOR    AX,AX
        MOV    ES,AX set to segment
              0 (interrupt table)
        XOR    DX,DX
        MOV    AL,SYMINT interrupt
              number
        MOV    CX,4 get position in
              interrupt table
        MUL    CX
        MOV    BX,AX
        TEST   WORD PTR ES:[BX],0
              test if set?
        JZ     DOIT no, go set it
        INT    20H exit to dos with
              out mod
DOIT:    get interrupt routine
        MOV    address
        word ptr
        ES:[BX],offset corc
        store it at the
        appropriateint
        address
        MOV    ES:[BX+2],CS also
        store the segment
        MOV    DX,5+16 length of
        this pgm in segments
        MOV    AX,3103H exit & stay
        resident
        INT    21H this is the
        actual interrupt
CORC:    CLI
        PUSH   ES save all used
        registers
        PUSH   BP
        PUSH   BX
        MOV    BP,SP
        MOV    ES,[BP+8] get
        calling segment from
        stack
        MOV    BX,[BP+6] get
        calling address from
        stack
        DEC    BX back up one
        MOV    BYTE PTR ES:[BX],13H
        store interrupt 13h
        there
        MOV    BYTE PTR DS:SYMFLG,0
        zero out the floppy
        test flag
        POP    BX restore registers
    
```

```

POP    BP
POP    ES
STI
IRET
back to
symphony
CSEG  ENDS
    
```

3 *Where are all the people who wrote and called to say that they had IBM cracks and to ask why we didn't print those as well as Apple II info? We can only print what you send us. So take some time and write to us. Our IBM editor has gone fishing and left a note for us to call him when we have something to edit.*

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_____	\$8
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