

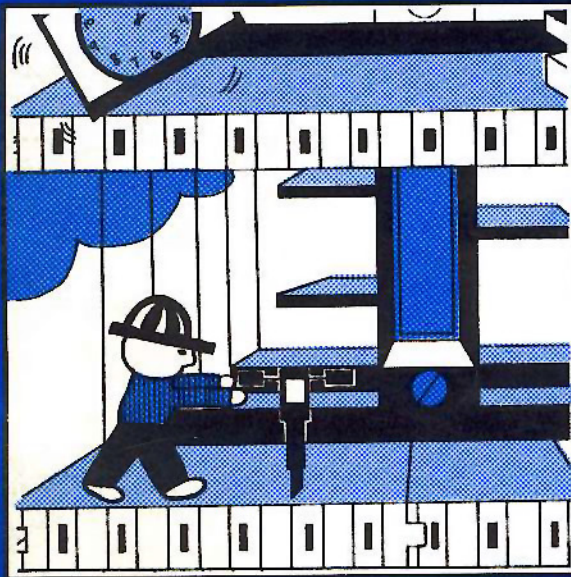
HOW TO BACK-UP, UNLOCK, OR MODIFY COPY-PROTECTED SOFTWARE

Hardcore

Issue No. 5

\$2.50

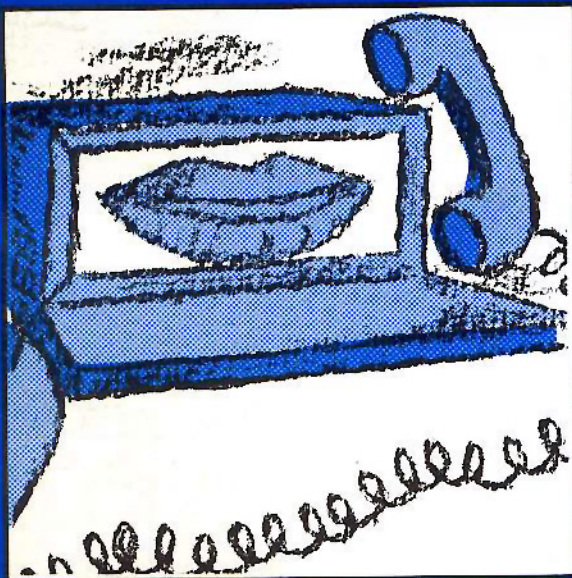
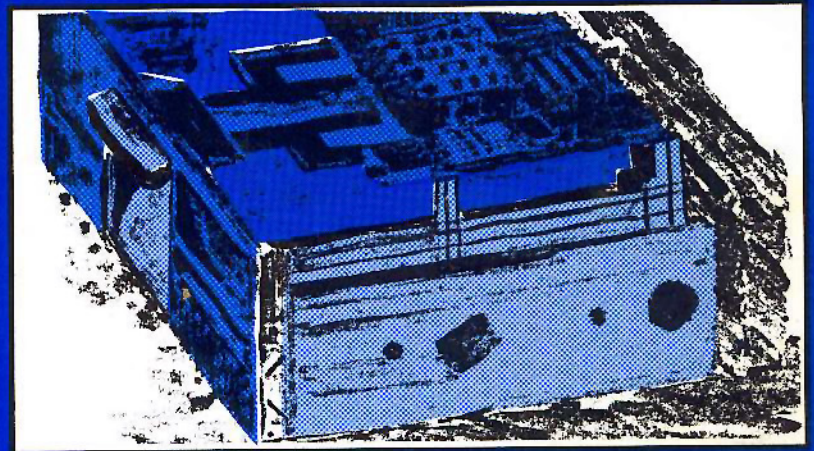
# COMPUTIST



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Monitor the position of your disk drive's  
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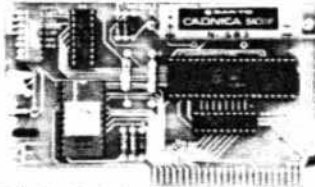
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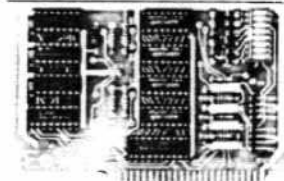
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An official PRO-DOS Clock

- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
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- Powerful 2K ROM driver — No clock could be easier to use.
- Full emulation of most other clocks, including Thunderclock and Appletclock (but you'll like the TIMEMASTER II mode better). We emulate other clocks by merely dropping off features. We can emulate them but they can't emulate us.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Appointment book will remind you in plenty of time. Plus DOS data so it will automatically add the date when disk files are created or modified. The disk is over a \$200.00 value along—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

PRICE \$129.00

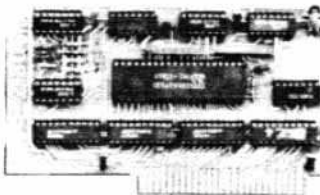
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- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

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

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SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

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

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## Hardcore

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**Publisher/Editor** Charles Haight  
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Advertising Department  
3710 100th St. SW  
Tacoma, WA 98499

**Technical Editing** Gary Peterson  
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**Programmer** Ray Darrah  
**Printing** Grange Printing, Inc.  
Seattle, WA

**Production & Graphics** Lynn Campos-Johnson  
**Publishing** Softkey Publishing  
P.O. Box 44549  
Tacoma, WA 98444  
USA

Address all advertising inquiries to Softkey Publishing, Advertising Department, 3710 100th ST SW, Tacoma, WA 98499. Address all manuscripts and editorials to: Softkey Publishing, Editorial Department, P.O. Box 44549, Tacoma, WA 98444. All subscription inquiries should be directed to: Subscription Department, Hardcore Computist, P.O. Box 44549, Tacoma, WA 98444. See page 32 for subscription rates and information.

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# INPUT INPUT INPUT

## Bit-Copier Detector?

I enjoy your magazine very much and look forward to each issue. The softkey on Magic Window II was particularly helpful.

I heard from an Apple salesman that the Apple company has incorporated a bit-copier detector in the ROM of the Apple IIe and that some bit-copiers will not work on the IIe. He specifically mentioned Locksmith 4.1 as one that won't work. I have noticed that LS 4.1 won't work on most things I've tried to copy on my IIe. Maybe you know something about this?

G.F. Cox  
Newport NC

*Mr. Cox: Thank you for your compliments on our magazine and the softkey for Magic Window.*

*As to the rumor you heard about the Apple IIe's bit-copier detector, we can only say that this one has to rank right up there with the reports of Paul McCartney's death.*

*A bit-copier detector in ROM would require rather sophisticated routines which would have to check out any and all programs that utilized the ROMs. This would not only slow down the execution of most programs on the IIe but would practically eliminate the IIe's compatibility with programs written for the Apple II's.*

*Although we do not, as yet, have any experience with the Apple IIe, some bit-copy programs written for the II+ may not work on the IIe because they call monitor ROM subroutines whose entry points may have changed slightly.*

*Locksmith 5.0 is advertised as being Apple IIe compatible.*

## A Fix for Rana

I may have a solution for Dan Cospers and all Rana drive controller owners who wish to do Boot Code Tracing [HARDCORE COMPUTIST #2].

While the Rana controller's ROM code is incompatible with the standard ROM and controller, the I/O addresses are supposed to be compatible since they will work with DOS 3.3. So, all they have to do is borrow some time on a computer with a standard con-

troller and do the following:

Boot a diskette with normal DOS 3.3  
BSAVE CONTROL ROM,ASC600,LS100

When they want to do the boot code trace, instead of moving the controller ROM routine to \$x600, just BLOAD the file CONTROL ROM at the address needed. They should be able to follow the boot code tracing procedures with no problem.

Joseph W. Leathlean  
San Diego CA

*Joseph: Although we don't have a Rana disk drive to try this out on, it should work with no problems.*

Some comments on the comparative advantages of having the copy software on diskette versus in ROM on the card should be included as well. Another article comparing the latest versions of Nibbles Away, Copy II Plus, Back It Up and covering such new programs as "Essential Data Duplicator" and the "CIA" would probably be of great interest to your readers.

James R. Weiner  
Brussels, Belgium

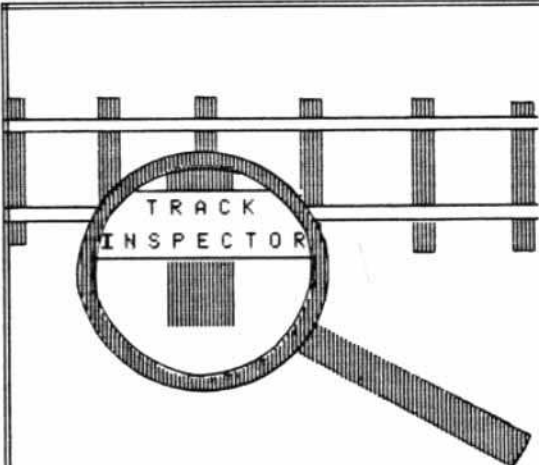
*James: See upcoming issues of HARDCORE COMPUTIST for a review of the "Essential Data Duplicator" and the "CIA."*

## More Reviews, Please

I thoroughly enjoy your publication and have found it very useful. May I suggest more reviews, however? I would particularly like one on the latest generation of copy cards, including Alaska (by Central Point Software), Replay II, Snapshot, Copykit, etc.

## All Gone

Sometime ago [HARDCORE COMPUTING #3 (old series)] you published a list of LS (Locksmith) parameters for users of Locksmith 4.1. This list indicated the PARM changes necessary for copying tracks of certain software available at that time. You also indicat-



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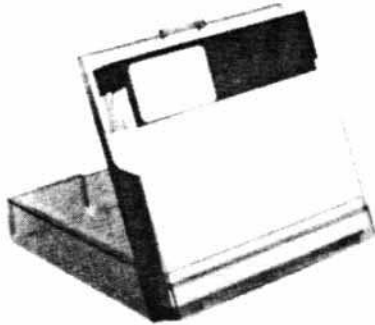
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ed in that article that the parameter information was a reprint of several files maintained on the "SOURCE." As a new Apple IIe user, I would appreciate any updates to the original LS parameter list you might have added since then. In particular, I would appreciate the most current LS parameter list you have available.

Marvin Simon  
La Canada CA

*Marvin: Omega Software no longer maintains its list of Locksmith parameters on the SOURCE. They also no longer supply parameters for any program which has a backup available for \$5, or less. We have published Locksmith parameters in **HARD-CORE COMPUTING #3 (old series)** and in **HARDCORE COMPUTIST #2** and currently have no additional parameters to print. Our readers are encouraged to submit Locksmith and other bit-copier parameters to us so that we may update and publish our lists.*

**ED:** *The following is an open letter sent to several Apple-oriented magazines.*

This is an open letter to all users of Apple computers who are concerned about the risks they are taking when they entrust their valuable data to copy-protected software.

Users of application programs (as opposed to programmers and hobbyists/hackers) on microcomputers will generally find that they need three major types of application programs: word processor, data base management system and spreadsheet.

Pie Writer, a greatly enhanced and improved version of Apple Pie, is distributed by Hayden Book Company and is, without question, the very best word processor for the Apple. No further discussion; the case is closed!

The Spreadsheet 2.0 (also sold in stores as Magicalc) is the very inexpensive spreadsheet program sold by the Apple Pugetsound Program Library Exchange (A.P.P.L.E.). The Spreadsheet 2.0 may not be the fastest spreadsheet around, but it has some features which most of the others do not have. This includes the ability to display in 70-column mode without hardware, variable width columns and hidden columns. In addition, some of the Visicalc-type utilities, such as Visiblend, seem to work quite well with the Spreadsheet.

The Data Reporter (Version 3.0) by Synergistic Software is its latest revision and is just now appearing on the market. It is also the first version of the data base management system to be unlocked. Now, the fastest, most versatile and most fun-to-use DBMS can also be backed-up! Can Heaven be this good?

For non-application uses (programming and such) there are also a number of companies now putting out unlocked software. Almost any product from A.P.P.L.E. is assured of being a quality, useful item and, of course, everyone knows of the great stuff by Beagle Bros., as well as the policy of unlocked software which Penguin Software applies to its graphics.

With this lineup of unlocked programs, it should never again be necessary to use copy-protected software.

The reason more and more programs are now being sold on unlocked disks and are still making a profit for their companies is that it has become quite clear to these companies that application programs (as opposed to games and other trivia) are virtually useless without the documentation and manuals which go with them.

Companies which continue to try to palm off copy-protected software have not yet learned that it is good, useable documentation which keeps a program of this type from being pirated, not the expensive and useless copy-protection schemes they are using and which are doing nothing but causing frustration and anger among the users of such software.

Not only are each of the programs mentioned above outstanding in its own right, but the fact that they are unlocked makes them even more attractive. I feel we all should support those companies which make it a matter of policy to sell unprotected software and if the software is among the best in its class what else need be said?

Thus, we can send a message to these other rip-off producers and suppliers telling them that we now have quality programs for all our needs on unlocked disks and that we will no longer be forced into buying protected software and entrusting our valuable data to the hidden innards of such programs.

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

*Dr. Militello: You are absolutely right, the better the sales of well-written, non-copy-protected software, the sooner the extinction of the copy-protected dinosaur.*

## Copy Protection Tips

Several notes. First I love your magazine! It's probably the best Apple-oriented magazine of the market. Second, the crack that was published for Zork I works on all Infocom games: Zork I, Zork II, Zork III, Starcross, Suspended, Deadline, Witness, Planetfall, Enchantor and Infidel. I have tried them all, so I know how it works.

And for all the potential backer-upperers out there I heartily recommend "The Essential Data Duplicator" and "The CIA." These are both extremely powerful and also have detailed explanations of the processes involved. NMI cards are almost useless, because most programs can now recognize if they have been interrupted by one. And finally, here are some of my own softkeys.

Homeword, by Sierra On-Line

copy with COPYA, then edit  
track 10, sector 0A  
Bytes 9-A from 49 C9 to EA 60

That's it!

Aztec, by Datamost

use the modified COPYA from  
Zork or Witness softkey, then

modify track 0, sector 3, Byte 42  
from 38 to 18

And a final note on copy protection using normal DOS 3.3:

---

**CALL-151  
B8A3:92  
B99B:92  
B93F:92  
BCB3:92  
3D0G  
INIT HELLO**

---

This protects against standard copiers. If you want to protect against bit-copiers, make 92, 91 instead. Try it. It works great.

Marco Hunter  
Los Angeles CA

might be able to backup some of my own software. Between the various copy programs and some of my own flubbing around, I have done fairly well; however, a program which I own beats me: Sensible Speller by Sensible Software.

I am not able to copy this program with any copy program I have: Locksmith, Copy II+ version 4.3. I have not been able to view or edit tracks 00 or 01.

Do you have any suggestions or the latest parms for this program?

I would like to see someone publish a tutorial on copy-protection breaking which would start out at the novice level.

Frank McDonald  
Laguna Hills CA

## Sensible Speller?

I am a long time subscriber from the first, and have been trying to follow the examples which you publish so that I

*Mr. McDonald: We have received several inquiries like yours concerning Sensible Speller and unfortunately, we do not know of any backup method of the new version of this program. Perhaps another one of our readers could respond to your plea via our INPUT column.*

*continued on page 7*

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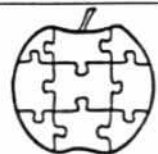
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## Use a Pascal Zap

There is a problem with the Softkey for Bag of Tricks in **HARDCORE COMPUTIST #3**. The problem is with the ZAP program. It will not let you catalog a Pascal Disk. The problem is at \$03D9 which does a JMP to \$B7B5, the RWTS subroutine in DOS 3.3.

To have it work with ZAP, it, instead, needs to JMP to \$77B5 in the SUPPLEMENT program. Add this line to the HELLO program:  
**115 POKE 987,119**

Ken Simons  
Salt Lake City, UT

*Ken: You are absolutely right, there is a problem with the Softkey for the Bag of Tricks. For a complete fix of any problems you may have had with the deprotected version of this program see the article "Fixing the Softkey for Bag of Tricks" on page 14 of this issue.*

## Copy Co-operation

I recently tried to backup a copy of Spy's Demise by Penguin Software according to the instructions given under the Copy II + parameter list in issue 3. For the disk I have these parameters would not work properly. I would get only the title picture, but no game. After some experimentation with other programs I found that the disk would copy easily by using Locksmith 4.1 for tracks 0 to 12 (error 2 on track 12 is okay) and Nibbles Away II on tracks 1, 5 and 7. Locksmith was apparently not able to copy those tracks. No parameter changes were required for either copy program and it was not necessary to copy any other tracks

Peter M. Anker M.D.  
Harrisburg, PA

*Dr Anker: In our experience, software companies often will use more than one protection scheme on a particular product. For this reason you will often find more than one set of parameters listed for a given disk. Possibly this was the reason that Copy II + would not backup this disk for you.*

*You should also be aware that bit-copier parameters are usually submitted by users like yourself and are not verified by the distributor of the copy program or by our staff.*

*Thank you very much for your tip on how to backup Spy's Demise. Your "mix and match" use of bit-copiers is bound to sweep the planet.*

## Wizardry Back-Up

Looking through your last **HARDCORE** issues, I saw on the softkey parameter exchange how to backup Wizardry by Sir-Tech. While the program uses state-of-the-art copy protection, there is a much simpler way of making a backup and it works every time, not just 3 out of 5 times.

First copy tracks 0-22 unsync with auto retry. Or if, like me, you hate using Locksmith because it is so slow, you can use COPYA to copy the disk. After copying the disk with Locksmith or COPYA, go back to Locksmith and copy track 0A-0E SYNC and change these to parameters....46 = 96, 21 = 02.

That's it and have fun.

Greg Burns  
New Canaan, CT



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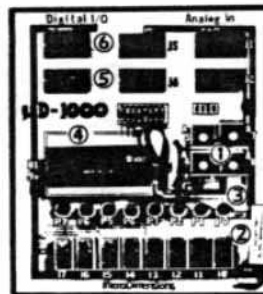
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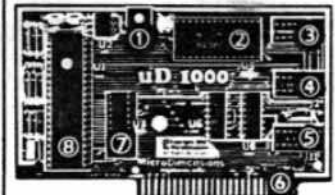
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# READERS' SOFTKEY & COPY EXCHANGE

## BACKING-UP DARK CRYSTAL By Clay Harrell

Dark Crystal  
Sierra On-Line  
Sierra On-Line Building  
Coarsegold, CA 93614  
\$39.95

### Requirements:

48K Apple  
One disk drive with DOS 3.3  
A Sector Editor  
4 blank disks

Whenever I invest in an adventure game about the first thing I try to do is to back it up. Adventures are prone to disk failure due to the large amount of disk access done during play.

Dark Crystal is copyable with just COPYA on all four sides. I suggest if you have a copy to go and make backups now.

Unfortunately, disk one, side A, will not work unless you make some byte changes to the disk.

The protection lies after the hi-res titles pages appear at location \$5FF0. This routine pulls and pushes some bytes from the stack and later compares them. If we bypass this routine, Dark Crystal becomes unprotected.

**Note:** you only need to make these byte changes to disk one, side A, of the Dark Crystal.

1) Using COPYA, make copies of all four sides of the Dark Crystal.

2) Run a Sector Editor and insert disk one, side A, of your copy of Dark Crystal.

3) Make the following changes to the disk and write sectors back out:

Trk	Sect	Byte	From	To
5	F	A8	20	EA
5	F	A9	F0	EA
5	F	AA	5F	EA
7	C	22	20	EA
7	C	23	F0	EA
7	C	24	F5	EA

That's all it takes for the de-protection of Dark Crystal.

## SCREENWRITER II SOFTKEY By Daniel Price

Screenwriter II  
Sierra On-Line  
Sierra On-Line Building  
Coarsegold, CA 93614  
\$129.95

### Requirements:

Apple II+//IIe, 48K and at least one disk drive  
Screenwriter II master diskette  
A blank diskette  
FID or COPYA

The Screenwriter II word processor is a powerful writing tool, combining many advanced features with ease of use. The only problem is that you can't back it up.

I found this particularly upsetting because the program is stored as a series of binary files on an *almost* standard DOS 3.3 diskette. This means that the diskette can be copied with FID or COPYA but the data that tells the copy protection routine that the diskette is an original is lost (the information is coded into the formatting of the diskette) and the program won't run. Fortunately, the way to unlock this disk is very simple.

What we will do in this procedure is remove a machine language JSR (Jump to SubRoutine) instruction and bypass a particularly nasty subroutine which checks the disk to see if it is an original. If this routine found that the disk was a copy, it would clear the memory and reboot.

**Step one:** Make a backup of the diskette with either FID or COPYA and *hide the original!* I can't stress the importance of this enough. It is too easy to make a fatal mistake and have *your only copy destroyed.*

**IF YOU USE FID:** Boot the original disk. When the main menu appears press Control-C to enter BASIC. Remove your master diskette and insert your backup. Type the following:

**NEW  
INIT START  
DELETE START**

Now use FID to copy all the programs which are on the master diskette onto the backup.

**IF YOU USE COPYA:** Just boot any DOS 3.3 diskette,

**RUN COPYA**

and follow its directions.

**Step two:** We will now make the actual changes to the program. These changes consist of a three-byte patch to two files on the diskette. Check to make sure your master diskette is hidden (just remember how much this program cost!) Now, with the backup in the drive, do the following:

1) Enter the monitor

**CALL-151**

2) Load the first file

**BLOAD RPART1**

3) Make the first patch

**1F90:EA EA EA**

4) Save the changes

**BSAVE RPART1,ASC00,LS1400**

5) Load the second file

**BLOAD EDITOR PART2.OBJ0**

6) Make the second patch

**1F49:EA EA EA**

7) Save these changes

**BSAVE EDITOR PART1.OBJ0,  
ASC00,LS1400**

The Screenwriter II is now unlocked and can be backed-up with COPYA or FID as many times as you like without needing any further changes.

If you use a different DOS, you must arrange to BRUN the file named START upon booting. This may be accomplished by creating a HELLO file to do it or by patching DOS directly.

The procedure to patch DOS 3.3 to BRUN a binary file upon booting is: First, boot a DOS 3.3 diskette, then type:

**POKE 40514,52**

Any diskette INITed with this DOS will BRUN whatever file you specified in the INIT command.

A note to those who own Quality Software's "Bag of Tricks." The INIT program's reskew function can be used to greatly increase the Screenwriter II's efficiency in loading, saving and packing files. Reskew the Screenwriter II program diskette (your backup!) tracks 3-22 to 9 DESCENDING and the TARGET and TEXT diskettes tracks 0-22 to 6 DESCENDING.

**Note:** The softkey for Screenwriter II was not verified by our staff.

## SOFTKEY FOR VISIFILE

By Bob Bragner

### Visifile

VisiCorp

2895 Zanker Rd

San Jose, CA 95134

### Requirements:

48K Apple or an Apple IIe

Visifile

Two blank disks

Apple's COPYA program

A disk zap utility, such as The Inspector or Watson

(An Applesoft Program Line Editor, e.g. such as Konzen's GPL, is useful but not essential)

Visifile is a medium-powered, somewhat overpriced, data base manager. My first (original) copy got zapped when the Turkish Electric Company hiccuped during a configuration file write on the master disk. Since I didn't have a backup and I knew that the disks were protected, I packed both of them off to VisiCorp along with a check for \$30 for a replacement.

After nearly two months the disks finally made their way back across the Atlantic and Mediterranean with the enchanting message: "Undeliverable at this Address" stamped on the package! VisiCorp had apparently moved and not notified the Post Office.

By this time I had of course found their new address (no thanks to them) and, once again, shipped the disks off with a somewhat caustic letter. This time the disks were returned: updated and with a backup to boot (sorry for the pun) in about three weeks.

Nevertheless, having been burned once, I decided I had to have my own copyable Visifile. Locksmith will copy it, but with a lot of annoying parameter changes and the copy will remain protected. I wanted a "cracked" version and backups squirreled all over the place.

Pirates' Harbor published a crack for Visifile about six months ago. It consisted of copying the disk with COPYA, then, changing one byte in one of the sectors on the disk, using a disk zap utility like Watson. COPYA, however, refused to copy my disk. Every time I tried it, I got an "\*\*\*\*\* UNABLE TO WRITE \*\*\*\*\*" error when the program tried to format the blank disk.

Using Watson, I was able to determine that there were no protected sectors on the original disk. FID could move all the files (except for the dummy serial number) over to another disk, but if you try to boot the result, the screen fills up with inverse "A's."

After using the FIXCAT utility from

Bag of Tricks on the original, it was clear that there were some peculiar things in the catalog track. For one thing, the volume number appeared to be 255 (\$FF: an invalid volume number!) even though it showed up as 254, when you looked at the catalog.

If you examine line 250 of the COPYA program you will see:

```
250 PRINT "INIT XXX,S" SS",D"
      SD", V" PEEK(714):FT = 1
```

Checking the value at location 714, after COPYA crashes, reveals that there is indeed a 255 there. So change line 250 to read:

```
250 PRINT "INIT XXX,S" SS ",D"
      SD", V" PEEK(714)-1:FT = 1
```

and then RUN. COPYA will make a perfect copy of both Visifile disks. These copies can be copied as much as you like by a normal, unaltered COPYA.

However if you try to boot Disk 1, you still get a screenful of reversed "A's." After a bit more snooping, it was easy to determine that the blowup occurred when the file VISIFILE.BIN on Disk 1 was BRUN.

A quick disassembly of this file didn't reveal anything significant (although there is a section where there are a bunch of reversed "A's," but, then, I remembered the Pirates' Harbor crack: byte \$2D of track \$22, sector \$04, was supposed to change from \$0A to \$0F and this sector was part of the VISIFILE.BIN file!

After making this change with Watson, I booted the resulting disk and all was well.

Here is a step-by-step procedure to crack Visifile:

- (1) **LOAD COPYA**
- (2) Edit line 250 by inserting "-1" after the PEEK(714)
- (3) If GPL is lurking around, remove it before you attempt to make a copy.
- (4) **RUN** the program in memory and follow normal copy procedures. Repeat step 4 for Visifile Disk 1 and Disk 2.
- (5) Enter your favorite disk zapper and read track \$22, sector \$04 of the copy of disk 1. Change byte \$2D from \$0A to \$0F. Write this change to the copied disk. "Red Rebel," of Pirates' Harbor, deserves the credit for this discovery.

You now have a cracked copy of Visifile from which you can make all the backups you want, using normal copy procedures.

Do you want a faster sort routine? Hard disk capability? With your cracked Visifile, you are now free to

modify to your heart's content.

**Note:** The Softkey for Visifile was not verified by our staff.

## BACKING-UP LANCASTER

By Clay Harrell

### Lancaster

Silicon Valley Systems

1625 El Camino Real

Belmont, CA 94002

### Requirements:

48K Apple, with Applesoft

One disk drive and DOS 3.3

DOS 3.3 System Master

Lancaster

One blank disk

Lancaster caught my eye as having unusually smooth animation and graphics. Being intrigued by the animation and playability of the game, I bought it with the intention of discovering the author's methods of animation.

But, in order to snoop through the code it, naturally, meant that I had to unprotect it first for disassembly.

The first thing to notice upon booting the game is that an Applesoft cursor appears at the bottom left of the screen.

This means that the protection involves somewhat of a normal DOS and disk structure.

*continued on page 12*

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# Getting On The

By Robert Linden

**Requirements:**

*Apple II+ or compatible with disk drive*

*Bit copier, sector editor or other program that seeks specific tracks on demand.*

*STABILO fine-point pen, or other similar marker.*

When making backups of copy-protected programs, there will be times when the backup will not boot.

It might keep rebooting continuously, spin with no head movement, stop, or do something else it shouldn't. Often this is the result of just a few tracks being incorrectly backed-up. Finding these tracks quickly will speed up your task greatly. Here's how:

Turn off your computer. Remove the screws holding the cover on your disk drive (**WARNING:** this could void your warranty) and slide the cover to the rear and off the drive.

Turn on your computer and boot a program that seeks specific tracks on demand.

Now you will need to find both the frame that holds the read/write head and the cam that drives this frame (see figure 1).

Have the drive seek track 0, then track 22 (hex), while viewing the interior of the drive from one side. The object moving rapidly over (and under) the disk is the frame that holds the read/write head. Below this frame you will see a three-to-four-inch round object which turns only when the frame moves. This is the cam that drives the frame holding the read/write head.

A common method of indicating tracks for future use is to place a reference mark on the read/write frame and then, as the drive is stepped through the tracks by the track-seeking program, to mark each track on a nearby, motionless part of the drive.

The problem with this method is that the marks are as close together as the tracks on the disk. To greatly increase the distance between the track marks I prefer marking the cam instead.

If your cam is made of shiny plastic,

you will need a fiber-tip pen, intended for writing on plastic, such as a STABILO fine-point. If your cam is made of rough plastic, similar to Bakelite, you could use paint for greater visibility. In this case use a water-based, model paint to avoid any risk of the paint dissolving part of the cam. Use a fine-tipped brush and, if you like, several different colors to ease the identification of the tracks. Whichever method

**When making backups of copy-protected programs, there will be times when the backup will not boot. Often this is the result of a few tracks being incorrectly backed-up. Finding these tracks will simplify your task.**

you use, make a test mark on the cam to be sure the marks will adhere.

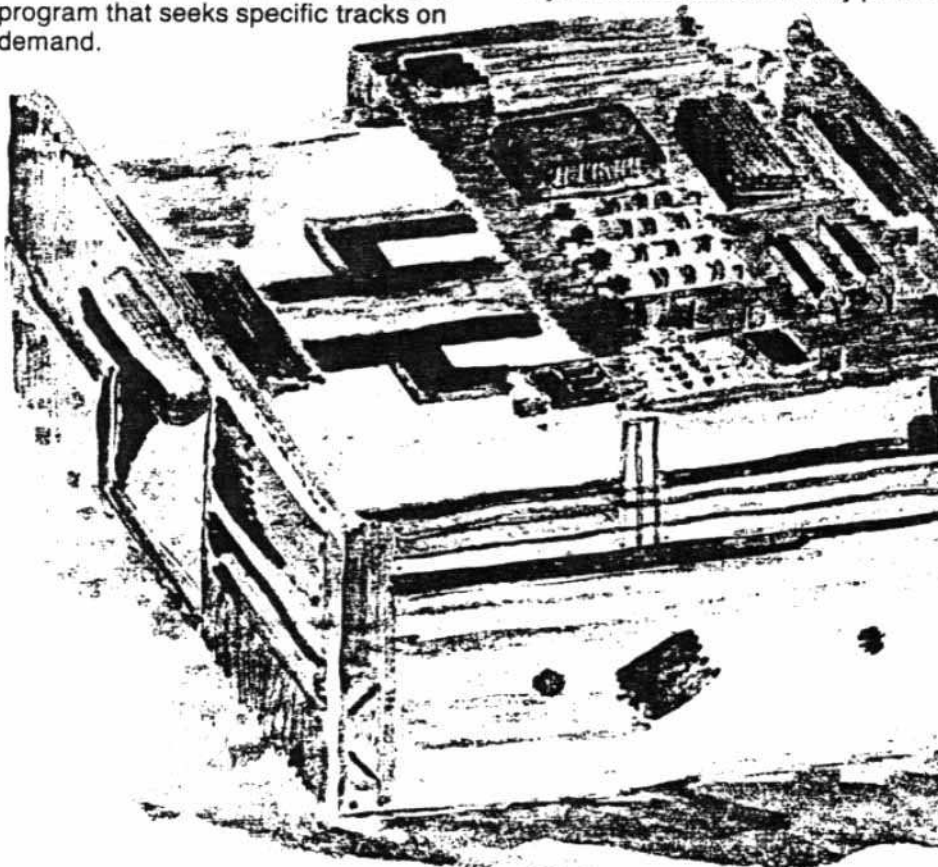
First, place a reference mark on the most easily visible spot that is directly next to the cam.

Then, have the drive seek track 0 and place a mark on the vertical edge of the cam. Make sure this mark lines up with the reference mark.

If you feel uneasy about touching the interior of the drive while it's on, or if you're not sure about what you can and can't touch, you should turn off the computer after seeking a track and then turn it on again after you have finished the marking for that track.

Next, have the drive seek track 18 (hex). On my drive this will turn the cam one complete revolution to the mark made for track 0. If your drive is different, find the track that does line up to the mark for track 0. On top of the cam, above the mark, write a small 0/18. Do NOT place any marks in the spiral groove that is engraved on top of the cam. This groove is used by the cam to move the read/write head, so take care not to gum it up.

Note where the read/write frame is, in relation to the center of the cam. Now have the drive seek track 0 again. You will notice that the read/write frame has moved much closer to the edge of the cam. This is how you can



# Right Track

tell if the drive is on track 0 or track 18.

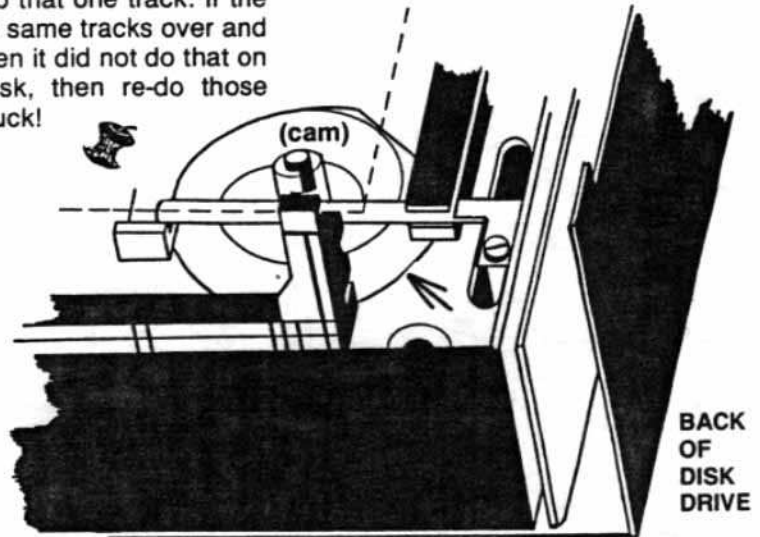
Now work your way around the cam, seeking each track, marking it and labeling it, until you get to track 22. I label each track in hex (i.e., base 16) instead of base 10 since most references to the tracks are in hex. Note that the marks for tracks 18-22 (hex) will overlap with the marks for tracks 0-10 (hex). In the case where two tracks use the same marks you must take note of the read/write head frame in relation to the cam in order to distinguish which track is being accessed.

You are now ready to make a backup.

Boot the disk to be backed-up while you watch the cam to see if the drive seeks any 1/2 tracks or anything past track 22.

Using this information, try to make a backup. If the backup will not boot properly, watch the tracks over which

the drive goes before the backup fails. These are the tracks which have one or more bad sectors on them. If the drive stops or spins continuously on one track, re-do that one track. If the drive seeks the same tracks over and over again, when it did not do that on the original disk, then re-do those tracks. Good luck!



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9071 Metcalf / Suite 124  
Overland Park, KS 66212

Some protectors have begun to bypass the routine which outputs the prompt, but you can still guess that there's a modified DOS present if the boot sounds like a normal DOS boot, but the disk won't copy with COPYA.

To confirm my hunch that Lancaster was using a modified DOS, I booted one of my normal DOS 3.3 disks and put Lancaster in the drive and typed CATALOG. The disk drive recalibrated and made other obnoxious noises and returned the message I/O ERROR. Not that I was expecting any miracles, but why not try?

Still believing that there was a somewhat normal DOS present on the disk, however, more snooping had to be done.

Let's think about what causes an I/O error, for a moment. Whenever anything goes wrong during disk access, RWTS branches to a routine at \$B942 to set the carry bit and return. The other routines in RWTS monitor the carry bit and check to see if there was a bad data read, a bad address read or some other no-no.

At \$B942 there are, simply, two instructions: SET THE CARRY and RETURN.

If we wish to defeat the DOS error checking (which we do in this case), we can change the SET THE CARRY to CLEAR THE CARRY. By making this change, you are telling RWTS not to check for any errors, assume everything is alright and go on.

This, obviously, is not good general practice since you are defeating the purpose of all the careful error checking that DOS does.

But it is great for examining modified DOS's. It will handle any changes to the epilog bytes or intentional errors in the checksum of either field but not in the header bytes. (Header changes must be done by modifying the appropriate code in the subroutine).

With this in mind, we enter the monitor with CALL-151 and type B942:18 to disable the DOS error checking. Now type CATALOG and, gosh! Indeed, there is a catalog!

Now all the files are loadable (or BLOADABLE) for further snooping.

But this is not the end of the protection. Examining the HELLO program revealed an unusual file named SVS and some curious CALLS and POKES. Upon further inspection, I came to the conclusion that the file SVS was a secondary protection involved in Lancaster. Simply preventing the loading

continued on page 28

# Unlocking Bill Budge's Trilogy

Trilogy of Games  
California Pacific  
757 Russell Blvd  
Davis, CA 95616

By Michael  
Decker

**Requirements:**  
48K Apple II plus  
Bill Budge's Trilogy of Games  
A blank diskette

## Background

One of Bill Budge's earliest offerings was his Trilogy of Games: Driver, a rudimentary driving-skills game; Pinball, a rudimentary you-guessed-it; and Space Wars, a (I won't say it) two-player space battle.

This old, DOS 3.2 disk still sells and Space Wars remains one of the most entertaining arcade-style games in which two players can directly battle each other. Most people often prefer it to newer, much more sophisticated, games in which one battles the computer. I was motivated to de-protect the game by a slight bug (one player's ship is more affected by gravity than the other ship) and by my annoyance with the game's DOS 3.2 format.

## Inside Budge

I, first, tried cracking the disk. Protection was simple: changes in the prologues/epilogues. However, it looked like direct disk addressing was used. Ugh.

So, I booted with an Inspector/BASICS disk, then booted Trilogy. At the menu, I reset out, then looked memory over: picture at \$4000; program at \$6000. Hmm.

I, then, booted DOS and saved picture and program. Next, I restarted the program (\*6000G) and, in turn, loaded each game. I found the entry points and saved the games. Next, I examined the main program and identified the transition between the menu and the disk access routines. Finally, I wrote an Applesoft program to handle the game switching. Presto! The Transparent Budge!

## Doing It

- 1) Boot the DOS 3.3 System Master.
- 2) Prepare to boot 13-sector DOS

**BRUN BOOT13**

3) Insert the Trilogy disk and press **RETURN**

- 4) Hit **ESC** to get to menu.
- 5) Remove the disk and press **RESET**.
- 6) Press **RESET** again.

7) Boot a 48K slave (preferably with no "HELLO" program) having around 150 free sectors.

**JPR#6**

8) Save the picture first  
**BSAVE PICTURE, A\$4000, L\$2000**

9) Enter the monitor

**CALL-151**

10) Make a modification.

**\*67B7:4C D2 D7**

11) Save the first 8 pages of this modified program

**\*BSAVE ATTRACT, A\$6000, L\$800**

12) Restore the original program

**\*67B7:20 00 6D**

13) Insert Trilogy disk and re-start the game

**\*6000G**

14) Hit **ESC** to get to menu.

15) Type **1** to select Driver, the first game in Trilogy.

16) When the title and/or instructions come up, hit **RESET**.

17) Swap disks and save the just loaded program.

**BSAVE DRIVER, A\$800, L\$1801**

18) Enter the monitor again

**CALL-151**

19) Repeat steps 13-18 for PINBALL AND SPACE WAR. Using the same BSAVE parameters

```
10 ON PEEK (104) = 112 GOTO 20:
   POKE 103,1: POKE 104,112: POKE
   28672,0: PRINT CHR$(4)"RUN
   BUDGE.HELLO"
20 PRINT CHR$(4)"BLOAD ATTRACT
   "
30 PRINT CHR$(4)"BLOAD PICTURE
   "
40 POKE 10,76: POKE 11,0: POKE 1
   2,96: PRINT USR (0): CALL -
   10621
50 D$ = CHR$(13) + CHR$(4): VTAB
   1: ON PEEK (67) - 3 GOTO 60
   ,70,80
60 PRINT D$"BLOAD DRIVER": CALL
   3523: RUN 40
70 PRINT D$"BLOAD PINBALL": CALL
   2048: RUN 40
80 PRINT D$"BLOAD SPACE WAR": CALL
   6015: RUN 40
```

20) Coldstart BASIC and DOS

**\*FP**

21) Type in the BASIC menu driver program listed above.

22) Save it

**SAVE BUDGE.HELLO**

I would sometimes get an ?OUT OF MEMORY ERROR. If you should encounter this, just **RUN 20** each time and you'll be fine.

Now, would someone tell me how to make both spaceships feel the same gravity?

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# FIXING THE SOFTKEY FOR BAG OF TRICKS

By Earl Taylor

**Bag of Tricks**  
Quality Software  
6660 Reseda Blvd., Suite 105  
Reseda, CA 91335  
\$39.95

## Requirements:

Apple II, II Plus, IIe or compatible  
Blank disks  
DOS 3.3 Master  
Backup disk created using  
Neal Taylor's "Softkey for Bag of  
Tricks" (see **HARDCORE COM-  
PUTIST#3**)  
Bag of Tricks original disk

## Introductory

Having spent considerable effort un-  
locking the Bag of Tricks at an earlier  
time, I was very interested to read Neil  
Taylor's simpler procedure for obtain-  
ing an unlocked backup in **HARD-  
CORE COMPUTIST #3**. I used his  
technique only to discover that it does  
not produce a completely functional  
copy.

I, then, developed the procedure  
described below which, along with Neil  
Taylor's article, allows the reader to  
produce the desired unlocked, fully-  
functional backup copy. His procedure  
is straightforward and easy but,  
perhaps, it is just a little too easy.

What follows is a way to clean up the  
loose ends in his softkey.

## The Problem

Actually, that softkey does not quite  
produce an unlocked, fully-functional  
copy of the original. After using the  
procedure described in that article and  
examining the resulting files, I disco-  
vered that an important link was  
missing.

For an eye-opener, load the **HELLO**  
program and delete line 110. Now,  
**RUN** the modified **HELLO** program  
and, when the menu appears, select  
**ZAP**, **INIT** or **FIXCAT**. The chosen pro-  
gram will be loaded and run but  
without the **SUPPLEMENT** program. If  
you try out the programs you will find  
that they run equally well without the  
**SUPPLEMENT** as with it.

Why, then, is the **SUPPLEMENT**  
needed? The answer comes when  
**DOS 13** or **CP/M** or **Pascal** modes are  
selected while using the programs. No  
format other than **DOS 16** (**DOS 3.3**)  
is supported without a properly func-  
tioning **SUPPLEMENT** program.

## What's in a Supplement

The main programs (**ZAP**, **INIT**, **FIX-**

**CAT** and **TRAX**) access the **RWTS**  
(**Read or Write a Track/Sector**) rou-  
tines in their **SUPPLEMENTs** through  
locations in the Apple's page 3 of  
memory.

Using the method given in **HARD-  
CORE COMPUTIST #3**, these loca-  
tions connect normal **DOS's RWTS**  
routines to the main program so that  
they work fine with normal **DOS 3.3** (16  
sector) diskettes.

The other formats, however, require  
different **RWTS** routines and these are  
only available in the **SUPPLEMENTs**.

6) Press reset once, wait a second  
and press reset again to shut the drive  
off

7) Type **CALL-151** to enter the mo-  
nitor and, when the asterisk appears,  
type the following:

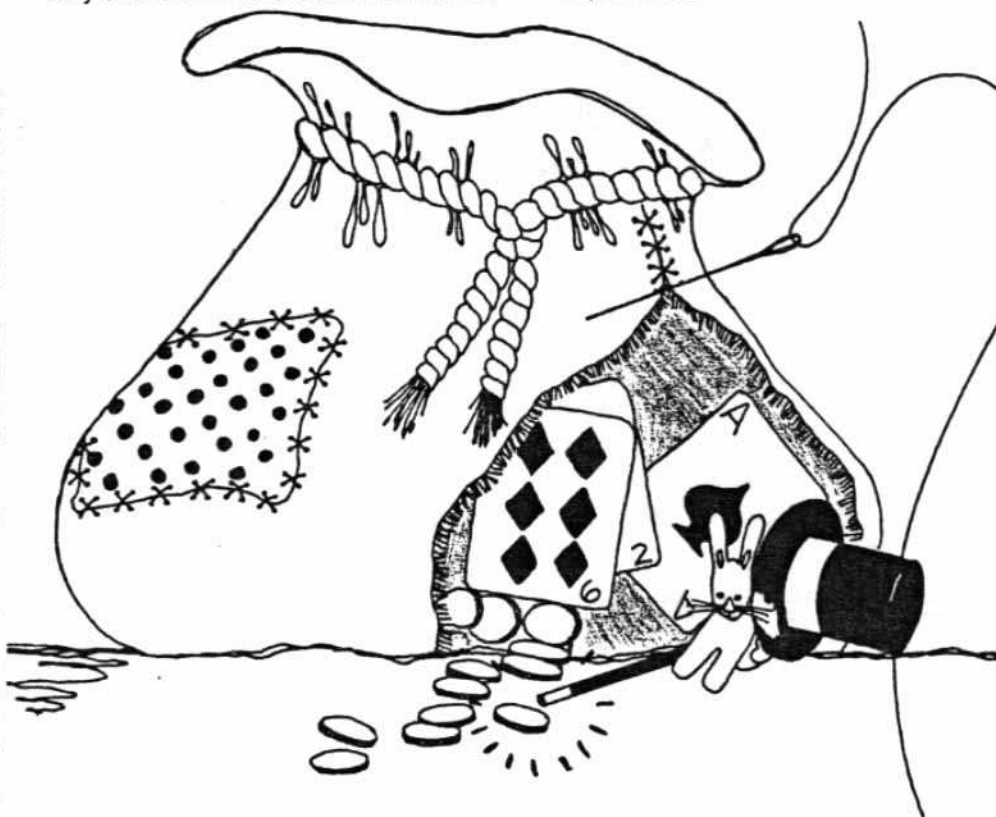
8) **5400 < 9400.96FFM**

9) **5485:55**

10) **5517:55**

11) **5530:55**

12) **5542:56**



Although loaded into memory, the  
**SUPPLEMENTs** have been left "un-  
connected" to the main programs. To  
correct the problem we need to fix the  
page 3 locations to properly connect  
the **SUPPLEMENTs**.

## Getting the Third Page

- 1) Boot the **DOS 3.3 Master** disk
- 2) Type **FP** and put a blank disk in  
the drive
- 3) Type **INIT HELLO**
- 4) Insert the original **Bag of Tricks**  
disk in drive 1 and boot it up
- 5) When the menu appears and the  
drive light goes off, open the drive door

13) **554A:56**

14) Insert the disk **INITed** in step 3,  
above, and type

**C600G**

15) When the disk has booted  
**BSAVE FIXPG3,A\$5400,LS300**

16) Using **FID** from the **DOS 3.3**,  
Master disk, transfer the **FIXPG3** file  
to the disk made according to the arti-  
cle in **HARDCORE COMPUTIST #3**

17) Change the **HELLO** program on  
the backup disk to the one listed  
below.



# PROGRAM

```

10 TEXT : HOME : HIMEM: 25600
20 IF PEEK (104) = 96 THEN 50
30 POKE 103,1: POKE 104,96: POKE
  24576,0
40 PRINT CHR$ (4):"RUN HELLO"
50 A = PEEK ( - 16384) - 128: IF
  A = 70 OR A = 73 OR A = 84 OR
  A = 90 OR A = 69 THEN 100
60 POKE - 16368,0
70 HTAB 10: VTAB 10: PRINT "LOAD
  ING MENU ..."
80 PRINT CHR$ (4):"BLOAD PICTUR
  E,A$4000": POKE - 16299,0: POKE
  - 16297,0: POKE - 16302,0:
  POKE - 16304,0
90 IF PEEK ( - 16384) < 128 THEN
  90
100 A$ = CHR$ ( PEEK ( - 16384) -
  128): POKE - 16368,0
110 IF A$ = "T" THEN A$ = "TRAX"
  :A = 0: GOTO 170
120 IF A$ = "Z" THEN A$ = "ZAP":
  A = 2: GOTO 170
130 IF A$ = "I" THEN A$ = "INIT"
  :A = 1: GOTO 170
140 IF A$ = "F" THEN A$ = "FIXCA
  T":A = 3: GOTO 170
150 IF A$ = "E" THEN TEXT : HOME
  : END
160 GOTO 90
170 TEXT : HOME : VTAB 11: HTAB
  ((13 + LEN (A$)) / 2): PRINT
  "LOADING ";A$;"..."
180 D$ = CHR$ (4)
190 IF A$ = "TRAX" THEN PRINT D
  $:"BLOAD TRAX.SUP,A$8700": GOTO
  210
200 PRINT D$:"BLOAD SUPPLEMENT,A
  $7600"
210 PRINT D$:"BLOAD ";A$;"A$800
  "
220 PRINT D$:"BLOAD FIXPG3,A$540
  0"
230 POKE 47016, PEEK (43): POKE
  38079,A: CALL 21635
  
```

That's it. The resulting disk should now contain the new FIXPG3 file and the new HELLO program, along with the ZAP, INIT, FIXCAT, TRAX, TRAX.SUP, SUPPLEMENT and PICTURE files from before.

This disk now supports all the formats of the original disk and has a couple of other features as well.

First, if you hit the key for your choice of the main program soon enough (during the loading of the HELLO program), the loading of the menu will be skipped and the desired program will be run immediately.

Secondly, the "E" key will exit the menu to Applesoft with normal DOS.

## How it Works

The original Bag of Tricks uses a routine at \$9483 to set up page 3 to connect the main program and the SUPPLEMENTs. It copies an image from page \$96 into page 3 and, then, patches in the boot slot #.

If TRAX is being used, it makes a patch to compensate for the different SUPPLEMENT program then it resets the system stack and jumps to the start of the main program.

In order to use this routine at \$9483, steps 1 through 15 follow the same general method used in the original article. But, before the program is saved, it is moved to page \$54 (step 8) and patched, to allow it to run at this location (steps 9 to 16). This is necessary since it cannot be loaded back into its original location without conflicting with standard DOS. It is, then, saved and added to the other programs on the backup disk in steps 14 to 16.

## New HELLO Program

In order to use the FIXPG3 program, a new HELLO program is required. It functions as follows:



Lines 10 to 40 cause the HELLO program to reload itself between \$6000 and \$6500 to avoid conflicts with the other programs which are loaded later on.

Line 50 skips the loading of the menu if a correct menu choice is waiting at the keyboard.

Line 60 clears any incorrect key waiting at the keyboard.

Lines 70 and 80 load the menu into the second hi-res graphics page and display it.

Lines 90 to 160 get the user's choice of program, setting A\$ to the program name and A to a value from 0 to 3, depending on the choice made.

Lines 170 to 210 load the chosen program and its required SUPPLEMENT.

Line 220 loads the FIXPG3 program at \$5400.

Line 230 puts in the boot slot # (from location \$2B) and POKEs it to where FIXPG3 expects to find it. The user's choice (A = 0, 1, 2 or 3) is also put where FIXPG3 needs it. A call to FIXPG3, then, starts the whole process running.



## A Stitch in Time

At this point, I would like to recommend using one of the faster DOS's such as DiversiDOS, DOSBoss, ProntoDOS, etc. to speed up the loading of the programs. Using normal DOS with the backup is painfully slow, compared to the original, protected disk.

## An Almost Exact Backup

Finally, for those who want an essentially identical copy of the original, I present the following method, using Locksmith 4.1:

1) Copy track 0 using normal parameters

2) Copy tracks 1 to 15 with these parameter changes: parm 44 = D6, parm A6 = D6 and parm A8 = B5

3) Boot up ZAP from the original Bag of Tricks disk, then, place the copy disk in the drive

4) Enter the following ZAP commands:

```

R0,0
41:A94C
43:8D3C03
46:A953
48:8D3D03
4B:A902
4D:8D3E03
50:4C0103
53:A960
55:8DA0BE
58:4C00B7
41 I
  
```

You should see:

```

$5041: LDA #A4C
$5043: STA $033C
$5056: LDA #A53
$5058: STA $033D
$505B: LDA #A02
$505D: STA $033E
$5060: JMP $0301
$5063: LDA #A60
$5065: STA $BEA0
$5068: JMP $B700
$506B: BRK
etc.
  
```

If it is not correct, go back to step 4 and correct any errors you may find.

But if it is correct, type **UNLOCK WRITE**. The resulting copy will function exactly like the original, including the fast load up.

The copy is, of course, still protected from normal COPYA copying but can be bit-copied using just steps 1 and 2, above.

## Checksums

10	- \$B8F0	130	- \$1B94
20	- \$1FBC	140	- \$FCC4
30	- \$AB48	150	- \$4FB8
40	- \$249F	160	- \$F571
50	- \$9A28	170	- \$CCFC
60	- \$01C0	180	- \$4EA1
70	- \$EBFE	190	- \$8928
80	- \$618B	200	- \$15BE
90	- \$F578	210	- \$A77C
100	- \$860F	220	- \$D77D
110	- \$9869	230	- \$CF26
120	- \$24B4		



**Egbert Software**  
W.H. Nail Co.  
275 Lodgeview Drive  
Oroville, CA 95965  
(916)589-2043  
\$69.95

**Requirements:**

Apple II Plus, IIe, or compatible  
DOS 3.3 Master Disk  
Egbert II Communications Disk  
MUFFIN program  
Blank disk

Since I haven't read anything about the Egbert II disk, other than the ad marketing it, I'll assume that not too many people are aware of the ingenious ideas that are packed into this system disk.

But before I show you how to crack and modify the disk, I'll describe and explain the system a bit. This is only a very brief review and isn't meant to be comprehensive. The disk is chock full of pleasant surprises.

The Egbert II Communications disk contains three very powerful main programs.

# Cracking The Egbert II Communications Disk (RTTY/CW/TRANSFER)

By Keith S. Goldstein, M.D.

The RTTY (Radio Teletype) program receives and transmits radio teletype signals. It generates RTTY tones on transmit and decodes the RTTY tones on receive. Some other goodies it has are a "Mailbox" option and an audio frequency counter option.

The CW (Continuous Waves) program does the same for Morse Code, while the Transfer program allows you to send and receive Applesoft, Integer and Binary programs over the telephone or radio.

The special attraction is that all of the tone generation and decoding is done from within the program, so there is **NO HARDWARE INTERFACE REQUIRED!**

The cassette I/O plugs are used from the rear of the computer. Simply plug the cassette input into the speaker/earphone jack of any communications receiver (or telephone amplifier for the Transfer program) and plug the cassette output into the microphone jack of the transceiver. That's all you need to send/receive RTTY or CW.

For the non-amateur radio operators, you can use the RTTY program to receive foreign and domestic wire news services and telegrams such as those supplied by UPI.

The CW (Morse Code) program will decode or send Morse Code at rates from three to 125 words per minute. It is a great teacher for those interested in learning Morse Code or you can simply eavesdrop on radio hams.

Both the RTTY and CW programs use the on-board speaker-to-monitor arrangement.

The Transfer program will work just as well with any transceiver, or you can transfer programs over the telephone without a modem! All you need is a cheap amplifier (Like the Radio Shack 277-1008 which costs \$11.00) and a telephone pick-up coil (also available at the 'Shack for about \$2.00). It sure beats the price of a Modem!

Now that your mouth is watering at the possibilities of getting the news and listening in on private and government teletype communications without messing around with any extra hardware, order one! I heartily recommend this disk. It's worth every penny.

But once you have the disk you will find some unfriendly little annoyances programmed-in there.

Haven't you ever wished that you could go from receive to transmit RTTY without that darn CW (Morse

Code) identifier breaking your concentration? Doesn't having your name and serial number flashed at you constantly annoy you? Wouldn't you just love to have the programs load super fast by using a speedy DOS? Wouldn't you like to be able to modify the programs to your heart's content? Wouldn't you just like to have a backup copy and don't have a nibble-copier?

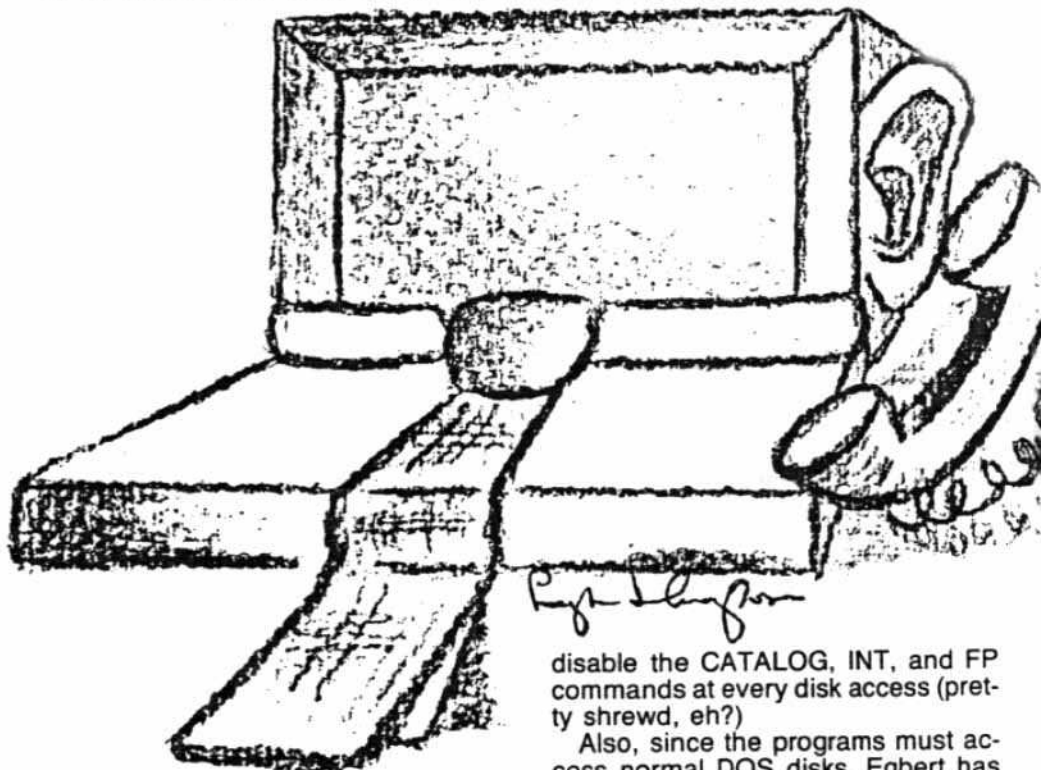
You can find how to do these things and more below.

## The Lock

The Egbert II Communications Disk uses several simple and yet very effective tricks to prevent the user from discovering its secrets.

The major copy-protection scheme it incorporates is its DOS and the way the disk is initialized. It won't allow any standard copy programs or nibble-copiers (without changing parameters) to duplicate it. To unprotect the programs on the original disk, each one must be loaded by the Egbert DOS and saved by a normal DOS onto a standard disk. After you have transferred the programs they will all, eventually, bomb into the monitor because the author included some checking routines to be sure that you are using his custom DOS. We will defeat those routines too.

The author was quite thorough in his protection scheme. It is impossible to stop the computer, by using reset or any normal method. Egbert DOS is a standard 3.2 with many modifications and patches. The author patched over the INIT command with his own routines. Among other things, this patch will set the Run Flag (\$D6) to FF and

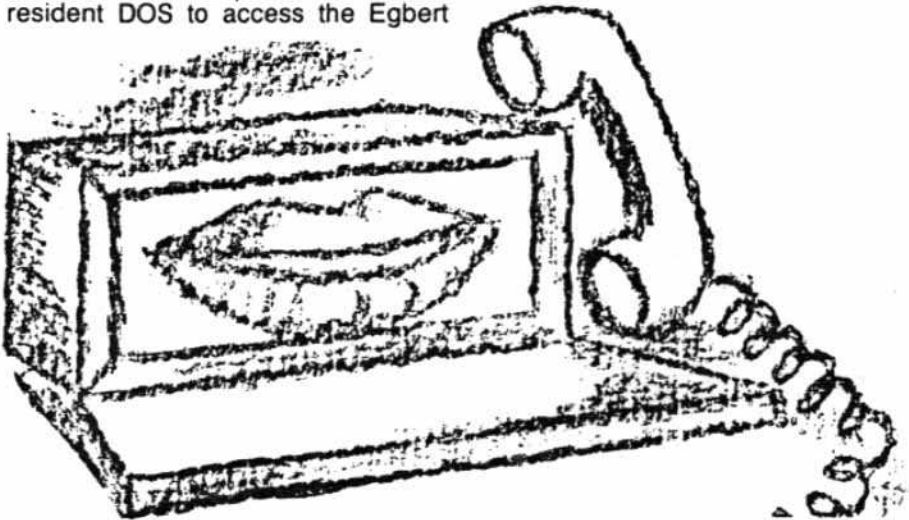


disable the CATALOG, INT, and FP commands at every disk access (pretty shrewd, eh?)

Also, since the programs must access normal DOS disks, Egbert has

the normal DOS routines loaded and moved into place immediately after any of the programs have been loaded. This makes it impossible to use the resident DOS to access the Egbert

- 7) Relocate the first chunk of code  
 •1900<B800.BA10<Ctrl>Y



disk for the purpose of transferring the programs once any of them starts running.

These problems can be solved by using a modification of the DOS 3.3 Master Disk program called MUFFIN. The modified MUFFIN has come to be called DEMUFFIN PLUS.

As you recall, MUFFIN is a machine-language program which will transfer programs or files from DOS 3.2 to DOS 3.3. In general, it reads from one disk format and writes to a different disk format. The modification to MUFFIN allows it to use whatever DOS is present in the machine to read from the locked disk and to write the file out onto a standard DOS 3.3 disk. This gem is just what is needed to transfer the Egbert files to a DOS 3.3 disk.

If you already have DEMUFFIN PLUS, you can skip this entire section on how to create the program and begin to break the disk at step 1.

### How to Create DEMUFFIN PLUS

1) Boot DOS 3.3 Master to load Integer BASIC

2) Enter the other BASIC

]INT

3) Load the MUFFIN program

>BLOAD MUFFIN

4) Enter the monitor

>CALL-151

5) Initialize the Programmers Aid relocation feature

•D4D5G

6) Tell the monitor what is being moved and where it is going

•1900<B800.BFFF<Ctrl>Y\*

8) Move the data segment

•.BC57M

9) Relocate the rest of the code

•.BFFF<Ctrl>Y

10) Make the following modifications to MUFFIN and the relocated RWTS subroutine

•1155:00 1E

•115B:D9 03

•1197:A0 20

•15A0:A0 D2 C5 D3 C9 C4 C5 CE

•15A8:D4 A0 C4 AE CF AE D3 AE

•15F7:C4 C5

•20A0:A9 1E 8D B9 B7 20 FD AA

•20A8:48 A9 BD 8D B9 B7 68 60

11) Save this new code

•BSAVE DEMUFFIN PLUS,  
AS803,LS1900

You now have a copy of DEMUFFIN PLUS, a powerful utility which can be used for other cracking projects.

The Egbert files can now be transferred.

### The Softkey

Here are the steps to follow in order to transfer the files to a standard DOS 3.3 disk:

1) Boot the system master and format a blank disk

]INIT HELLO

2) Delete the HELLO program

]DELETE HELLO

3) Load DEMUFFIN PLUS in a safe place where the boot won't mess it up

]BLOAD DEMUFFIN PLUS,AS6000

The Egbert DOS will "lock you out" of the machine once it is loaded, so we will have to allow the Egbert DOS to load in and then we will have to stop it before it initializes itself (i.e: takes over). This can best be done by a tech-

nique called Boot-Tracing. The process takes a little time but the satisfaction and knowledge gained is well worth the effort.

In general, this technique involves loading a chunk or stage of the boot into memory, examining it, moving it to a safe place in RAM, modifying it to work at the new location and stopping the boot (after loading each new stage) so that we will always be in control of the computer. In this way, the Egbert DOS can be allowed to fully load itself and then be forced to halt.

4) Put the Egbert disk in Drive 1, Slot 6 and enter the monitor

]CALL-151

5) Move the bootcode in the controller card to RAM

•8600<C600.C6FFM

6) Make the moved bootcode JuMP into the monitor after loading track 0, sector 0

•86F8:4C 59 FF

*The Drive will stay on for the remainder of this process.*

7) Move the first boot stage to a new location

•8000<800.9FFM

8) Now we must change a few locations so it will work at this new location

•8003:BD 00 80

9) Make this new stage JuMP into the monitor when finished

•8049:4C 59 FF

10) Now we have to tell the first stage where our new second stage has been moved to

•86F8:4C 01 80

11) Load the third stage of the boot

•8600G

12) Since the last stage ended with a JuMP to location \$301, we know where this third stage of the boot was just loaded. To be certain that it won't be over-written by the next stage, we will move it to a safe place

•8300<300.3FFM

13) Now, again, we have to change a few locations so that this stage will function properly at this new location in memory

•8313:AD CC 83

•833C:AD CC 83

14) The jump out of the fourth stage is not immediate but only after many jumps to a certain subroutine does it continue on to the next stage of the boot. Therefore, we'll place a short program for this stage to jump to. We will also check it to see if it is going to the subroutine again (and if so, let the program continue) or if not, then stop and JuMP into the monitor. We will place our little program at \$8400 but

we need to intercept the program to JuMP to our little routine.

•8343:4C 00 84

15) Enter this little routine

•8400:A5 3E C9 D5 D0 03 6C 3E 00 4C 59 FF

16) Now we mustn't forget to let our stage three know where this stage four was moved to so that it will be able to continue to load another chunk of the DOS for us

•8049:4C 01 83

17) At this point we will let the computer use all of our routines to load in stage four of the boot

•8600G

18) Now we've got almost all of the DOS loaded. Let's see where the final stage has been loaded

•83CC

*The number you should see is \$B6. Add 1 to it (\$B6 + 1) = \$B700 therefore, our next JuMP will be to \$B700.*

19) Since we know where this last portion has been loaded, we are ready to complete the boot and have it stop just before it begins to start up the DOS. Let's move this fourth stage out of the way.

•5700 < B700.BFFF

20) Now, we see the familiar DOS initialization routine JuMP near the beginning of all this stuff we have just moved. Once it has finished loading itself into the machine, let's have it JuMP into the monitor instead of starting the EGBERT DOS

•5747:4C 59 FF

21) We also must not forget to let the previous third stage boot know where we have moved this final stage to

•8409:4C 00 57

22) We are, now, ready to allow the entire EGBERT DOS to be read into the machine and it will stop just before it can take control, which is exactly what we want!

•8600G

*The disk will stop spinning now since the boot has finished*

23) Since we stopped the EGBERT DOS from being able to initialize itself, it wasn't able to fill-in its page-3 vector table. In order for our previously entered DEMUFFIN PLUS to function, it needs these vectors intact. This can be easily accomplished since the page-3 vector table image already exists within the Egbert DOS image. Just move it to page 3

•3D0 < 9E51.9E7EM

24) Move the DEMUFFIN PLUS program back to \$803 and start it running

•803 < 6000.8000M

•803G

Page 18

25) Select Convert Files from the menu. For "File Name?" enter "" (The Wildcard character). Transfer all files from the original disk to the standard initialized DOS 3.3 disk.

Do not attempt to transfer seven of those files shown in INVERSE as they are DUMMY FILES and will cause errors if you try to copy them.

## Fixing the Files

Now that you have all of the programs on a standard DOS 3.3 disk, you are ready to remove the checks for the non-standard DOS so they will function correctly. Most of the changes that will be made will remove a POKE 214,255. This sets the Run Flag.

26) Boot your DOS 3.3 Master Disk. Remove it and insert your new Egbert DOS 3.3 disk

27) Modify the HELLO program

]LOAD HELLO

```
2 INVERSE : FOR I = 1 TO 40: PRINT
  "@": NEXT : VTAB 15: FOR I =
  1 TO 40: PRINT "@": NEXT : FOR
  I = 2 TO 14: VTAB I: HTAB 1:
  PRINT "@": HTAB 40: PRINT
  "@": NEXT : NORMAL : VTAB 3
  : HTAB 7: PRINT "EGBERT COMM
  UNICATIONS DISK": PRINT
```

]SAVE HELLO

28) Modify the MAIN program

]LOAD MAIN

```
8010 VTAB 3: HTAB 7: PRINT "EGBE
RT COMMUNICATIONS DISK": VTAB
5: HTAB 16: PRINT "MAIN MENU
": RETURN
```

]SAVE MAIN

29) Modify the RTTY program

]LOAD RTTY

```
3 BS = CHR$(4): GOSUB 91: VTAB
16: HTAB 11: FLASH : PRINT "
LOADING PROGRAMS": NORMAL : D
$ = CHR$(219): ES = CHR$(
221): PRINT BS;"BLOAD COMBO
1-8-83,D1": PRINT BS;"BLOAD
SPL,D1"
```

```
79 TEXT : HOME : PRINT "BYE!": PRINT
CHR$(7): END
```

```
85 ONERR GOTO 73
```

]SAVE RTTY

30) Modify the ECW program

]LOAD ECW

```
30 POKE 115,0: POKE 116,147: POKE
111,0: POKE 112,147
```

```
110 REM
```

```
120 REM
```

```
200 REM
```

]SAVE ECW

31) Modify the XFER program.

]LOAD XFER

```
135 REM
```

```
137 REM
```

]SAVE XFER

32) Modify the TRANSFER] program.

]LOAD TRANSFER]

```
675 REM
```

```
1035 REM
```

```
2011 REM
```

```
2020 REM
```

```
2030 REM
```

```
2040 REM
```

```
2050 REM
```

```
2060 REM
```

```
2070 REM
```

```
2080 REM
```

]SAVE TRANSFER]

33) Modify the BUFFER/MESSAGE program

]LOAD BUFFER/MESSAGE

```
145 REM
```

```
150 REM
```

```
220 VTAB 23: PRINT "THIS WILL TA
KE ABOUT 90 SECONDS ": VTAB
17
```

```
225 REM
```

]SAVE BUFFER/MESSAGE

34) Modify the COMBO 1-8-83 program

]BLOAD COMBO 1-8-83

This program checks for the non-standard patch to the CATALOG command on the locked disk. It checks for a \$60 in the DOS. If it is there, the program continues. If it isn't there, the RTTY program bombs. The normal DOS 3.3 value is a \$20. To enable it to work perfectly with DOS 3.3, one change is required which makes the check routine look for the normal DOS 3.3 value of \$20 instead of the \$60. (Incidentally, the \$60 of the non-standard DOS disables the CATALOG command; it causes the command CATALOG to be ignored). The change is as follows:

]CALL -151

•54BC:20

•BSAVE COMBO1-8-83,AS5000,LS0AD5

35) Fix the same CATALOG patch in the RCV program

•BLOAD RCV

•414E:00 00

•BSAVE RCV,AS4000,LS58B

36) Fix the CATALOG patch in the XMT program

•BLOAD XMT

•52C2:20

•BSAVE XMT,AS5000,LS3E8

37) Delete the image of DOS 3.3 on the disk

•DELETE DOS 3.3

38) Remove the DOS mover from the disk

•DELETE DOS MOVE 3.3

You now have a fully functional DOS 3.3 version of the entire EGBERT RTTY/CW/TRANSFER system to customize at your discretion.

For starters, here is how to obliterate the serial number of the diskette.

### LOAD RTTY

```
91 HOME : INVERSE : FOR I = 1 TO
40: VTAB 1: PRINT "@" CHR$ (
8);: VTAB 7: PRINT "@": NEXT
: FOR I = 2 TO 6: VTAB I: HTAB
1: PRINT "@": HTAB 40: PRINT
"@": NEXT : NORMAL : VTAB 3:
HTAB 9: PRINT "EGBERT II RT
TY PROGRAM": HTAB 9: PRINT "
WRITTEN BY G.W. EGBERT": HTAB
14: POKE 34,7: RETURN
```

Type in the following in immediate execution mode:

```
JF2 = PEEK(175) + PEEK(176) * 256 - 8: FOR
AT = 1 TO 4: POKE F2 + A, 0: NEXT
JSAVE RTTY
JLOAD ECW
260 REM
370 REM
```

Again in immediate execution mode type:

```
JF2 = PEEK(175) + PEEK(176) * 256 - 8: FOR
AT = 1 TO 4: POKE F2 + A, 0: NEXT
JSAVE ECW
JCALL -151
•BLOAD COMBO 1-8-83
•50D2:FF
•50D3 < 50D2.50E8M
•BSAVE COMBO 1-8-83, A$5000, L$ADS
```

- BLOAD RCV
- 414E:00
- 414F < 414E.415BM
- 415C:FF FF
- BSAVE RCV, A\$4000, L\$58B

To aid you in you customizing, here is a list of programs and a brief description. Have fun!



**HELLO** - Boot-up title.

**MAIN** - Main menu. Uses PRINT SET, BUFFER/MESSAGE, CODE, MESSAGE.OBJ, CODE, RTTY, ECW, XFER files.

**RTTY** - RTTY program body, uses COMBO 1-8-83, SPL files.

**COMBO 1-8-83** - RTTY machine language portion.

**SPL** - Printer spooler machine language portion.

**PRINT SET** - Printer set-up program. Uses SPL.

**ECW** - CW program body. Uses XMT, RCV, SPL, GP files.

**XMT** - CW transmit machine language portion.

**RCV** - CW receive machine language portion.

**GP** - CW game paddle overlay in machine language.

**CODE** - Contains the number of programs on the disk.

**XFER** - Transfer title and set-up program.

**TRANSFERJ** - TRANSFER program body. Uses XFER 3800.

**XFER 3800** - TRANSFER machine language portion.

**BUFFER/MESSAGE** - Buffer/message program. Creates messages, prints the buffer; uses MESSAGES, MESSAGE.OBJ files.

**MESSAGE** - Message program. Not copy-protected on original disk. Uses MESSAGE.OBJ file.

**MESSAGE.OBJ** - Contains the canned messages and saved files. Not locked on the original disk.

**DOS 3.3** - Overlay of standard DOS 3.3.

**DOS MOVE 3.3** - Relocates DOS 3.3 and overwrites the Egbert DOS with standard DOS 3.3.

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# BEEP!

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**Starcross**  
**Infocom Inc**  
**55 Wheeler St**  
**Cambridge, MA 02138**  
**\$39.95**

**Requirements:**  
 Starcross disk  
 Sector Editing program such as  
 Diskedit  
 One blank disk

STARCROSS IOB program which accompanies this article.

### Making a Copy of Starcross

1) Type in and save either the single or dual-drive version of the STARCROSS IOB program.

2) Run the STARCROSS IOB program to copy the original disk. If you are using the single drive version it will

Likewise for the dual-drive version change line 1010 to read:

**1010 FOR LO = 1 to 28**

The same sector modifications that were done to the copy of Starcross are also necessary to backup these other Infocom disks.

### Adding Your Own Text

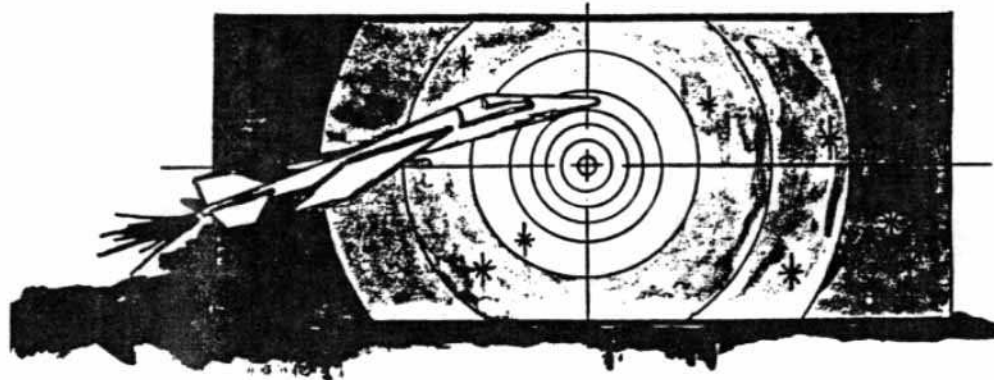
Infocom programs don't use normal text files for program text. Instead, binary information is read directly off the disk into memory, where some strange and wonderful alterations are performed to make it look like text to you and me.

When a sector editing program is used to look at the copy disk, only the error message and the SAVE and RESTORE prompts are visible. If the text were decoded, it would be possible to add your own messages and personalize your copy.

But this isn't easy. After experimenting with my Starcross IOB copy for a while, I realized that the coding is probably not just a straight byte-for-ASCII-byte mapping. In fact, some values may represent whole words. I also suspect that a checksum is used on all text data, because even the slightest change can cause the program to bomb.

Although you may find that decoding the text in Starcross is quite a challenge, you now have the peace of mind of a backup copy on which to practice.

In turn, your new IOB copy can be duplicated with any standard DOS copier, such as COPYA.



# BACKING-UP STARCROSS

By Jeff Rivett

Having just completed Starcross, I can say with certainty that it is one of the finest text adventures I have ever played. The puzzles are very logical and, although some are quite difficult, they can still be mastered by pure reasoning.

In other words, you don't have to rely on luck to win the game.

You don't have to rely on luck to make a successful copy, either. The entire game program uses only tracks \$0 through \$18 (0-24). Track 0 is not protected. The protection scheme on the remainder of the disk is to change the start-of-data marks, normally D5 AA AD, to D5 AA BC.

When a disk is protected by changing the data and address marks, an IOB program is often the best copy solution.

IOB stands for Input/Output control Block, a table of parameters used for disk access by the RWTS (Read or Write a Track and Sector) subroutine in DOS. The RWTS allows you to access the drive directly. The IOB program guides the RWTS as it reads from and writes to the tracks and sectors on a disk.

An IOB program needs an accessory subroutine called a Controlling Subroutine (or Controller) to make it specific for the program to be copied. The Controller indicates to the RWTS the specific tracks to be copied and when to read and write. For more information on the IOB and RWTS, refer to pages 94-98 of The DOS Manual.

To make a back-up copy of Starcross you will need to use either the single or dual drive version of the

instruct you when to remove and insert the proper disks. Note that your drive will make noise when reading track 2, but this does not affect the performance of your copy in any way.

3) When the IOB copy is completed, remove your original copy of Starcross from the drive and place it in a safe location.

4) Get out your sector editing program and make the following changes on track 0, sector 2.

Trk	Sct	Byte	From	To
0	2	FC	BC	AD
0	2	5D	BC	AD

The first modification allows the program to read the copied disk and the second one allows the save game routine to write to a normal 3.3 disk.

5) Write the track back to the disk and you have a deprotected version of Starcross.

The copied version of Starcross can now be booted from slot 6.

### Backup for Other Infocom Games

The method I have described above will also work on other Infocom games. The same STARCROSS IOB program will copy Zorks I and II without any modifications. By modifying the program to copy all tracks through 28 (\$1C) it will also copy Zork III, Suspended and Planetfall. If you are using the single drive version change line 1007 to read:

**1007 FOR LO = 1 to 28 step 6**

### PROGRAM

```

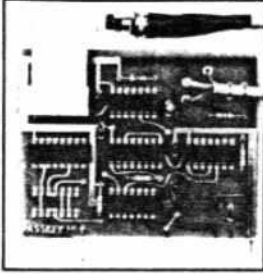
10 REM *****
20 REM
30 REM     SINGLE DRIVE
40 REM     IOB PROGRAM
50 REM     FOR STARCROSS
60 REM
70 REM *****
80 REM
90 TEXT : HOME : LOMEM: 37120: GOSUB
   63000: GOTO 180
100 HOME : VTAB 12: HTAB 12: PRINT
   "TRACK "TK";SECTOR "ST: RETURN
110 HTAB 20 - ( LEN (A$) / 2): PRINT
   A$;: RETURN
120 HOME : VTAB 12: GOSUB 110: VTAB
   14:A$ = "PRESS ANY KEY TO CO
   NTINUE": GOSUB 110: GET ANS:
   RETURN
130 POKE BUF,32: POKE CMD,CD: POKE
   TRK,TK: POKE SCT,ST: POKE DR
   V,DV: POKE VOL,VL: RETURN
140 POKE 47356,188: RETURN
150 FOR TK = LO TO LO + 5: POKE
   TRK,TK: FOR ST = 0 TO DOS: POKE
   SCT,ST: GOSUB 100: CALL IO: POKE

```

# PASS KEY

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- (Not compatible with Apple IIE)

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- Creates autobooting disk in just 32 seconds.
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```

BUF, PEEK (BUF) + 1: NEXT : NEXT
: RETURN
160 POKE TRK,TK: FOR ST = 0 TO D
OS: POKE SCT,ST: GOSUB 100: CALL
IO: POKE BUF, PEEK (BUF) + 1
: NEXT : RETURN
170 POKE 47356,173: RETURN
180 AS = "INSERT ORIGINAL DISK IN
DRIVE 1": GOSUB 120
190 CD = RD:DV = 1: GOSUB 130: CALL
IO
200 VL = PEEK (OVL):DV = 1:CD =
IN: GOSUB 130
210 AS = "INSERT BLANK DISK IN DR
IVE 1": GOSUB 120: CALL IO
990 REM ** CONTROLLER **
1000 AS = "INSERT SOURCE DISK": GOSUB
110: GOSUB 120
1010 TK = 0:DV = 1:CD = RD: GOSUB
130: GOSUB 160
1020 AS = "INSERT TARGET DISK": GOSUB
110: GOSUB 120
1030 TK = 0:DV = 1:CD = WR: GOSUB
130: GOSUB 160
1040 FOR LO = 1 TO 24 STEP 6
1050 AS = "INSERT SOURCE DISK": VTAB
12: GOSUB 110: GOSUB 120
1060 DV = 1:CD = RD: GOSUB 130: GOSUB
140: GOSUB 150:
1070 AS = "INSERT TARGET DISK": VTAB
12: GOSUB 110: GOSUB 120
1080 DV = 1:CD = WR: GOSUB 130: GOSUB
170: GOSUB 150
1090 NEXT
1100 AS = "COPY COMPLETED": GOSUB
120: END
  
```

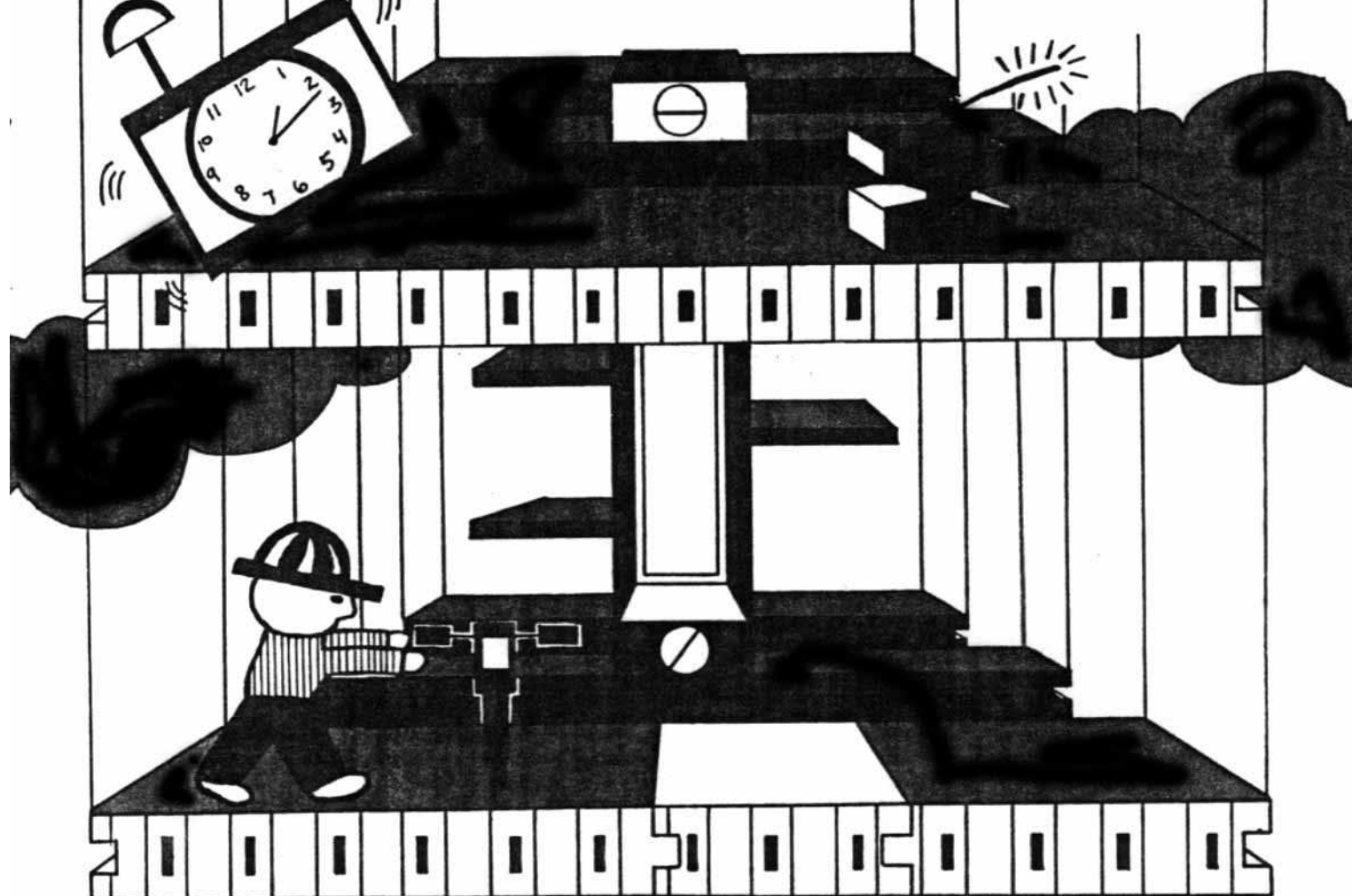
```

62990 REM ** INITIALIZATION **
63000 FOR X = 768 TO 796: READ A
: POKE X,A: NEXT
63010 DATA 169,3,160,8,32,217,3
,96,1,96,1,0,0,0,25,3,0,32,0
,0,1,0,0,96,1,0,1,239,216
63020 TK = ST = VL = CD = DV
63030 TRK = 780:SCT = 781:CMD = 7
88:RD = 1:WR = 2:SLT = 777:D
RV = 778:BUF = 785:ERR = 789
:VOL = 779:IO = 768:INIT = 4
:OVL = 790
63040 DOS = 15
63050 RETURN
10 REM *****
20 REM
30 REM DUAL DRIVE
40 REM IOB PROGRAM
50 REM FOR STARCROSS
60 REM
70 REM *****
80 REM
90 TEXT : HOME : LOMEM: 16385: GOSUB
63000: GOTO 170
100 HOME : VTAB 12: HTAB 12: PRINT
"TRACK "TK",SECTOR "ST: RETURN
110 HTAB 20 - ( LEN (AS) / 2): PRINT
AS: RETURN
120 HOME : VTAB 12: GOSUB 110: VTAB
14:AS = "PRESS ANY KEY TO CO
NTINUE": GOSUB 110: GET AN$:
RETURN
130 POKE BUF,32: POKE CMD,CD: POKE
TRK,TK: POKE SCT,ST: POKE DR
  
```

```

V,DV: POKE VOL,VL: RETURN
140 POKE 47356,188: RETURN
150 FOR ST = 0 TO DOS: POKE SCT,
ST: GOSUB 100: CALL IO: POKE
BUF, PEEK (BUF) + 1: NEXT : RETURN
160 POKE 47356,173: RETURN
170 AS = "INSERT ORIGINAL DISK IN
DRIVE 1": GOSUB 120
180 CD = RD:DV = 1: GOSUB 130: CALL
IO
190 VL = PEEK (OVL):DV = 2:CD =
IN: GOSUB 130
200 AS = "INSERT BLANK DISK IN DR
IVE 2": GOSUB 120: CALL IO:V
L = 0
990 REM **: CONTROLLER **
1000 TK = 0:DV = 1:CD = RD: GOSUB
130: GOSUB 150:DV = 2:CD = W
R: GOSUB 130: GOSUB 150
1010 FOR TK = 1 TO 24
1020 DV = 1:CD = RD: GOSUB 130: GOSUB
140: GOSUB 150
1030 DV = 2:CD = WR: GOSUB 130: GOSUB
160: GOSUB 150
1040 NEXT
1050 AS = "COPY COMPLETED": GOSUB
120: END
62990 REM ** INITIALIZATION **
63000 FOR X = 768 TO 796: READ A
: POKE X,A: NEXT
63010 DATA 169,3,160,8,32,217,3
,96,1,96,1,0,0,0,25,3,0,32,0
,0,1,0,0,96,1,0,1,239,216
  
```

*continued on page 25*



## Boot Code Tracing HARD HAT MACK

By Rich Lyon

Hard Hat Mack  
Electronic Arts  
2755 Campus Drive  
San Mateo, CA 94403

### Requirements:

Apple II Plus, or compatible  
Hard Hat Mack disk  
Blank initialized disk with no "HELLO"  
program  
Some knowledge of boot code tracing  
or machine language

Hard Hat Mack is an addictive construction-site game with three different levels. I was first introduced to it at the local computer store and couldn't stop playing it.

While there, I took some time to examine the boot code on the game disk and found it to have a very strange boot code, one like I had never seen before. About a month later, I decided to buy the disk for, mainly, two reasons: I liked the game and wanted to face the challenge of breaking the copy-protection scheme.

For those of you who are not familiar

with the boot process, here is a general explanation. When any disk is booted on the Apple, control is transferred to the boot program which is at \$C600. If your disk controller card is in slot 5, the program will be found at \$C500.

It will be assumed that the card is in slot 6 to keep things simple. When executed, this program will read in track 0, sector 0, from the disk and put it in at \$800. It will, then, jump to \$801.

Depending on the disk, from this point another boot stage will be loaded in and, eventually, the main program will be read into memory and executed.

When it comes to copy-protected disks almost every disk is different. The unique thing about Hard Hat Mack is that the first boot stage loaded in takes 16 pages of memory. In most cases, boot 1 only occupies one page of memory. The advantage of this lengthy boot stage is that this is the only boot stage. From here on, the game is loaded right in.

### Blue-Collar Boot Code Tracing

Here are the steps used to boot code trace Hard Hat Mack:

1) The first step is entering the Ap-

ple's monitor.

**CALL-151**

2) Memory move the boot program down to a page in RAM so it can be modified to load in the next boot stage

**9600 < C600.C6FFM**

3) Change the JMP \$801 to a JMP \$B047

**96F9:47 B0**

Why jump to \$B047? After tracing the code for the first time, I ended up jumping there upon exiting the first boot stage so from there on I jumped to \$B047 immediately.

4) Put a short routine at \$B047 to shut off the drive motor and return to the monitor. A JMP \$FF59 will jump to the monitor

**B047:8D E8 C0 4C 59 FF**

5) Insert the original Hard Hat Mack disk and type

**9600G**

This will execute the first boot stage to load the next boot stage into \$800. This will take about five seconds because it has to load in 16 pages of



memory. Usually, this boot stage occupies only one page of memory but if you check the value at \$800 you will find a \$10 (16 decimal) where normally you would find a \$1. This number tells the first boot stage how many sectors to read in.

6) Memory move pages 8 through 18 to \$B000

**B000 < 800.1800M**

If you list through the boot stage at \$800 (801L) you will find that all it does is the memory move and then jumps to \$B047.

Now, rather than modify the code at page \$8, it is easier to put it where it belongs and jump directly there from boot number 1. The next step is finding the jump to the start of the program. In other words, a JMP instruction to somewhere other than within the boot stage.

The only jumps I found were two indirect ones to \$42. At first, I thought these were used (at least one of them) to jump to the start of the program. I traced them and found that they were not used to exit the boot. That left me knowing that I was faced with a problem.

Somewhere within this lengthy boot stage is a hidden or a coded jump. Rather than trace through everything that looked suspicious, I decided to try for a one-in-a-million shot.

I had traced the boot code about ten times prior to this and remembered one place where I had halted the boot code and most of the program had been loaded in. I went over it again and stopped in that place then I paged through memory and looked for something that might be the start of the game.

It didn't take much looking because I found something interesting right at \$800. Without even testing it I assumed that it was the start of the program.

Now, my next step was boot code tracing the disk again and halting it in the same place. But, instead of coming to a complete stop, calling a short routine to cover up the first three bytes at \$800 with a 4C 59 FF.

That way, if the boot code jumps to \$800, the start of the program will cause a jump into the monitor.

Once everything was set, I executed the boot and waited with high hopes. Just as the game was about to start, I heard a beep and the cursor appeared. Indeed, \$800 was the start of the game.

The place I interrupted the boot stage was at \$BBC4 and at that location was a JMP \$BBD4. What I did here was to set \$BBC4 to jump to \$B100 and at \$B100 I put the routine to cover up the start of the program

with a JMP \$FF59. \$B100 is a safe place to put data because it is only the data for the Electronic Arts logo.

7) Set a jump to \$B100 at \$BBC4  
**BBC4:4C 00 B1**

8) Enter the routine to cover up the start of the program

**B100:A9 4C 8D 00 08 A9 59 8D 01 08 A9 FF 8D 02 08 4C D4 BB**

9) Reboot the disk

**9600G**

This will load in the entire game and return control to you. When the prompt appears, you are ready for the last step before saving the game. Right now, we want to restore what was originally at \$800 before the routine at \$B100 covered it up. It was a JSR \$2204.

10) Restore the code that was at \$800

**800:20 04 22**

Next, we will reboot DOS. First, we must move page \$8 to a safe place or it will be overwritten when we reboot. The question is where to put it. Paging through memory, I found an area that looked like it contained "garbage." Actually, I concluded that all memory from \$3400 to \$3FFF was unused because the game did nothing with it before clearing the hi-res page.

11) Memory move page \$8 to page \$34

**3400 < 800.8FFM**

12) Put in a blank slave disk with no "HELLO" program and type

**6 (Ctrl-P)**

13) Now, after booting DOS, enter the monitor again.

**CALL-151**

14) Next, we will move page \$8 back to its proper place from page \$34

**800 < 3400.34FFM**

The game could be saved now but it would not work.

When the space bar is pressed to begin the game, a check is done to the disk to make sure that the Hard Hat Mack disk is present. The only problem is finding where the disk is accessed.

Knowing that this happens when the space bar is pressed, when you do that look for a read from the keyboard and a check. I found this in the subroutine at \$BC8.

There was also an LDA \$C000 and, further on, a CMP #\$A0. When the space bar is pressed this subroutine sets a flag byte and returns.

The next step is to find out where the subroutine at \$BC8 is called from. I found this at \$84E. After calling the

subroutine it checks the flag and if it is set, it continues.

At \$864 is a JSR \$4D34 and this is part of the game beginning sequence. The subroutine at \$4D34 does a lot of playing with the stack and by tracing the PLAs and PHAs, I found that it leaves two extra values on the stack and, then, does an RTS.

This is a disguised jump. Confused? When an RTS is executed, the two top values are taken off the stack and the computer jumps to the address of those two values, plus one. When I checked the two values left on the stack, I found \$FF and \$04. Adding one to \$04FF you get \$0500 and that's where it was going.

The next text page is \$0500 and there was nothing there upon exiting the boot. At \$803 there is a JSR \$3300 and if you list through \$3300 you will see that it moves \$3000 through \$32FF down to \$500 so, actually, when you list through \$3000 you are seeing what will be at \$0500.

Looking at \$3000 there are disk access commands in the assembly. Therefore, you can assume that this is where the disk is checked. All that we have to do to remove this disk check is to change the subroutine at \$4D34 so it does not push two extra values on the stack. Simply change the PHA at \$4D53 to a PLA so that instead of pushing on the second value, it would pull off the first, hence, leaving the stack the same.

15) Change the operation at \$4D34 from PHA to PLA

**4D53:68**

All we have to do, now, is save the game to disk. Since DOS does not allow us to save a file longer than \$7FFF bytes and we need to save \$8D00, we have to change a byte in DOS.

16) Patch DOS so that we can save this long a file

**A964:FF**

17) Finally save the BRUNable version of Hard Hat Mack

**BSAVE HARD HAT MACK, A\$800,LS8D00**

This will save all memory from \$800 to \$94FF. Actually, the game loads in past \$9500 but, after testing the game, I found it to work fine. All the memory above \$9500 is just "garbage" memory.

Finally, if you wish to compress the file remember that pages \$34 to \$3F are free. This will save you 12 sectors on your disk. I often shorten game files as much as possible.





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### DOCUMENTATION

Documentation, if it exists, is on the disk with the program. Usually the documentation has the same name as the program except that a ".DOC" is added to the name. HOW TO READ THIS LISTING The name of each disk is in bold lettering, followed by a number USE THE NAME AND NUMBER WHEN ORDERING. The column of titles under the disk name shows the programs on that volume. The left column indicates the language required by the program.

### Code Requirements

A Applesoft in ROM or Apple soft firmware card or Language card and DOS master disk.

I Integer in ROM or Integer firmware card or Language card and DOS master disk.

B These programs are written in machine code and will work in any Apple. However, if the program uses routines from Integer or Applesoft, then the requirements for I and A programs apply.

T These are text files and are used by the other three program types.

The second column is the number of sectors on the disk used by the program.

### APPLE III OWNERS

Most of these PDS disks will work on the Apple III in emulation mode. We have not tested all of the programs nor do we have a list of what works. So be careful. "Caveat Emptor."

### PROGRAM CRASHES

If a program crashes the disk may have a bad sector. We will replace any disk that has a bad copy of a program or that has media defects. Some programs will give SYNTAX errors. These are not media defects or bad copies.

ONE FINAL NOTE POS is not commercial quality and is supplied as is

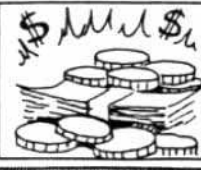
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### APPLE TUTOR

- Apple Tutor 001
- I 004 Basic Programming
  - I 036 Basic Programming 1
  - I 047 Basic Programming 2
  - I 048 Basic Programming 3
  - I 044 Basic Programming 4
  - A 004 Basic-Integer
  - B 022 Basic-Integer X
  - I 019 Conventions
  - I 016 CPU 6502
  - I 002 Hello Sample
  - I 030 Micro 6502 Simulation
  - I 051 Mini Assembler Tutorial
  - A 022 Random Drill Tutor 3.2 Only
  - I 007 Sweet 16 Disassembler
  - I 004 Sweet 16 Speed
  - B 002 Sweet 16 Speed X
  - I 026 Top Down Programming

### BUSINESS & FINANCE

- Business & Finance #18
- A 005 Annuity Principal & Interest
  - A 003 Annuity Regular Deposits
  - A 018 Annuity-NW
  - A 013 Bond Price & Interest
  - A 012 Bond Value
  - A 032 Budget Monthly
  - A 013 Decision Matrix
  - A 054 Financial Pak
  - A 016 Investment Annuity Forecasts
  - A 012 Keogh Savings Program
  - A 014 Loan Amort Schedule
  - A 008 Loan Direct Reduction
  - A 004 Loan Interest
  - A 029 Market Evaluator Pak
  - A 009 Mortgage Calculation
  - A 007 Nicer Writer-NW
  - A 003 Regular Deposits I
  - A 007 Sales Tax at 6%
  - A 017 Security Analysis
  - A 006 Security Analysis Copy Data
  - A 003 Simple Interest
  - A 010 Stock Option Analysis
  - A 016 Stock Option Covered Hedge
  - A 015 Stock Option Pricing I
  - A 021 Stock Option Pricing II
  - A 008 Stock Portfolio Valuation
  - A 028 Stocks
  - A 010 Trip Cost Analysis

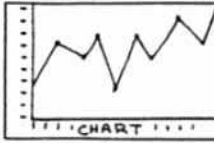


### BUSINESS & FINANCE

- Business & Finance #19
- I 030 Calendar Personal
  - I 006 Letter Writer
  - I 006 Letter Writer Enhance
  - I 014 Phone List
  - I 005 Real Estate Plot
  - B 034 Real Estate Plot X
  - A 012 Stock Monitor I
  - A 015 Stock Monitor II
  - A 024 Trend Line Analysis
  - A 006 Visicalc Coord Formulas
  - A 012 Visicalc O File Printer
  - A 014 Visicalc Formulas
  - A 006 Visicalc Formulas Instr

### BUSINESS & FINANCE

- Business & Finance #20
- A 025 Apartment Mortgage
  - A 052 Banking and Finance
  - A 058 Business Finance
  - A 006 Check Stub
  - A 029 Household Expenses Profile
  - A 041 Income Tax 1040 for 77
  - A 029 Inventory Company
  - A 004 Inventory Cost File Entry
  - A 016 Inventory Home I
  - A 022 Inventory Model
  - A 009 Inventory Print-NW
  - A 003 Inventory Shortest
  - A 003 Inventory Shortest Read
  - A 023 Inventory
  - A 003 Inventory DOC
  - A 019 Inventory File Create
  - A 029 Inventory File Read
  - A 018 Stock Market Forecaster
  - A 011 Stock Valuation



### MATH & STATISTICS

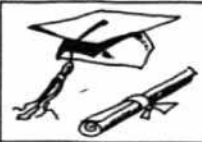
- Math & Statistics #61
- A 003 Angle Conversion
  - A 012 Anglo to Metric III
  - A 003 Area of Polygon
  - A 008 Binomial Distribution
  - A 004 Blackbody
  - A 003 Chi Square Distribution
  - A 004 Chi Square Test
  - A 004 Coordinate Conversion
  - A 008 Coordinate Plot
  - A 003 Curvilinear Interpolation
  - A 002 Derivative
  - A 016 Diff
  - A 011 Differential Eqn Solver Demo
  - A 004 Exponential Regression
  - A 004 F Distribution
  - A 004 Gaussian Quadrature I
  - A 003 Geometric Mean
  - A 004 Geometric Regression
  - A 004 Greatest Common Denominator
  - A 005 Histogram
  - A 003 Linear Interpolation
  - A 007 Linear Programming
  - A 004 Linear Regression
  - A 005 Mann Whitney U Test
  - A 022 Math Drill III
  - A 019 Math Multply Drill
  - A 019 Math-NW
  - A 013 Matrices
  - A 004 Matrix Inverse I
  - A 004 Matrix Multiplication
  - A 004 Matrix Operation Simple
  - A 004 Mean Van Stor Dev I
  - A 007 Multiple Linear Regression
  - A 004 Normal Distribution
  - A 006 Nth Order Regression
  - A 004 Number Combinations
  - A 002 Parabola Plot
  - A 003 Permutation Combination I
  - A 007 Permutation Combination II
  - A 003 Poisson Distribution
  - A 006 Polar Equation Plot
  - A 011 Polyfit
  - A 013 Polynomial Regression
  - A 006 Power Curve Fit (C)

- A 003 Prime Factors I
- A 006 Prime Factors II
- A 003 Quadratic Formula
- A 006 Quadratic Surface
- A 015 Right Triangle Solver
- A 016 Root Finder
- A 005 Roots of Poly Hall
- A 005 Roots of Polynomials
- A 004 Simpson's Rule
- A 004 Simultaneous Equations
- A 004 T Distribution
- A 005 T Distribution Test
- A 003 Trapezoidal Rule
- A 005 Triangle Factors
- A 007 Triangle Parts
- A 003 Trig Polynomial
- A 004 Vector Analysis
- A 003 Vector Operations

### UTILITY

- UTILITY #66
- B 002 Ep1.3
  - B 002 Ep2.3
  - B 002 Ep3.3
  - B 003 Ep4.3
  - A 002 Epson Catalog Dbl Strike
  - A 008 Epson Driver Instr
  - B 002 Epson Driver
  - A 002 Epson Greeting
  - A 004 Epson Labels I
  - A 005 Epson Labels II
  - A 006 Epson Labels III
  - A 002 Epson Lower Case
  - A 002 Epson MX/FX-80 List Capture
  - A 006 Epson MX/FX-80 List Format
  - A 005 Epson MX/FX-80 List Instr.
  - A 003 Epson MX30 Catalog
  - A 005 Epson MX30 Demo I
  - A 007 Epson MX30 Demo II
  - A 024 Epson MX30 Label Maker I
  - A 052 Epson MX30 Label Maker II
  - A 053 Epson MX30 Label Maker III
  - B 034 Epson MX30 Label PIC
  - A 003 Epson MX30 Letterhead
  - A 015 Epson MX30 Program List
  - A 023 Epson MX30 Reminder Calendar
  - A 033 Epson MX30 Setup I
  - A 005 Epson Utility 3.3 Demo
  - A 023 Epson Utility 3.3 Info
  - A 022 Epson Word Game
  - A 003 Epson Exec. Maker A3.3
  - I 003 Epson Exec. Maker C3.3

- B 005 Text Demo
- B 004 Text Mktst
- T 002 XEpson V3.3



### EDUCATION & SCHOOL

- Education & School #28
- I 025 Alphabet & Sound
  - A 004 Class Boy Girl Ratio
  - A 030 Class Grade Book
  - A 036 Class Grader
  - A 004 Class Grader Initialize
  - A 015 Final Grade
  - A 004 Final Grade Doc
  - A 014 Fourth Grade Demo
  - A 022 Student Head Court
  - A 004 Student Head Court Doc
  - I 010 Test in Woodworking
  - A 042 Test Maker
  - A 019 Test Maker Multi Choice
  - I 013 Typing Practice
  - A 016 Typing Practice-NW
  - A 005 X-Averages
  - A 003 X-Date
  - T 002 X-E File
  - T 002 X-File
  - A 005 X-File Int
  - I 009 X-Grading Instr
  - I 002 X-School Menu Needed
  - B 040 X-School I
  - I 002 X-Schoolfile
  - A 005 X-Student Names
  - A 005 X-Student Names Grades
  - A 004 X-Test Grades



### MUSIC & SOUND

- Music & Sound #65
- T 003 America
  - I 012 Hanoi Etude #1 in C
  - T 002 Happy Birthday
  - A 015 Harmonic Analysis
  - I 019 Music Computer
  - I 036 Music Functions
  - I 011 Music Gee
  - I 023 Music in IB
  - I 014 Music Maker
  - I 017 Music Mozart Theme
  - I 007 Music Rugby
  - A 026 Music Starway to Heaven
  - A 004 Music Start
  - I 030 Music Two Voices
  - I 022 Music Writer 3
  - I 008 Musical Keyboard
  - B 002 Musical Keyboard X
  - A 017 Musical Memory
  - I 010 Name That Tune
  - I 007 Sound Effects Demos
  - A 005 Sound Effects How to
  - I 007 Sound Effects Random
  - A 003 Sound Routine
  - I 011 Sounds And Music Starwars
  - I 006 Swanne River
  - T 038 Tunes



### FOOD

- Food #35
- B 004 Alpha#
  - A 026 Calorie Counting Program
  - A 014 Calorie Rights
  - A 029 Food Values
  - A 033 Ideal Body Weight
  - A 031 Life Expectancy
  - I 026 Life Expectancy Test
  - A 017 Metric Kitchen
  - A 043 Recipe Box
  - T 002 Recipe File
  - T 002 Recipe File
  - A 042 Recipe Calorie Cost
  - A 003 Recipe Cost
  - A 026 Recipe Cost Per Serving

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## NOTE TO OUR READERS

Several of our readers have called or written to ask what assembler was used to produce the source code listings printed in *HARDCORE*. The answer to this question is that we use the S-C Macro Assembler from the S-C Software Corporation (2331 Gus Thomasson, Suite 125, P.O. Box 280300, Dallas, TX 75228, \$80.00).

In order to convert the source files published in our magazine to a format that is compatible with the particular assembler that you use, consult the following list of S-C Assembler directives:

### S-C Assembler Directives

- .OR** - ORigin. This sets the address of program origin to the value of this expression.  
Example:  
**.OR \$300**
- .TA** - Target Address. This sets the location or Target Address at which the object code will be placed during assembly. Example:  
**.TA \$4000**
- .TF** - Target File. This directive causes the object code to be stored to disk during assembly, rather than in memory. Example:  
**.TF CHECKERS GAME**
- .IN** - INclude. This causes the contents of the specified source file to be included in the assembly. Example:  
**.IN CHECKER BOARD**
- .EN** - ENd of program. This is an optional directive which indicates the end of the source code to be assembled.
- .EQ** - EQuate. Defines a label to have the value of the expression. Example:  
**COUT.EQ \$FDED**
- .DA** - DAta. Creates constants or variables in the program.
- .HS** - Hexadecimal String. This directive converts a string of hex characters to binary and stores them at the current location in memory.
- .AS** - ASCII String. Stores the binary equivalent of the ASCII characters in quotes. Example:  
**.AS "APPLE II"**
- .AT** - ASCII Terminated. This operates the same as **.AS** except that the high-order bit of the last character in

the string is set opposite to that of the preceding characters.

- .BS** - Block Storage. This reserves a specified number of bytes for storage. Example:  
**.BS 6**
- .TI** - Title. This is used to print a program title and page number at the beginning of each page during assembly.
- .LI** - List control. Controls whether a program listing will be generated during assembly. The listing can be either turned on or off. Example:  
**.LI OFF**
- .MA** - MAcro definition. Beginning of Macro definition.
- .EM** - End Macro definition.
- .US** - USer directive. Allows the user to indirectly jump to a set of user-supplied instructions.
- .PG** - PaGe control. Prints an ASCII form feed character during assembly.
- .DO** - DO conditional assembly. If the value of the expression following the DO statement evaluates true then the code up to the **.FIN** directive will be assembled, otherwise it will be ignored. Example:  
**FLAG .EQ 1**  
**.DO FLAG**
- .FIN** - FINish conditional assembly. Indicates the end of code to be assembled under conditional assembly.
- .ELSE** This is used to introduce an IF-THEN-ELSE structure into portions of source code affected by conditional assembly.

In addition, the S-C Assembler uses a pound sign (#) to indicate the lower byte of a label's address and a slash (/) to indicate the upper byte of a label's address. Example:

```
LDA #COUT
LDX /COUT
```

We are now using a standard version of the S-C Assembler, but in the past, several source files produced by a custom version of the assembler managed to slip by our staff and were published in *HARDCORE*. As a result, some source code listings contained BGE (Branch on Greater or Equal) and/or BLT (Branch on Less Than) instructions. In order to make these source files compatible with your assembler, convert BGE to BCS and BLT to BCC.

*continued from page 21*

```
63020 TK = ST = VL = CD = DV
63030 TRK = 780:SCT = 781:CMD = 7
      88:RD = 1:WR = 2:SLT = 777:D
      RV = 778:BUF = 785:ERR = 789
      :VOL = 779:IO = 768:INIT = 4
      :OVL = 790
63040 DOS = 15
63050 RETURN
```

### CHECKSUMS FOR SINGLE DRIVE

10	- \$BADD	210	- \$112B
20	- \$9B13	990	- \$C20A
30	- \$4D3B	1000	- \$6EAB
40	- \$AD92	1010	- \$BB13
50	- \$C899	1020	- \$C80D
60	- \$FF65	1030	- \$4256
70	- \$A3BF	1040	- \$3291
80	- \$A900	1050	- \$8B4C
90	- \$22D5	1060	- \$18DF
100	- \$EDE4	1070	- \$B2BF
110	- \$A5F1	1080	- \$2A3A
120	- \$D8E3	1090	- \$0216
130	- \$0280	1100	- \$6811
140	- \$EBA9	62990	- \$08DE
150	- \$97F0	63000	- \$8742
160	- \$C2E5	63010	- \$26A6
170	- \$BCD0	63020	- \$C02F
180	- \$E158	63030	- \$4F28
190	- \$A63E	63040	- \$FCCA
200	- \$2860	63050	- \$0C87

### CHECKSUMS FOR DUAL DRIVE

10	- \$BADD	180	- \$6211
20	- \$9B13	190	- \$8E30
30	- \$4D3B	200	- \$B710
40	- \$AD92	990	- \$2542
50	- \$C899	1000	- \$0A9B
60	- \$FF65	1010	- \$115F
70	- \$A3BF	1020	- \$8069
80	- \$A900	1030	- \$8E0A
90	- \$3DD3	1040	- \$9ACF
100	- \$4D47	1050	- \$DFA4
110	- \$23AE	62990	- \$D1DF
120	- \$3B43	63000	- \$ACC5
130	- \$3AAF	63010	- \$EB19
140	- \$8D4A	63020	- \$0D90
150	- \$FE49	63030	- \$6AE5
160	- \$DDBE	63040	- \$4917
170	- \$A772	63050	- \$0D5C



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on p.32.**

# Attention Adventurers!

## Adventure Database

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

## Your Clues, Please

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

## How and Where

So, if you know how to open the jewel-encrusted egg, how to plug the hole in the rowboat, where to find the key to the treasure chest, or any other information that may be of help to your fellow travelers, please send this information on a 3x5 postcard to:

**Softkey Publishing**  
**Attention: Adventure Hints**  
**P. O. Box 44549**  
**Tacoma WA 98444**

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



## Softkey For The Home Accountant

By Barry May

The Home Accountant  
Continental Software  
11223 S. Hindry Ave.  
Los Angeles, CA 90045

### Requirements:

The Home Accountant disk  
An initialized disk (preferably with a fast DOS)  
Apple's FID program

For many months, the Home Accountant has consistently ranked #1 on Softalk's Home Top 10 List. This popular checkbook/home budget program has some very nice features but it has some very annoying ones as well.

Its three biggest faults are: 1) you cannot go back to a previous month to make an addition or correction; 2) you must wait an inordinately long time for the copyright notice and logo display to run through before you are presented with the opening menu and 3) the program is constantly loading new modules and re-reading the data files, resulting in very long waits between tasks.

Removing the copy protection allows at least two of the problems to be solved easily. The opening can be eliminated with a couple of simple changes, as shown below, and a fast DOS will speed up the disk I/O.

The protection on the Home Accountant is very simple. The address epilog has been changed from DE AA EB to DF AA EB. All that needs to be done is change the read address routine to ignore the first byte of the epilog.

This is done by changing byte \$B993 (47507 in decimal) from an \$AE to a \$00. Now, instead of branching to the "Bad Read" routine, the computer merely branches to the next instruction, the one it would normally execute

if everything was O.K.

All that is left to do is get the programs off the protected disk and on to one of yours. The easiest way to do this is to run a program that copies files using the DOS in the computer, like FID.

Just copy the programs on the disk like you would if you were backing up programs from a normal disk.

- 1) Boot a System Master disk
- 2) Change the branch

**POKE 47507,0**

- 3) Run the copy program

**BRUN FID**

- 4) Copy all the programs from the Home Accountant to an initialized disk. (Use a disk initialized with a fast DOS, if you want) and that's it!

After releasing the program from its protection, deleting lines 200 through 1110 from "HELLO" and using Beagle Brothers' Pronto DOS, the time from start to menu drops from 37.7 seconds to 13.7 seconds. A fast DOS which speeds up text files (Diversi-DOS does this) will help even more.

Now it's up to someone else to write a routine for correcting previous months on the program. While I'm still on my wish list, somebody please figure out how to backup Sensible Speller!





# LOOK WHAT YOU'VE MISSED!



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of this file and disabling the calls to its routines was all that was really needed in the deprotection of Lancaster:

The following steps recap the procedures necessary in the deprotection of Lancaster:

1) Boot a normal DOS 3.3 disk and initialize a blank disk with the command

**INIT HELLO**

2) Type

**CALL-151**

to enter the monitor and then

**B942:18**

to disable the DOS error checking routine.

3) Insert your DOS 3.3 System Master in a drive and run the program FID with the command

**BRUN FID**

4) Copy all the files from the Lancaster disk to the blank initialized disk you just prepared

5) Boot your DOS 3.3 System Master and put your newly created Lancaster disk in a drive

6) Delete the Hello program from your Lancaster clone disk with the command

**DELETE HELLO**

7) Unlock the file Lancaster with the command

**UNLOCK LANCASTER**

8) Rename the file Lancaster to Hello with the command

**RENAME LANCASTER,HELLO**

Lancaster is now unprotected and all the code can be examined for educational and modificational purposes.

### **SOFTKEY FOR AMPER-MAGIC By Bob Bragner**

**AMPER-MAGIC  
Anthro-Digital  
Box 1385  
Pittsfield, MA 01202**

**Requirements:**  
48K Apple or an Apple IIe  
Amper-Magic  
One blank disk  
Apple's COPYA program  
Text file editor, such as AppleWriter II,  
Apple's EDASM, etc.  
A Disk Zap utility, such as THE INSPECTOR or WATSON. FIXCAT from "Bag of Tricks" and FID are also useful.

AMPER-MAGIC is a disk library of machine-language routines that can be easily attached to Applesoft programs thus providing extensions to BASIC, such as PRINT USING, SWAP, DELETE ARRAY, INPUT ANYTHING and many, many more. The routines are connected to Applesoft through the ampersand, "&," and it is easy to pass parameters. There is also a second disk of routines available, dealing largely with screen formatting.

If you do any serious programming in Applesoft and find the language too slow for some applications but the thought of writing your own machine language routines to speed things up makes your head hurt, then AMPER-MAGIC is for you.

The program is super-friendly and comes with a well thought-out loose leaf manual.

The price is a little steep, however. I paid \$67 for my master and another \$15 to be a "Registered Commercial Owner." Such registration entitles you to automatic notification in case the manufacturers add any corrections or improvements and also authorizes you to use the AMPER-MAGIC routines in any commercial applications you may write. Having paid this one-time fee, your only other obligation is to mention Anthro-Digital's name in the documentation of any program using their routines. Fair enough. More than fair: generous.

However, I did balk at the \$7 price tag on the backup disk. That's about \$4 more than I'm willing to pay for such a necessity. But I like *lots* of backups, so I set about making them.

To my dismay, however, I discovered that not only is AMPER-MAGIC protected, it is protected in a very ingenious and potentially dangerous way. Actually, it is *nowhere* mentioned that the disk is protected and you are nowhere warned not to write anything onto the master disk. This is not friendly.

AMPER-MAGIC has several levels of protection. You can copy the disk with Apple's COPYA without a hitch, but the result won't work. When you at-

tempt to EXEC the main control textfile as directed, the disk drive turns on and stays on. Hitting reset will lock up your machine. The only ways out are control/open Apple/reset or turn-the-machine-off-then-on.

An examination of the controlling text file called AMPER-MAGIC showed, among other things, the following:

```
FF$ = "A":FORI = 1TO29:FF$ = FF$  
+ CHR$(8) :NEXTI  
PRINTCHR$(4);"BRUN"FF$  
DEL 1,0  
RUN
```

For you, newcomers, CHR\$(8) is the backspace on your keyboard (control H). It's been so long since anyone used control characters to conceal filenames in catalogs that it never even occurred to me to look for them. This particular trick causes the filename to be written over by the next one in the catalog, thus rendering it invisible. Cute.

Changing the file's name to something more respectable (on the copy, of course), I proceeded to examine the binary file, now simply called "A."

This is a 288-byte file that lives at \$25B. The code is not difficult to disassemble, but it was doing some strange things. It appeared to look for 14 bytes in track 0, sector 0, and to compare them with a table in memory. If they matched and if a number of other conditions were met, then another program, called "AMPER.MAGIC PROGRAM," was loaded. Otherwise, program "A" hung up. Since program "A" did a jump to the standard DOS LOAD command, AMPER.MAGIC PROGRAM had to be somewhere in the catalog track (track \$11), and it had to be in the VTOC. But it wasn't.

Call up WATSON or THE INSPECTOR and do a sector-use map of your AMPER-MAGIC disk. Now look at sector \$F of track \$11 and backstep through the catalog. In sector \$C you will see the "A" file whose name contains 29 inverse "H's" (it's at track \$21, sector \$08.)

In sectors \$B and \$A you will see



some deleted Applesoft files with odd names like NIL0 and NIL1, which seem to have been used to overwrite other deleted binary files with names like "REPEET" and "RWTS.O." They contain (meaningless?) data statements. When you get to sector \$9, you will see that the link to the next catalog sector (8) is missing! Hmm... To DOS this means that this is the end of the catalog.

Backstep once more and suddenly the words "AMPER.MAGIC PROGRAM" are staring at you from sector \$8. This program appears to start at track \$0F, sector \$F. Check it out; it does.

Backstep some more. Notice that the link in sector \$2 is missing. Now look at sector 1 and you will find yourself looking at what must be a VTOC! "But VTOC's are supposed to be in sector 0," I hear someone say. I don't? Well, anyhow, there is a byte in DOS called READ/WRITE VTOC BUFFER. It is located at \$B00D (45069) and it normally contains a 0.

Just for fun, try poking the value 1 there and type "CATALOG" with an ordinary disk in the drive. (For a lot of fun, poke in a number greater than 15!) Unless the disk has had a great many file names on it at one time, this track will usually be empty and your catalog will have disappeared. If any file names have been stored in this sector, then CATALOG will display some quaint garbage since DOS will attempt to interpret what it finds there as a VTOC. Place your AMPER.MAGIC master in the drive, do a POKE 45069,1, then CATALOG and you will see the hidden file.

Returning to a more careful examination of the disassembled code of "A" it turns out that this program does indeed store a 1 at \$B00D before it attempts to load the AMPER.MAGIC PROGRAM. The latter program, for its part, pokes a 0 back into that location so it can get at the routines stored on the disk. The reason this method of copy-protection is dangerous, aside from the fact that you don't know it is there, is that the normal VTOC at sector 0 may not know anything about AMPER.MAGIC PROGRAM. If it thinks the sectors it occupies are unused, and if you try to save something on the disk, DOS will cheerfully write all over the hidden program.

Moral: never write anything to a master disk, even if the manufacturer doesn't tell you not to.

Additional examination of "A" reveals that the whole routine can be bypassed. The program checks to see whether or not it is running on an original disk and whether or not an EXEC file is in operation. Finally, it doctors the VTOC and loads the hidden program. Examination of AMPER.MAGIC

PROGRAM shows that it makes no attempt to protect itself once it is running.

Here is a step-by-step procedure to crack AMPER-MAGIC (The commands to type in are given in bold):

1) Copy the master disk using normal COPYA procedures

**RUN COPYA**

2) Point DOS to the VTOC on sector 1

**POKE 45069,1**

3) Catalog the disk

**CATALOG**

4) Load the AMPER.MAGIC PROGRAM file

**LOAD AMPER.MAGIC PROGRAM**

5) Unlock the AMPER.MAGIC PROGRAM file

**UNLOCK AMPER.MAGIC PROGRAM**

6) Delete the AMPER.MAGIC PROGRAM file

**DELETE AMPER.MAGIC PROGRAM**

7) Point DOS to the VTOC on sector 0

**POKE 45069,0**

8) Catalog the disk again

**CATALOG**

9) Save the AMPER.MAGIC PROGRAM file

**SAVE AMPER.MAGIC PROGRAM**

10) Unlock the EXEC text file AMPER.MAGIC

**UNLOCK AMPER-MAGIC**

11) Bring up a text file editor such as AppleWriter IIe, Apple EDASM, etc.

12) Load AMPER-MAGIC into the editor.

13) Insert the word "REM" at the beginning of the line that reads PRINTCHR\$(4);"BRUN""FF\$.

14) Insert the following: PRINTCHR\$(4)"LOAD AMPER.MAGIC PROGRAM" before the last line in the file (the one that says "RUN").

15) Save this as a text file under the name AMPER-MAGIC

**SAVE AMPER-MAGIC**

16) Exit the editor.

You now have a deprotected copy of AMPER-MAGIC from which you can make all the working backups you want, using normal copy procedures.

You're not quite done yet, though, because the disk's catalog is still a bit messed up. You can use WATSON/THE INSPECTOR to manually restore the missing links (and zero out the extra VTOC at track \$11, sector 1) or you can run the FIXCAT utility in "Bag of Tricks" and let it do the work for you.

You really *should* repair the catalog if you intend to use FID to move files off of, or on to, the deprotected disk. If you use FIXCAT you should ignore the temptation to restore the deleted files since most of them have been written over.

There is, however, a strange little Applesoft program not located at track \$10, sector \$E (its track/sector list is in sector \$F). Restore this program and call it "WEIRD HELLO," then run it for an odd message

By the way, Volume Two of Amper-Magic is unprotected and can be copied without any fooling around. I like to FID all its binary files over to the deprotected master since both disks are mostly empty space anyhow.

Do you want to add more routines to the library? Move everything to a hard disk or a Ram Pseudisk? Eliminate the annoying beeps in the main program? With your unprotected version of AMPER-MAGIC you are now free to make any modifications you wish.

## **SAMMY LIGHTFOOT SOFTKEY**

**By Eric Kinney**

**Sammy Lightfoot  
Sierra On-Line Inc  
Sierra On-Line Bldg  
Coarsegold, CA 93614  
\$37.95**

### **Requirements:**

Apple II, with 48K  
1 disk drive  
1 blank disk  
Sammy Lightfoot Diskette  
DOS 3.3 System Master with COPYA  
Any Disk Editor (such as DiskEdit 2.7)

Sammy Lightfoot is a running/jumping/climbing type of game which is fun to play, has high quality graphics, and is easy to backup, as you will soon see.

The game has three "scenes," with six levels of difficulty for each scene. Sammy, the hero of the game, is trying out for a circus act in which he bounces on trampolines, dodges giant circus balls and uses ropes to swing over flames and certain death below.

The copy-protection used seems to be a check of track 0 prior to each new scene.

Several things were done to hide the code in memory. With effort, however, it can be traced and tested at various points to find where it actually checks for copy-protection.

My first thought was that it was checking for a nibble-count, but since copying track 0 with Locksmith's nib-

ble counter didn't copy it, I suspect that it checks for something else.

By tracing the machine language code and disabling various subroutines until I homed in on the right one, I discovered a place where the copy-protection could be circumvented.

This was at location \$989B, where it does a JSR to \$9E00. In assembly code, that's 20 00 9E.

I changed the bytes to EA, which is assembly code for NOP, or "No OPeration." Since the bytes I changed were 20 00 9E, it was not too difficult to scan the disk with DiskEdit until I found these three bytes, and changed them permanently.

Making a backup of Sammy Lightfoot is very simple:

1) Boot up with DOS 3.3 System Master

2) **RUN COPYA**

3) Copy Sammy Lightfoot with COPYA

4) Boot up any Disk Editor, such as DiskEdit 2.7 by **HARDCORE COMPUTING**

5) Use your sector editor to make the following changes to your copy of Sammy Lightfoot and then write the sector back out.

Trk	Sect	Byte	From	To
D	0	9B	20	EA
D	0	9C	00	EA
D	0	9D	09	EA

You now have a working backup copy.

#### UNLIMITED SAMMYS

1) Using a sector editor, make the following changes to the disk and write sectors back out:

Trk	Sect	Byte	From	To
C	3	69	CE	EA
C	3	6A	4F	EA
C	3	6B	73	EA
C	3	73	CE	EA
C	3	74	4E	EA
C	3	75	73	EA
10	B	81	CF	EA
10	B	82	4F	EA
10	B	83	73	EA
10	B	8B	CE	EA
10	B	8C	4E	EA
10	B	8D	73	EA

#### APT FOR OLD MONITOR ROM

When the game has begun play, hit RESET to get into the monitor. If you want to alter the playing level and/or

the scene use the following procedure once you are in the monitor:

1) Enter the level of play (0-B) at location \$36B.

2) Enter the scene (0-3) at location \$94E3.

3) Restart the game by typing **96C8G**.

### BACKING UP BUZZARD BAIT By Clay Harrell

**Buzzard Bait**  
Sirius Software Inc.  
10364 Rockingham Dr.  
Sacramento, CA 95827  
\$34.95

#### Requirements:

48K Apple, with old F8 monitor ROM  
One disk drive with DOS 3.3  
Initialized 48K Slave DOS 3.3 disk  
Buzzard Bait

Sirius Software always provides us with games that are challenging both in play and protection. Buzzard Bait is no exception.

If you try copying the disk with your favorite nibble copier, you will find that the people at Sirius have done their homework in discovering ways to defeat you (but we have come to expect that from this fun-loving bunch).

Not being one who enjoys watching the bytes go by for hours with a copier, I tend to think there is a better way! Although the Sirius people have gone to great lengths to protect their disk from the bit bunch, they failed to protect the memory to any great extent.

(A note for Replay-Wildcard owners: Sirius hasn't forgotten you either! Just enough disk access has been put in to discourage any easy copies).

Once the game is done with its load and the little red light goes out, RESET should be the next key pressed and the monitor prompt should appear.

Snooping through memory and checking all the "standard" starting locations reveals that an **8000G** will start the game up just like nothing happened! Further examination of memory reveals that Buzzard Bait lives from **\$800 to \$9800**.

Now all we must do is move the portions of memory that get destroyed in a Slave disk, boot to somewhere safe and save the game as a **BLOADABLE** file. Hi-res page one is a perfect candidate for this since it gets re-drawn upon starting the game and, therefore, does not need to be saved.

We must also defeat the disk access that occurs between all levels. This access does not load any data, but just checks to see if the disk is present.

In cookbook fashion, here is what we must do:

1) Boot Buzzard Bait.

2) Reset into monitor after the drive stops.

3) Move the code from **\$800** through **\$1000** up to **\$2000**

**2000 < 800.1000M**

4) Move the code from **\$9600** through **\$9800** down to **\$3000**

**3000 < 9600.9800M**

5) Boot a 48K normal DOS 3.3 Slave disk

**6 CTRL P**

6) Reduce the number of DOS buffers to one

**MAXFILES1**

7) Enter the monitor

**CALL-151**

8) Move the code at **\$2000** through **\$2800** back down to **\$800**

**800 < 2000.2800M**

9) Move the code at **\$3000** through **\$3200** back up to **\$9600**

**9600 < 3000.3200M**

10) Save the first chunk of code

**BSAVE BAIT2,AS4000,LS5800**

11) Make two patches that bypass the disk access between levels

**7FD:4C 00 20 N 2000:A9 18 8D B5 B7 A9 60 8D B6 B7 4C 00 80**

13) Save the second chunk of code

**BSAVE BAIT1,AS7FD,LS1811**

14) Create the following Applesoft program:

```
10 HIMEM:16284
20 DS = CHRS(4)
30 PRINT DS;"MAXFILES1"
40 PRINT DS;"BLOAD BAIT2"
50 PRINT DS;"BRUN BAIT1"
```

15) Save the Applesoft program

**SAVE BUZZARD BAIT**

16) This softkeyed version of Buzzard Bait you have created is not an exact copy of the original because the backup does not have any sound effects. To me this is an acceptable tradeoff for the security of not having to wear out my original game disk. Perhaps with the information I have provided, someone out there can produce a softkey procedure that retains those annoying sound effects we have all come to love.

*continued on page 32*



# FICTION

## L300 Grindle Series 12 Faces Life

By Elizabeth Nieuwland

"Good morning, Miss, I'm L300 Grindle Series 12, your Handy Dandy Little Jiffy Kitchen Gadget Representative. I have here your amazing can opener, corkscrew, egg timer and ..."

"Madame is not at home."

"Perhaps you would care to purchase one."

"I am not programmed to purchase supplies for the household. I am programmed to cook and clean and answer doorbells. I am programmed to have Thursdays and Sundays off and have needlepoint and attending movies as my hobbies. My favorite actor is Clint Eastwood and by coincidence his latest flick is at the Bijou tonight, show time 8:00 P.M. twenty-hundred Army Navy time EST. Rated PG, parental guidance suggested."

"Huh?"

"Would you care to come in, L300 Grindle Series 12, you look tired, I was about to have a jolt of electricity in my kitchen, would you join me?"

"Thank you, Miss, that would be most refreshing. You have a very nice kitchen here."

"Thank you, L300 Grindle Series 12, just let me unscrew this light bulb, there, just stick your index appendage in there."

"That was most refreshing Miss, oh, Miss?.."

"My name is 9.9 Series Model 127XD, assembled in Newark, New Jersey, December 9, 1979."

"That is a coincidence, Miss 9.9, I have a cousin assembled by Newark's parent company in Great Falls, Montana."

"Small world."

"Small world."

"Clint Eastwood is also one of my favorite actors, Miss 9.9, would you care to accompany me to the evening showing of his latest movie, show time 8:00, rated PG, parental guidance suggested."

"Thank you, L300 Grindle, Series 12, I would be most pleased to go. I think Clint Eastwood's appeal is not only his Macho image, but a certain computer-like demeanor suggesting superior assembling at his place of origin."

"Then may I call for you this evening, Miss 9.9 for the movie and perhaps afterwards, a jolt of electricity at a new power station I know of across town?"

"See you around 7:30 then, L300 Grindle Series 12. Oh, by the way what was your original purpose in calling here this morning?"

"Oh, Miss 9.9, a momentary lapse in my memory banks has occurred, but if I happen to think of it this evening, I shall bring it up."



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*continued from page 30*

## Note On Softkey For Legacy Of Lyllygamyn

Several of our readers have called or written about the softkey for Lyllygamyn which appeared in HARDCORE COMPUTIST #4. The method of deprotection for this latest Wizardry scenario apparently only worked on the pre-release, or beta-test version of the game. When Sir-Tech officially released the game, they changed their protection scheme so that the softkey we published no longer worked.

We apologize for any inconvenience this caused any of you rabid Wizardry players out there.

Currently, we are not aware of a backup method for Legacy of Lyllygamyn and would appreciate hearing from any of our readers who have had success in this area.



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