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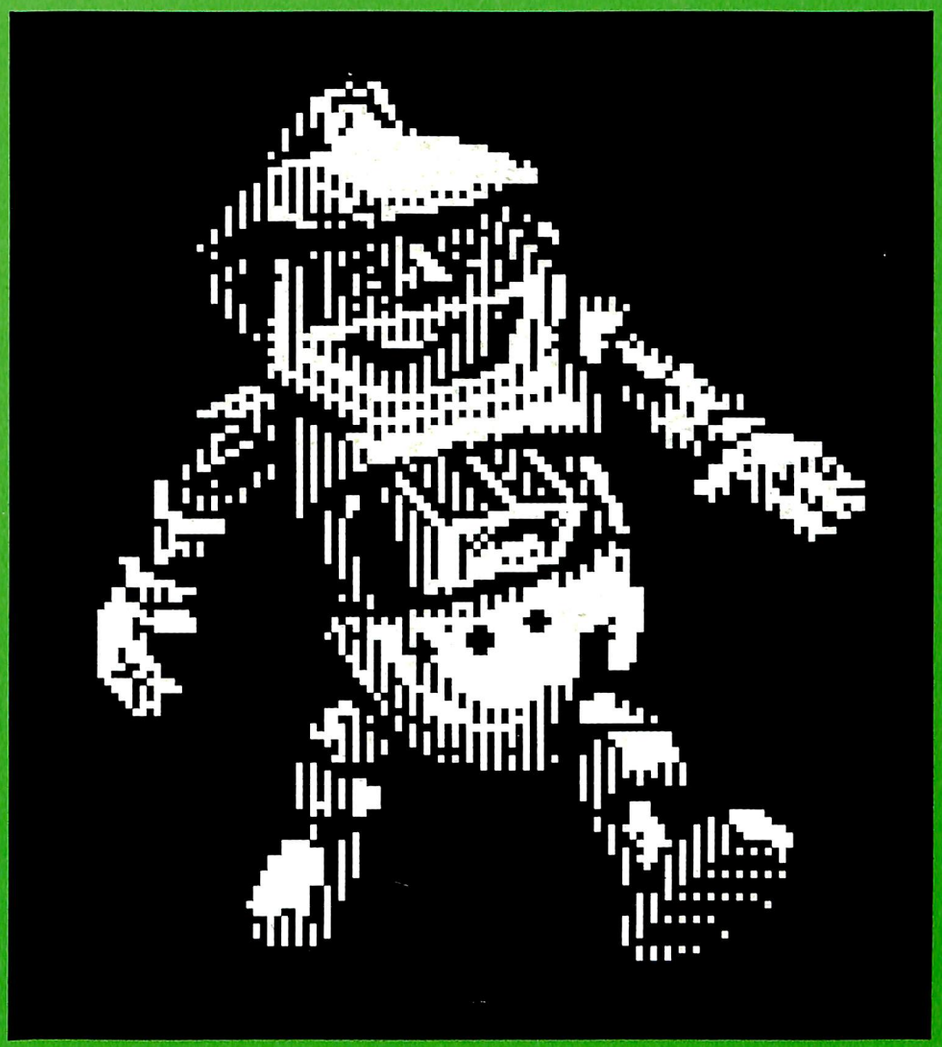

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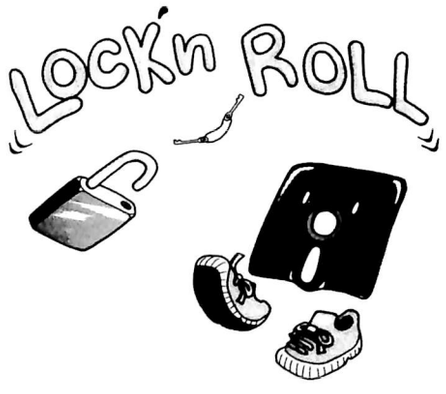

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Hardcore COMPUTIST 22: Softkeys for Miner 2049er, Iode Runner, A2-PB1 Pinball: Readers' Softkeys to the Heist, Old Ironsides, Grandma's House, In Search of the Most Amazing Thing, Morloc's Tower, Marauder, Sargon III; Features: Customized Drive Speed Control, Super IOB version 1.5; Core: The Macro System

Hardcore COMPUTIST 21: Softkeys for DB Master version 4+, Dazzle Draw, Archon, Twerps; Readers' Softkeys to Advanced Blackjack, Megaworks, Summer Games, College Entrance Exam Prep, Applewriter revisited; Features: Demystifying The Quarter Track; Core: Proshadow: A ProDOS Disk Monitor

Hardcore COMPUTIST 20: Softkeys for Sargon III, Wizardry: Proving Grounds of the Mad Overlord and Knight of Diamonds, The Report Card v1.1 and Kidwriter / Apple][Boot ROM Disassembly / The Graphic Grabber v3.0 / Copy II+ 5.0: A Review / The Know-Drive- A Hardware Evaluation / An Improved BASIC/Binary Combo

Hardcore COMPUTIST 19: Softkeys for Rendezvous With Rama, Peachtree's Back To Basics Accounting System, HSD Statistics Series. Arithmetickle, Arithmekicks and Early Games for Children / Double Your ROM Space / The Games of 1984: In Review- Part II / Towards a Better F8 ROM / The Nibbler: A Utility Program to Examine Raw Nibbles From Disk

Hardcore COMPUTIST 18: Softkeys for the Scholastic Version of Bank Street Writer, Applewriter //e, SSI's Non-RDOS Disks, BPI Accounting Programs and DesignWare Programs / Installing a Free Sector Patch Into Applewriter //e / The Games of 1984: In Review / 65C02 Chips Now Available / Checksoft v2 / Simple Copy Protection

Hardcore COMPUTIST 17: Softkeys for The Print Shop, Crossword Magic, The Standing Stones, Beer Run, Skyfox, and Random House Disks / A Tutorial For Disk Inspection and the Use Of Super IOB / The Graphic Grabber For The Print Shop / The Lone Catalog Arranger Part Two / S-C Macro Assembler Directives (Reprint)

Hardcore COMPUTIST 16: Softkeys for Rescue Raiders, Sheila, Basic Building Blocks, Artsci Programs, Crossfire, Sensible Speller for ProDOS and Sideways / Secret Weapon: RAMcard / The Controller Writer / A Fix For The Beyond Castle Wolfenstein Softkey / The Lone Catalog Arranger Part 1

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

Hardcore COMPUTIST 11: Copy II Plus 4.4C Update / PARMS for Essential Data Duplicator / Ultimaker III / Mapping of Ultima III / Ultima II...The Rest of the Picture / Softkeys for Sensible Speller, Ultima III, Softporn Adventure, The Einstein Compiler v5.3, & Mask of the Sun

Hardcore COMPUTIST 7: Softkeys for Zaxxon, Mask of the Sun, Crush, Crumble & Chomp, Snake Byte, DB Master, & Mouskattack; Features: Making Liberated Backups That Retain Their Copy Protection, S-C Assembler: Review, Disk Directory Designer; Core: COREfiler: Part 1, Upper & Lower Case Output for Zork

Hardcore COMPUTIST 4: Ultima II Character Editor / Softkeys for Ultima II, Witness, Prisoner II, & Pest Patrol / Adventure Tips for Ultima II & III / Copy II Plus PARMS Update

Hardcore COMPUTIST 1: Softkeys for Data Reporter, Multiplan & Zork / PARMS for Copy II Plus / No More Bugs / APT's for Choplifter & Cannonball Blitz / Reviews: Replay, Crackshot, Snapshot & Wildcard copy cards

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(★CORE is no longer published as an independent quarterly magazine.)

Back issues not listed are no longer available. But disks are still available for ALL sold-out issues of Hardcore COMPUTIST upon request.

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Don't *TYPE IN* programs that appear in Hardcore COMPUTIST.

Order the Library Disk, instead!

Each month a Library Disk with all the programs that appeared in the previous issue of Hardcore COMPUTIST is prepared for **SMART READERS** like you who have *better* things to do with their time than type in program listings. Please use the order form to the left to order disks.

Many of the articles published in Hardcore COMPUTIST detail the removal of copy protection schemes from commercial disks or contain information on copy protection and backup methods in general. We also print bit copy parameters, tips for adventure games, advanced playing techniques (APT's) for arcade game fanatics and any other information which may be of use to the serious Apple user.

Hardcore COMPUTIST also contains a special CORE section which focuses on information not directly related to copy protection. Topics may include, but are not limited to: tutorials, hardware/software product reviews and application and utility programs.

What Is A Softkey Anyway? Softkey is a term which we coined to describe a procedure that removes, or at least circumvents, any copy protection on a particular disk. Once a softkey procedure has been performed, the resulting disk can usually be copied by the use of Apple's COPYA program (on the DOS 3.3 System Master Disk).

Commands And Controls: In any article appearing in Hardcore COMPUTIST, commands which a reader is required to perform are set apart from normal text by being indented and bold. An example is:

PR#6

Follow this with the RETURN key. The RETURN key must be pressed at the end of every such command unless otherwise specified.

Control characters are indicated by being boxed. An example is:

6[CTRL-P]

To complete this command, you must first type the number 6 and then place one finger on the CTRL key and one finger on the P key.

Requirements: Most of the programs and softkeys which appear in Hardcore COMPUTIST require one of the Apple][series of computers and at least on disk drive with DOS 3.3. Occasionally, some programs and procedures have special requirements. The prerequisites for deprotection techniques or programs will always be listed at the beginning of the article under the "Requirements:" heading.

Software Recommendations: The following programs (or similar ones) are strongly recommended for readers who wish to obtain the most benefit from our articles:

1) **Applesoft Program Editor** such as Global Program Line Editor (GPLE).
2) **Sector Editor** such as DiskEdit, ZAP from Bag of Tricks or Tricky Dick from The CIA.
3) **Disk Search Utility** such as The Inspector, The Tracer from The CIA or The CORE Disk Searcher.
4) **Assembler** such as the S-C Assembler or Merlin/Big Mac.
5) **Bit Copy Program** such as Copy][Plus, Locksmith or The Essential Data Duplicator
6) **Text Editor** capable of producing normal sequential text files such as Applewriter][, Magic Window][or Screenwriter][.

You will also find COPYA, FID and MUFFIN from the DOS 3.3 System Master Disk useful.

Super IOB: This program has most recently appeared in Hardcore COMPUTIST No. 22. Several softkey procedures will make use of a Super IOB controller, a small program that must be keyed into the middle of Super IOB. The controller changes Super IOB so that it can copy different disks. To get the latest version of this program, you may order Hardcore COMPUTIST No. 22 as a back issue or order Program Library Disk No. 22.

RESET Into The Monitor: Many softkey procedures require that the user be able to enter the Apple's system monitor during the execution of a copy protected program. Check the following list to see what hardware you will need to obtain this ability.

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

Apple][Plus - Apple compatibles: 1) Install an F8 ROM with a modified RESET vector on the computer's motherboard as detailed in the "Modified ROM's" article of Hardcore COMPUTIST No. 6 or the "Dual ROM's" article in Hardcore COMPUTIST No. 19.

Apple //e - Apple //c: Install a modified CD ROM on the computer's motherboard. Don Lancaster's company (Synergetics; 746 First Street; Box 809-HC; Thatcher, AZ 85552; free voice HelpLine 602-428-4073) sells the instructions necessary to make this modification. Making this modification to an Apple //c will void its warranty but the increased ability to remove copy protection may justify it.

Recommended Literature: The Apple][Reference Manual and DOS 3.3 manual are musts for any serious Apple user. Other helpful books include: *Beneath Apple DOS*, Don Worth and Peter Leichner, Quality Software, $19.95; *Assembly Language For The Applesoft Programmer*, Roy Meyers and C.W. Finley, Addison Wesley, $16.95; and *What's Where In The Apple*, William Lubert, Micro Ink., $24.95.

Keying In Applesoft Programs: BASIC programs are printed in Hardcore COMPUTIST in a format that is designed to minimize errors for readers who key in these programs. To understand this format, you must first understand the formatted LIST feature of Applesoft.

An illustration- If you strike these keys:

10 HOME:REMCLEAR SCREEN

a program will be stored in the computer's memory. Strangely, this program will *not* have a LIST that is exactly as you typed it. Instead, the LIST will look like this:

10 HOME : REM CLEAR SCREEN

Programs don't usually LIST the same as they were keyed in because Applesoft inserts spaces into a program listing before and after every command word or mathematical operator. These spaces usually don't pose a problem except in line numbers which contain REM or DATA command words. The space inserted after these command words can be misleading. For example, if you want a program to have a list like this:

10 DATA 67,45,54,52

you would have to omit the space directly after the DATA command word. If you were to key in the space directly after the DATA command word, the LIST of the program would look like this:

10 DATA 67,45,54,52

This LIST is different from the LIST you wanted. The number of spaces you key after DATA and REM command words is very important.

All of this brings us to the Hardcore COMPUTIST LISTing format. In a BASIC LISTing, there are two types of spaces; spaces that don't matter whether they are keyed or not and spaces that must be keyed. Spaces that must be keyed in are printed as delta characters (Δ). All other spaces in a Hardcore COMPUTIST BASIC listing are put there for easier reading and it doesn't matter whether you type them or not.

There is one exception: If you want your checksums (See "Computing Checksums" section) to match up, you *must not* key in any spaces after a DATA command word unless they are marked by delta characters.

Keying In Hexdumps: Machine language programs are printed in Hardcore COMPUTIST as both source code and hexdumps. Only one of these formats need be keyed in to get a machine language program. Hexdumps are the shortest and easiest format to type in.

To key in hexdumps, you must first enter the monitor:

CALL -151

Now key in the hexdump exactly as it appears in the magazine ignoring the four digit checksum at the end of each line (a "$" and four digits). If you hear a beep, you will know that you have typed something incorrectly and must retype that line.

When finished, return to BASIC with a:

E003G

Remember to BSAVE the program with the correct filename, address and length parameters as given in the article.

Keying In Source Code The source code portion of a machine language program is provided only to better explain the program's operation. If you wish to key it in, you will need an assembler. The S-C Assembler is used to generate all source code printed in Hardcore COMPUTIST. Without this assembler, you will have to translate pieces of the source code into something *your* assembler will understand. A table of S-C Assembler directives just for this purpose was printed in Hardcore COMPUTIST No. 17. To translate source code, you will need to understand the directives of your assembler and convert the directives used in the source code listing to similar directives used by your assembler.

Computing Checksums Checksums are four digit hexadecimal numbers which verify whether or not you keyed a program exactly as it was printed in Hardcore COMPUTIST. There are two types of checksums: one created by the CHECKBIN program (for machine language programs) and the other created by the CHECKSOFT program (for BASIC programs). Both programs appeared in Hardcore COMPUTIST No. 1 and The Best of Hardcore Computing. An update to CHECKSOFT appeared in Hardcore COMPUTIST No. 18. If the checksums these programs create on your computer match the checksums accompanying the program in the magazine, then you keyed in the program correctly. If not, the program is incorrect at the line where the first checksum differs.

1) To compute CHECKSOFT checksums:

LOAD filename
BRUNCHECKSOFT

Get the checksums with

&

And correct the program where the checksums differ.

2) To compute CHECKBIN checksums:

CALL -151
BLOAD filename

Install CHECKBIN at an out of the way place

BRUN CHECKBIN,A$6000

Get the checksums by typing the starting address, a period and ending address of the file followed by a [CTRL-Y].

xxx.xxx[CTRL-Y]

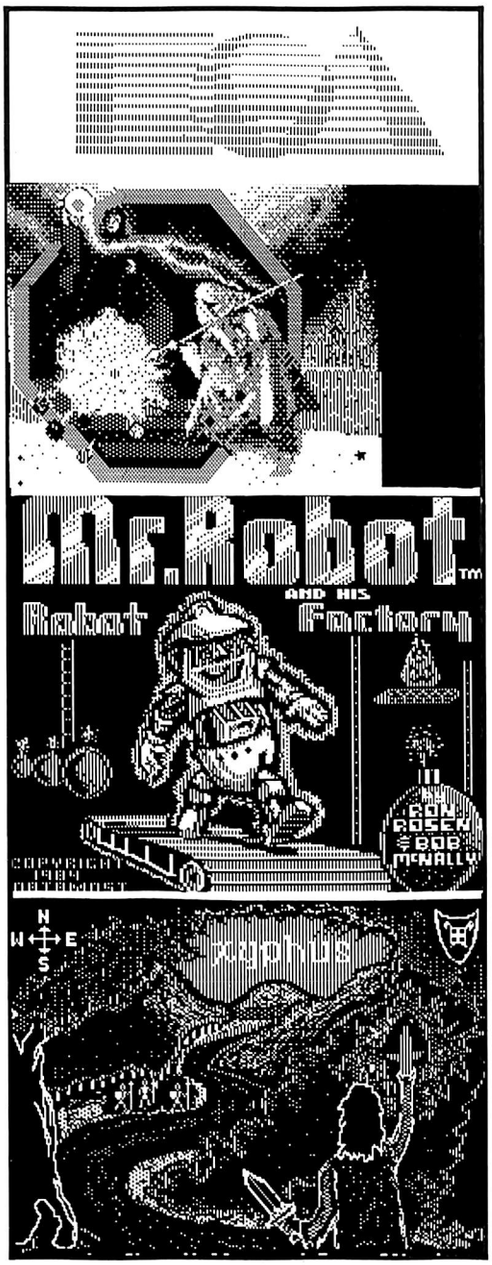
And correct the lines at which the checksums differ.

How-To's Of Hardcore

Welcome to Hardcore COMPUTIST, a publication devoted to the serious user of Apple][and Apple][compatible computers. Our magazine contains information you are not likely to find in any of the other major journals dedicated to the Apple market.

Our editorial policy is that we do NOT condone software piracy, but we do believe that honest users are entitled to backup commercial disks they have purchased. In addition to the security of a backup disk, the removal of copy protection gives the user the option of modifying application programs to meet his or her needs.

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



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COMPUTIST

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softkeys

10 Electronic Arts Software
As an update to the Electronic Arts softkey appearing in Hardcore COMPUTIST No. 13, this article shows how to deprotect three more EA releases (Seven Cities of Gold, Archon II: Adept and Adventure Construction Set). *by Steve and Rod Smith*

13 Grolier Software
Make backups of the Knowledge Explorer series of programs from Grolier Educational Software. *by Jay O'Donnell*

14 Xyphus
Fight evil in the form of altered markers and address headers on this Ultima-style adventure. *by Glenn Schmottlach*

18 F-15 Strike Eagle
Blow away enemy pilots and shoot down an ambitious copy-protection scheme. *by Larry Jasonowicz*

20 Injured Engine
Between inside views of an engine with this game, take a good look at how it was protected. *by Clay Harrell*

feature

22 Essential Data Duplicator copy parms
The latest list of parameters for E.D.D. III, as provided to us by Utilico Microware. Check this list for all your favorite programs. *from Utilico Microware*

core

16 Direct Sector Access From DOS
Add two new useful commands for reading and writing sectors directly to and from the disk. It's almost like having a built-in sector editor! *by Bryan Farlow and Robert Knowles*

departments

4 Input
6 Most Wanted List
6 Bugs
7 Readers' Softkey & Copy Exchange

Softkeys for:
Datamost's **Mr. Robot And His Robot Factory** *by Danny Pollak*, XPS's **Applecillin II** *by Mike Stafford*, Spinnaker's **Alphabet Zoo** *by Eward E. Harte, MD*, Datasoft's **Fathoms 40** *by Ken Black*, Sierra On-Line's **Story Maker** *by Nick Galbreath*, Counterpoint's **Early Games Matchmaker** *by Michael A. Coffey*, Epyx's **Robots Of Dawn** *by Phil Patengale*.

input

Please address letters to:

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Include your name, address and phone.

Correspondence appearing in the INPUT section may be edited for clarity and space requirements. In addition, because of the great number of letters that we receive and the small size of our staff, a response to each letter is not guaranteed.

Rescue Raider Troubles

Well, it looks like Sir-Tech has gotten wise. They placed copy-protection on "Rescue Raiders" different from that which was removed in Hardcore COMPUTIST No. 16. You can no longer copy the disk with COPYA, let alone read from it with a sector editor and therefore, cannot perform the deprotection procedure. Is there anyone who has version 1.5 and has discovered the password? If so, how did you do it?

Also, second my vote on a Hardcore BBS system. I think it would be a very good addition. Just as a suggestion, you could set it up so only Hardcore COMPUTIST subscribers could access the system. If, or when, they do not renew their subscription, you could just delete them from the BBS so they could not access it with their old password.

On the topic of bulletin boards, my friend and I have one set up. It's not much (yet) but you might like to give it a call. The number is: (517) 546-9503 and it is called "Montay IV". If you do call, let the captains know that you saw this in "Hardcore COMPUTIST".

Rob Klingsten
Howell, MI 48843

A Hardcore Protection

First, let me say that this is the only Apple computer magazine worth buying that I know of! Keep up the good work.

Now by using the 40 track init method by Yin H. Pun (Input by R. Boreiko Hardcore COMPUTIST No. 21 Page 5) and a slightly modified VTOC mover by Rohn Smith (Hardcore COMPUTIST No. 18 pages 25 and 26) I have a copy protection method that makes a disk that none of my bit copiers can touch. Here are the steps:

1) Boot Dos 3.3 or equal disk
2) Type FP to clear memory
3) Type POKE 44725.160
4) Type POKE 46063.40
5) Type POKE 48894.40
6) Create Hello program
7) Insert disk and type INIT HELLO
8) Put all desired programs on disk
9) Insert disk with VTOC mover on it and BLOAD it
10) Enter monitor and type:

0325:27
033B:27
0345:27
3D0G

11) Insert 40 track disk and type CALL 769
12) Sector edit track 01 sector 09
13) Change address $01 from $11 to $27

You now have a disk that bit copiers cannot copy.

Address Unknown

The Franklin Answer

In response to Mr. Trueman's letter in Hardcore COMPUTIST No. 20 and in addition to Mr. Baker's letter, I'd like to provide the following information.

The ACES HIGH Club of Denver is a primarily Franklin users group with a smattering of Apple II+ and Apple //e owners. It has a BBS that can be called 24 hours, 7 days a week at 303-329-6749. Downloads and technical information are available but you must be a club member to get more than bulletin capabilities. Currently, there are about 125 members who meet once a month with a help-session the following weekend. Information on dues and membership can be obtained by writing:

Editor
ACES HIGH
8356 E. Princton Ave.
Denver, CO 80237

Another BBS that is available is the ACENET system run by Jay Desio at 318-537-4085. Jay's system features direct technical support from Franklin Computer Corp. as well as the usual BBS sections.

As for other clubs, there are three more we are aware of in Mobile, Alabama; Jacksonville, Florida and Biloxi, Mississippi. These plus other clubs are usually listed in the COMPUTER SHOPPER magazine.

As for the COMPUTIST, the articles and softkeys have really improved over the years, especially the softkeys where more description is given about the why and how it works. While most of the information for Apple][Plus machines is relative, we do hope you will continue to include and improve the discussions on Franklin differences and how it may be used to advantage. Which, prompts me to ask that your technical personnel look into the new Franklin F-Dos Hardboot machines and determine if it offers some new benefits in machine usage.

Paul R. Widinski
Denver, CO

New Infocom Softkey

Infocom, Inc. has some very interesting text adventures on the market today. They recently changed their copy protection slightly, making the softkey outlined in Hardcore COMPUTIST No. 4 almost useless. It does, however, form the basis of this softkey.

THE PROCEDURE

The first thing we must do is load in COPYA (on your system master disk).

RUN COPYA

Then, hit [C]. When the program BREAK's, delete the line that reloads

input

COPY.OBJØ.

7Ø

Make a new line to stop the drive from turning while swapping disks (this part is not needed if you have two drives).

365 POKE 49384,Ø

Enter the Apple's monitor.

CALL-151

Type in the following machine code:

B925:18 6Ø
B988:18 6Ø
BE48:18 6Ø
B8FB:29 ØØ
3DØG

Note that the third change is the only one listed in the Hardcore COMPUTIST softkey. Next, execute the COPYA program

RUN

Copy the entire disk.

When the disk is copied, reboot a disk (so the drive will quit whirring when not in use) and run a sector editor (such as The Inspector.)

Sector edit:

TRACK	SECTOR	BYTE	FROM	TO
ØØ	Ø2	5D	BC	AD
ØØ	Ø2	FB	C9	29
ØØ	Ø2	FC	BC	ØØ

The backup disk should now work and be fully COPYAable.

Address Unkown

Scholastic Bankstree Writer Fix

Well, thank's again for the fine work. I just received Hardcore COMPUTIST No. 18 just when I needed Checksoft v2.Ø. I also needed the Scholastic version of Bankstreet Writer. There are two minor problems with the softkey. First, it works with version 1.3, but not with the newer 2.2 which allows embeded printer control characters. So, here is another challenge for you.

In addition, the UTILITY mode doesn't work on the softkeyed disk. But, have I got a deal for you--here are the patches to restore it.

PATCHING UTILITY MODE

The Utility mode doesn't work since BSW is trying to read a file of parameters, INITFILE!, from a protected disk. But the softkeyed BSW is no longer protected so it bombs.

The Utility program is a BASIC program that switches to protected mode with a "CALL 16384" and to unprotected mode with a "CALL 16387". The easiest way to deactivate these CALLs is to replace the BASIC token for CALL, "8C" with the token for REM, "B2". Therefore, search for two 8C313633383400's and two 8C313633383700's and replace the 8C's with B2's. Here are the changes for my disk.

TRK	SECT	BYTE	FROM	TO
$19	$Ø1	$F3	$8C	$B2
$19	$ØF	$29	$8C	$B2
$1A	$ØC	$39	$8C	$B2
$1A	$ØC	$85	$8C	$B2

These changes will result in a fully functioning BSW v1.3 disk.

Back in Hardcore COMPUTIST No. 17, I had a devil of a time trying to do the Crossword Magic. I had trouble following it and it didn't work.

Wes Felty
Bothell, WA

Cards for Sale

I am a long-time subscriber to your magazine. Recently, I purchased 7 APPLE INTEGER CARDS (you know with the old F8 ROM and a little red switch). I would place an ad in your magazine but for only 7 cards, it would hardly pay. So here is what I propose, anyone on your staff or friends can purchase any or all of the 7 for $2Ø.ØØ each, on a "first-come first-serve" basis until they are gone. Included in the $2Ø.ØØ is cost for shipping and postage back to the purchaser. I will not accept checks. Money orders or certified checks only!! Make out the Money order to Robert J. Hofemann, 4Ø27 Cranford Circle, San Jose, CA 95124 if you are interested.

Robert J. Hofemann
San Jose, CA

Double Those ROMS

I just finished using "Double your ROM Space" from Hardcore COMPUTIST No. 19, both for a Franklin and an Apple II+. Your method worked great for both, but there is at least one problem that your readers will want to know about. With an Apple II+ and an "official" Apple Language Card, the modified ROM doesn't work. With both switch settings, you get the same ROM and cursor. To fix this problem, you need to modify one chip on the Language Card. Pull the small chip in the upper right corner of the Apple Language Card, a 74LS2Ø, and bend pin 6 up out of the way. Replace the IC in the socket without pin 6 going into the socket. This fix is needed only for the "official" Apple Computer manufactured Language Card.

This fix allows both halfs of the 2732 to operate correctly.

I would like to tell you about another problem that I ran into, in case anyone else experiences it. The EPROM for the Franklin worked great with no problems, but I tried to take a shortcut for the Apple II+. I jumped a wire from pin 12 to pin 18. Pin 18 was cut off. This worked OK for a 2716, except of course, ProDOS wouldn't BOOT. When I tried to do the same thing with a 2732, both halfs of the EPROM worked, apparently normally, but ProDOS wouldn't BOOT under the "normal" or modified ROM. I have an Applesurance Disk controller card that test all of RAM and ROM on a cold boot. It showed errors in the F8 ROM on the language card, no less. Therefore, I made the modifications to the motherboard from your directions. I only had one 74LSØ2 in the patch area and all of its gates were in use. Therefore, I had to wire in a new 74LSØ2, a trivial job.

Thanks again for the article. It is exactly what I have been waiting for. I didn't want to modify my F8 if it would prevent some software from BOOTing. I want to try the same techniques now with the Inspector/Watson placed on the DØ and D8 chips with 2732 chips.

Wesley Felty
Bothell, WA

A2PB1 Procedure Rebounds

Let me commend you on the Macro System. It has saved me much time.

I had some problems with the softkey for A2-PB1 Night Mission. I had difficulty on page 14, #3. When I executed the command 3Ø1<3ØØ.BFFFM the screen got full of inversed

input

characters and my system locked up completely. I am using a 128K enhanced //e but I doubt this has anything to do with it (because I tested it on a friend's computer). When I checked my system, it says SYSTEM OK. Please get back to me on what the problem is.

William Vandervoort
Orlando, FL

Mr. Vandervoort: *At this point in the procedure, your screen is supposed to be filled with asterisks. If your machine doesn't come back to you, it's probably because DOS is connected, to avoid this, try typing "0[CTRL]P 0[CTRL]K " before this step.*

Customized Drive Speed Raptures

After reading William Wingfields "Customized Drive Speed Control" and then doing the job myself, I decided that a few extra pointers were appropriate.

1) Not all Disk II's use a 5K pot to adjust the drive speed. Mine was a 50K pot, thus everything was off by a factor of 10. Many retailers don't allow returns on electrical parts, so make sure you know what size(s) you need in advance.

2) In my case, I really needed my VOM to determine which padding resistors to purchase. I ended up with a 3.6K and 36K so I strongly recommended having a VOM before attempting this project.

3) Before removing the original pot make sure the drive speed is correct. This way you can measure the resistence between the wiper and each terminal with the VOM to get an idea of which resistors your own drive will require. For example, my original pot (50K) measured:

```
41 5K wiper-CCW
8 5K wiper-CW
```

Since I was using a 10K pot I subtracted 5K (half of 10K for each side) from each value, giving me:

```
10K new pot
36 5K wiper-CCW
3 5K wiper-CW
```

The closest actual sizes available were 36K and 3.6K which worked out great. It really is a nice addition to the disk drive...Good idea, Bill!!

Lloyd Glade
Federal Way, WA

Owner of a Lonely Apple

There are more than 100,000 Apple /// owners in the U.S. alone--and alone pretty well sums it up. We are trying to overcome that; the following is our most current ad:

The Apple /// Owners & Users Group International is an independent, non-profit organization for all Apple ///ers without a LOCAL Users Group or not connected to one via a modem (or any other ///er). Started in 1983 in Naples, Italy, we publish a monthly newsletter, the "Apple /// News & Views," containing /// news gleaned from every source possible, attempting to answer or obtain answers to mrmnrt's questions, and are building a "library" of EVERY piece of Apple /// Public Domain Software available. COST? Annual dues are $5.00 per calendar year in the U.S. ($20 foreign); however, this may change as we grow together. Software is $3 per disk (Members only, U.S. postage included; $7.50 foreign). Interested? Write for an application! Already a member; why not let other /// owners/users know about us? Put up copies of this introduction in your local computer stores!

Apple /// Owner & Users Group International
c/o H. Joseph Dobrowolski
PO Box 913
Langley AFB, VA 23665

Silence & indifference helped kill the ///'s production, so let's be well but be heard! We hope to see our notice in your publication soon.

H. Joseph Dobrowolski
Langley AFB, VA

bugs

Hardcore COMPUTIST No. 22:
Softkey for Morlocs Tower:
On page 8, step 5 should say "1A1C: 29 00" instead of "A1C: 29 00".

Most Wanted List

Need help backing-up a particularly stubborn program?

Send us the name of the program and its manufacturer and we'll add it to our Most Wanted List, a column (updated each issue) which helps to keep Hardcore COMPUTIST readers informed of the programs for which softkeys are MOST needed. Send your requests to:

Hardcore COMPUTIST
Wanted List
PO Box 110846-K
Tacoma, WA 98411

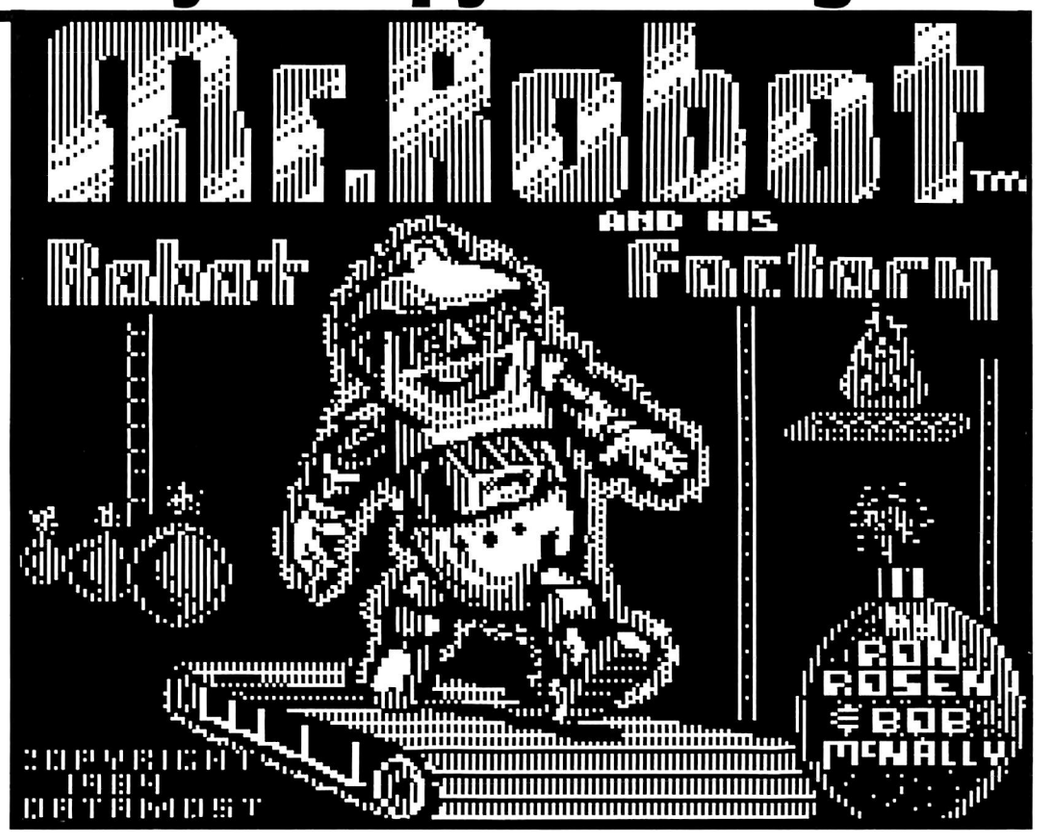
If you know how to deprotect unlock, or modify any of the programs below, let us know. You'll be helping your fellow Hardcore COMPUTIST readers and earning MONEY at the same time. Send the information to us in article form on a DOS 3.3 diskette.

Mouse Calc Apple Computer
Apple Business Graphics Apple Computer
Flight Simulator II Sub Logic
Factory Sunburst Communicating
Jane Arktronics
Bookends Sensible Software
Visiblend Microlab
Sundog FTL Games
Sundog, V2 FTL Games
Lifesaver Microlab
Catalyst Quark, Inc.
Gutenburg
Jr. & Sr. Micromation LTD
Prime Plotter Primesoft Corp.
Zardax Computer Solutions
The Handlers Silicon Valley Systems
Milliken Math Series (NEW) Milliken Publishing
The Apple's Core: Parts 1-3 The Professor
King's Quest Sierra On-line
Hayes Terminal Program Hayes
Fun Bunch Unicorn

readers' softkey & copy exchange

Danny Pollak's softkey for...

Mr. Robot and his Robot Factory



Mr. Robot and His Robot Factory
Datamost, Inc.
8943 Fullbright Ave.
Chatsworth, CA 91311

Requirements:
48K Apple][
Mr. Robot And His Robot Factory
An initialized slave disk

Mr. Robot And His Robot Factory is an arcade game by Datamost in which you move Mr. Robot around the screen picking up power pills while trying to avoid the alienfire which can kill Mr. Robot. The softkey for Mr. Robot is as follows:

1) Boot the Mr. Robot diskette.

2) Go past the animated Mr. Robot picture to the title page. Press Reset repeatedly until out of the program.

3) Type in the following:

CALL-151
3600<9600.BFFFM
2500<F00.1FFFM

4) Insert the initialized DOS 3.3 disk into drive one and reboot.

6[CTRL]P

5) Enter the following hexdump. It moves the Mr. Robot code to its proper locations when executed.

CALL-151

```
24D0: A2 00 A0 FF 84 3E C8 84    $68C6
24D8: 3C 84 42 BD F7 24 85 43    $3A4B
24E0: E8 BD F7 24 85 3D E8 BD    $3C19
24E8: F7 24 85 3F E8 20 2C FE    $2843
24F0: E0 06 D0 DE 4C 00 76 96    $91BE
24F8: 36 5F 0F 25 35             $C929
```

6) Save the game to the initialized disk with

BSAVE MR. ROBOT,A$24D0,L$7130

And there you have it. Now the program is accessible to you so that you can add some nifty APTs. You can also create your own levels for hours of fun. Be sure to save the levels you create on a separate formatted disk.

Mike Stafford's softkey for...

Applecillin II

Applecillin II
XPS, Inc.
P.O. Box 140
Carlisle, PA 17013

Requirements:
48K Apple][Plus
COPYA
A sector editor
A blank disk

Applecillin is a diagnostic program for analyzing and detecting problems with your computer, drive, or monitor. The version I have is for the][Plus, but I believe it is available for all of the Apple][series, up to and including the //e. Unfortunately, like most software, it is copy protected, but luckily not very heavily.

I usually try to use Super IOB's Swap controller first when softkeying a program, as it is the easiest method, but this program uses a custom DOS and direct disk access to load the program, thus ruling out the Swap method. I next tried Old Faithful, COPYA, with a modification to ignore address end marks as Applecillin uses AA DE instead of the normal DE AA. This worked fine, except a modification to the DOS was required to ignore the now normal prologue bytes.

Here's the step-by-step method:

1) Run COPYA from your DOS 3.3 system master. Don't answer any questions yet.

RUN COPYA

2) Hit [CTRL]C to enter BASIC, delete line 70 of COPYA, then enter the Monitor, and enter this modification to ignore address end marks when copying.

[CTRL]C
70
CALL-151
B988:18 60

3) Re-enter BASIC, then run the program.

[CTRL]C
RUN

4) You now have an unprotected version of Applecillin, but it requires a small modification to work properly. Get out your favorite sector editor, (I use Copy][Plus 5.0), and read in track 0, sector 3. Change bytes $92 and $93 from D0 AE to EA EA, and change bytes $9C and $9D from D0 A4 to EA EA. Write the sector back to your copy.

That's it, you should now have a perfectly functioning COPYAable copy of Applecillin. I hope you never need to use it!

Note: For some strange reason, the unprotected disk created by this softkey cannot reliably be reproduced by the Copy Disk option on Copy II 5.0, however COPYA and the Fast Disk Backup on Locksmith work just fine.

readers' softkey & copy exchange

Edwdard E. Harte, M.D., softkeys...

Alphabet Zoo

Alphabet Zoo
Spinnaker Software
One Kendall Sq.
Cambridge, MA 02139

Requirements:
Alphabet Zoo disk
Super IOB v1.2
A blank disk

Alphabet Zoo by Spinnaker Software is a very enjoyable educational game for children ages 3-8. The protection scheme utilized is altered address prologues and epilogues, and altered data prologue and epilogues. The address header is AA D5 AB, and the epilogue is DE AB. The data header is AA D5 EB, and its epilogue is ED AA EB. The IOB controller is written to deal with the altered marks.

The following is the softkey for deprotecting the disk.

1) Initialize a disk with normal DOS using "AZ#2" as the boot program name.

INIT AZ#2

2) Install the Alphabet Zoo Controller in Super IOB.

3) Run Super IOB. Do not utilize the Format disk option.

4) Enjoy!

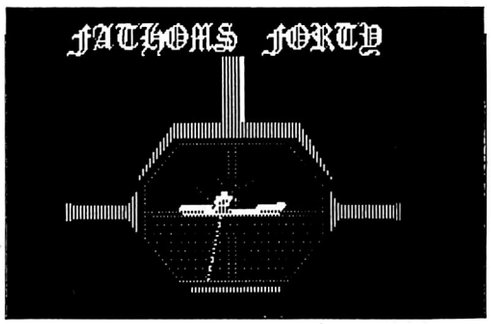
Now when your child uses the copy disk as a Frisbee, it won't cost much to replace it.

controller

```
1000 REM ALPHABET ZOO CONTROLLER
1010 TK = 3 :ST = 0 :LT = 35 :CD = WR
1020 T1 = TK : GOSUB 490 : RESTORE : GOSUB 170 :
     GOSUB 190 : GOSUB 210 : ONERR GOTO 550
1030 GOSUB 430 : GOSUB 100 :ST = ST + 1 : IF ST <
     DOS THEN 1030
1040 IF BF THEN 1060
1050 ST = 0 :TK = TK + 1 : IF TK < LT THEN 1030
1060 GOSUB 490 : GOSUB 230 :TK = T1 :ST = 0
1070 GOSUB 430 : GOSUB 100 :ST = ST + 1 : IF ST <
     DOS THEN 1070
1080 ST = 0 :TK = TK + 1 : IF BF = 0 AND TK < LT THEN
     1070
1090 IF TK < LT THEN 1020
1100 HOME : PRINT : PRINT "DONE^ WITH^ COPY" :
     END
62000 REM DATA FOR MARKS
62010 DATA ^ ^ 170 ,213 ,171 ,170 ,213 ,235
```

controller checksums

```
1000  - $356B     1070  - $F14A
1010  - $3565     1080  - $E365
1020  - $E08F     1090  - $5841
1030  - $F68E     1100  - $EF53
1040  - $E8AF     62000 - $88A6
1050  - $C6A8     62010 - $EBBD
1060  - $F94F
```



Ken Black's softkey for...

Fathoms 40

Fathoms 40
Datasoft, Inc.
19808 Nordoff
Chatsworth, CA 91311

Requirements:
48k Apple][
One blank disk
Super IOB v1.5
Fathoms 40 Game Disk

The reason I got started in deprotecting disks is that I lost a good disk I was using and had to pay for it. All it takes is one time to have an accident and it's gone. The reason I wanted to back up (softkey) Fathoms 40 was that all my bit copiers gave nonbootable copies. The hi-res screens of this game are great and this has to be the best sub game on the market today. It's definitely worth it to back up any program you like as much as I like this one.

Well, the procedure for this is the same for many other disks on the market. The protection scheme on this disk uses an altered address epilogue. We will use Super IOB (yet again) to put all the files on a regular DOS 3.3 disk. The procedure is as follows:

1) INITialize a disk with DOS 3.3. Use HELLO for the filename.

2) Install the controller program into Super IOB v1.5 and copy the Fathoms 40 disk (except the DOS) onto a blank disk. The controller takes into account the altered epilogues on the disk.

3) Put the original away. You now have a perfect COPYA disk. A good hi-speed DOS such as Pronto Dos will help considerably.

A note to other beginners like me: Try something like this procedure on other programs. I've seen it work on several others. Some will require sector edits but that's some detective work you'll have to solve. Now where was that convoy...

controller

```
1000 REM FAST CONTROLLER FOR FATHOMS 40
1010 TK = 3 :LT = 35 :ST = 15 :LS = 15 :CD = WR :FAST
     = 1
1020 GOSUB 490 : RESTORE : GOSUB 170 : GOSUB 610
1030 GOSUB 490 : GOSUB 230 : GOSUB 610 : IF PEEK
     (TRK ) = LT THEN 1050
1040 TK = PEEK (TRK ) :ST = PEEK (SCT ) : GOTO 1020
1050 HOME : PRINT "COPYDONE" : END
5000 DATA 204 ,170 ,222 ,170
```

controller checksums

```
1000  - $356B     1040  - $43C5
1010  - $2445     1050  - $9845
1020  - $F471     5000  - $1588
1030  - $A55A
```

Nick Galbreath's softkey for...

Story Maker

Story Maker
Sierra On-Line Systems
36575 Mudge Ranch Rd.
Coarsegold,CA 93614

Requirements:
Apple][
COPYA or equivalent sector copier
A sector editor

To crack Story Maker, use COPYA to copy it, then get out a sector editor and make these changes:

TRK	SEC	BYTE FROM	TO
9	7	$00	$20	$4C
9	7	$01	$4A	$E9
9	7	$02	$13	$0F

readers' softkey & copy exchange

Michael A Coffey's softkey for...

Matchmaker

Early Games Matchmaker
Counterpoint Software, Inc.
4005 West 64th St.
Minneapolis, MN 55435
$39.95

Requirements:
Apple][with 48K
Super IOB v1.2
A blank disk

Matchmaker was created to provide even the youngest preschooler with an enjoyable, educationally sound computer game. It promotes matching, discriminating, and grouping skills through the use of a variety of colors, configurations and exercises. Each game is sequenced from the easiest to most difficult task and are self correcting; thus allowing the child to know why an answer is right or wrong.

The protection scheme defeated every attempt by the best bit copiers on the market to provide me with a backup. Since there is a lot of disk interaction, a single Binary file is out of the question. Luckily, the use of Super IOB can quickly solve the problem. The non-standard DOS does a nibble count on non-essential Track 10 ($A). Tracks 7 to 9 and 11 to 34 ($7 to $9 and $B to $22) are written with altered address marks. (BB AA 96 instead of D5 AA 96) Tracks 3 to 6 are empty.

To defeat this copy protection, first INITialize a blank disk using the following as the HELLO program:

10 REM

Second, DELETE the HELLO program, because we will use the HELLO program already on the disk. Next type the controller at the end of this article into Super IOB. After RUNning Super IOB you will have your unprotected backup. Since we don't need Track 10 ($A), I included a sector edit routine to modify the VTOC so as to show the track as free and usable.

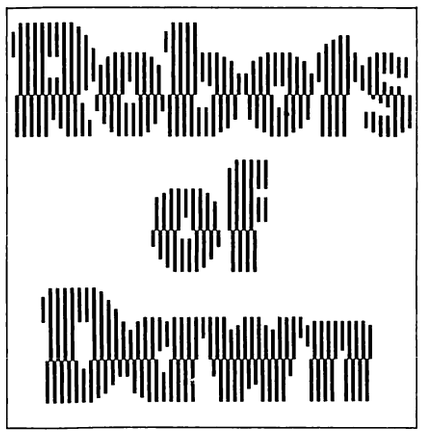
controller

```
1000 REM MATCHMAKER CONTROLLER
1010 TK = 7 :ST = 0 :LT = 35 :CD = WR
1020 T1 = TK : GOSUB 490 : RESTORE : GOSUB 190
1030 GOSUB 430 : GOSUB 100 :ST = ST + 1 : IF ST <
     DOS THEN 1030
1040 IF BF THEN 1060
1050 ST = 0 :TK = TK + 1 : IF TK = 10 THEN TK = 11
1055 IF TK < LT THEN 1030
1060 GOSUB 310 : GOSUB 230 : GOSUB 490 :TK = T1
     :ST = 0
1065 IF TK = 10 THEN TK = 11
1070 GOSUB 430 : GOSUB 100 :ST = ST + 1 : IF ST <
     DOS THEN 1070
1080 ST = 0 :TK = TK + 1 : IF BF = 0 AND (TK < LT )
     AND (TK < > 10 ) THEN 1070
1085 IF TK = 10 THEN TK = 11 : GOTO 1070
1090 IF TK < LT THEN 1020
1100 HOME : PRINT : PRINT "DONE^ WITH^ COPY" :
     END
1110 DATA 187 ,170 ,150
1120 DATA 2CHANGES
1130 DATA 17 ,0 ,96 ,255 ,17 ,0 ,97 ,255
```

controller checksums

```
1000  - $356B      1070  - $2401
1010  - $3F61      1080  - $8F50
1020  - $1733      1085  - $8DEF
1030  - $0132      1090  - $26C7
1040  - $4BDD      1100  - $B54D
1050  - $B72F      1110  - $463D
1055  - $C98A      1120  - $748B
1060  - $23FA      1130  - $39EE
1065  - $2C04
```

Phil Pattengale's softkey for...



Robots of Dawn
Epyx, Inc.
1043 Kiel Ct.
Sunnyvale, CA 94089

Requirements:
Apple][
COPYA
A sector editor
A blank disk
Robots of Dawn disk

You, Lije Baley, Earth's Greatest Living Detective, are on the planet Aurora to investigate the murder of your friend, Dr. Han Fastolfe. You are the main character in Epyx's text adventure Robots of Dawn, based on Isaac Asimov's novel of the same name. You certainly don't want your alter ego to die with the disk it's on, so you need a backup copy.

COPYA is unable to read the original normally, so a natural response is to disable DOS' error checking by changing byte $B942 from $38 to a $18 (SEC to CLC). The copy doesn't appear to work, it just sits and spins.

Since we never see a prompt (]) when the original boots, it is doubtful that this program uses a modified DOS. Instead, it probably uses just the RWTS from DOS to just load the program into memory direct from the disk, without the use of any files. This tells me that I should boot code trace the disk since it is hanging during the boot process.

After modifying the boot0 code to read only the boot1 code and return to the monitor (see previous articles in Hardcore COMPUTIST on boot code tracing), doing the same to the next stage of loading, and examining that, we find that right after jumping from boot1 to boot2 at $B700 there is a JSR $BB00. Following $BB00 down, we see some disk access code (C08y,X ;where y is a number between 0-F. These indicate disk reads and writes) followed by CoMPare (CMP) instructions. This is often a sign of protection code. They read parts of the disk and compare them with set values to determine if the disk is an original or not. In this case it doesn't matter what they are doing. It simply looks very, very suspicious.

Using a disk search utility, we find the offending JSR $BB00 in track 0, sector 1, byte 1. Change the three bytes to NOPs (EA EA EA). When the disk is booted, it will not go into that subroutine, but will continue on instead, thinking that it is an original.<

Summary:

1) Boot your System Master
2) Enter the monitor

   CALL -151

3) Kill DOS's error checking

   B942:18

4) Return to BASIC and run COPYA

   3D0G
   RUN COPYA

5) Copy the disk
6) Boot your sector editor
7) Change track $00, sector $01, bytes $01-03 from $20 00 BB to $EA EA EA.
8) Write the sector back out.

That's it... You now have a completely COPYAable Robots of Dawn.

Electronic Arts software

Seven Cities of Gold
Archon II: Adept
Adventure Construction Set

by Steve and Rod Smith

Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403

Requirements:
64K Apple][and up
As many blank disk sides as you have original sides
A sector editor
Super IOB
A good copy program (with ability to do specific tracks or ignore errors)
A little ingenuity...

Seven Cities of Gold

OK, we'll just start at the top of the list and work our way through. First up is Seven Cities of Gold.

If you have been reading the other softkeys for Electronic Arts, you may have noticed a pattern developing in the protection schemes used. Well, these programs are no exception. Seven Cities is quite easily deprotected, as one does not have to convert the disk format into a DOS 3.3 compatible form. That's right, it's copyable right from the very start! Well, there is a slight catch; tracks $05 and $06 on the boot side are used for the protection scheme, but they are not needed for the program to work, so to start, copy side one of Seven Cities onto a blank, formatted disk, and ignore any errors on tracks $05-$06, or if your copy program allows, just skip these tracks entirely. Then, copy side two onto the back side of your blank disk or another disk if you prefer. Just be sure to correctly label which side is which.

Now, the protection scheme we have to eliminate resides completely on the boot side or side one. It consists of two calls to a subroutine which examines the disk to determine if it is a valid original or not. The first of these occurs during the boot process. A simple boot trace reveals where the subroutine and the call to it reside.

Assuming your controller card is in slot six, let's move the boot ROM to RAM and fix it so it returns to the monitor after loading track 0, sector 0.

```
CALL-151
9600<C600.C6FFM
96F8:4C 59 FF
9600G
```

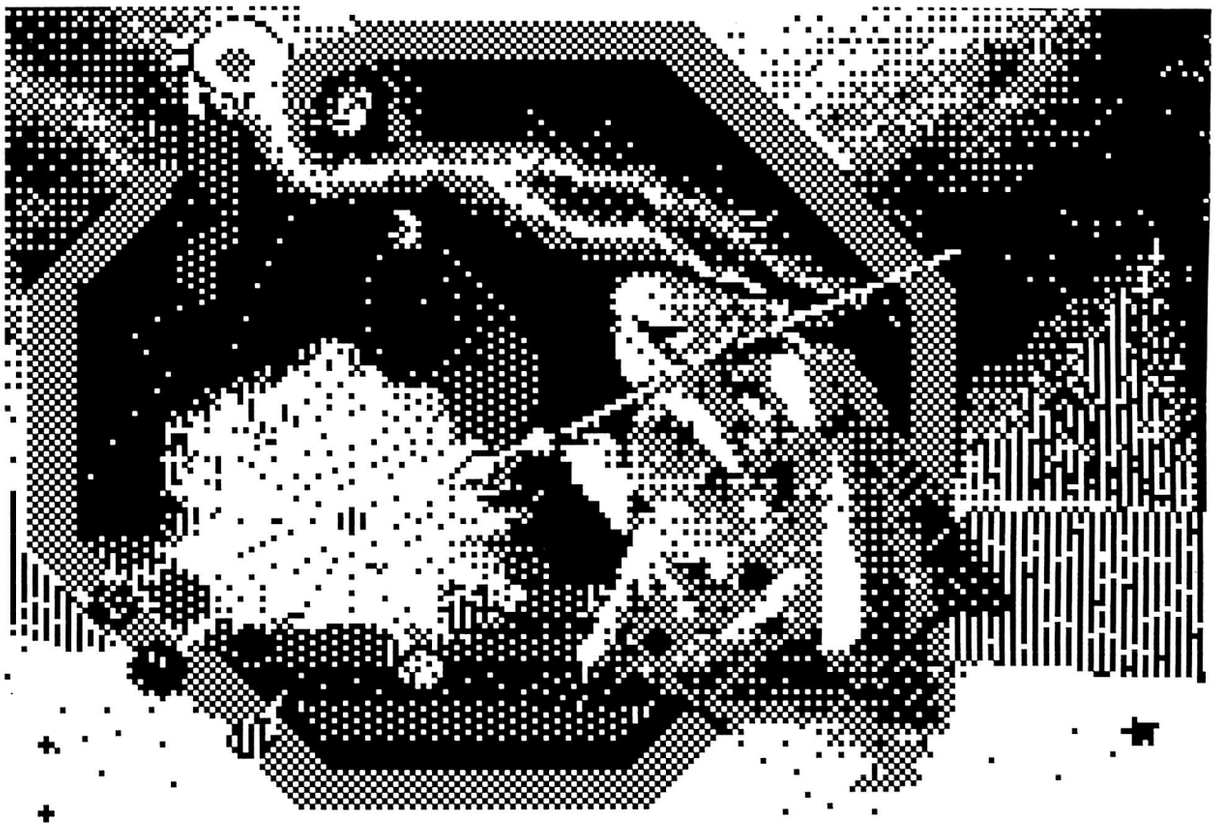
Now, turn the drive off. Fix the code we just loaded to jump into the monitor after it's done, and make the controller load track 0, sector 0 to $2800 instead of $800, then execute at $801 (which we just modified).

```
C0E8
83D:4C 59 FF
9659:28
96F8:4C 01 08
9600G
C0E8
```

That last one turned off the drive again. Now, the next stage of the boot is at $A806. The protection scheme lies at $A003, and the call to it is at $A147. It has been noted that placing an 18 60 code there would not work because Electronic Arts runs checksums on the code frequently. Well, you still may place an 18 60 there, but you must cover your tracks by balancing the checksum! This is done by placing an 18 60 40 at $A147. On the actual disk this is on track $01, sector $0E, byte $47-49. Use a sector editor to make the change. Now, continuing with the boot trace....

Electronic Arts always uses the same boot. After the initial loading and first call to the protection scheme, the code follows a tricky process of executing code through the aid of lookup tables. Well, there is an advantage to this. On all EA products the next stage of the boot is stored as an address at $A946 in lobyte hibyte form, except it is encoded, but it is not too difficult to decode. The lobyte ($A946) is EORed with a $03 and the hibyte ($A947) is EORed with a $D9. Seven Cities has at $A946 a 03 99, which decodes to 00 40. The next stage of the boot will jump to $4000. To stop this, we change it to a 5A 26, which will decode into a $FF59, and leave us in the monitor. Make the change, then turn on the drive with

```
C0E9
```



then continue the boot with

A8Ø6G

Be sure to take out the first call to the protection scheme!

Now, it should load in more code, make a funny drive sound as it makes its way past the protection scheme, toggle the lo-res graphics page, and then drop you into monitor. The code begins again at $4ØØØ and goes up to $4ØC9, where there is a jump to the next section at $652Ø. To stop this, we place at $4ØC9 the following code:

4ØC9:AD 81 CØ 4C 59 FF

that turns off the RAM card and drops us into the monitor. The reason for turning off the RAM card is because they have a modified ROM loaded that will not allow you to drop to the monitor properly. To continue the boot, type

4ØØØG

When in monitor again, we look at the code starting at $652Ø on up. If you follow it carefully, you will see that it goes up to $6875 where there is a JSR to $61ØØ, followed by a JMP to $6994. The JSR to $61ØØ is the call to the second protection subroutine. If we search the disk for 2Ø ØØ 61, we find it on side one, track $ØE, sector $Ø7, byte 75. To eliminate the call and satisfy the checksum, we change it to a 2C ØØ 55, which is a harmless BIT instruction. After writing the change back to disk, we have an unprotected Seven Cities of Gold!

Summary

1) Copy both sides of the program. Ignore errors on tracks $Ø5-$Ø6 on the boot side, or skip these tracks when copying.

2) Make these sector edits (all on the boot side):

Track	Sector	Start Byte	Change To
$Ø1	$ØE	$47	$18 6Ø 4Ø
$ØE	$Ø7	$75	$2C ØØ 55

Next Up:

Archon II

Now that we've had a taste of what deprotecting Electronic Arts is all about, we can easily continue with a couple more. Archon II is very similar to the protection used in Archon, except no bad things happen when the second call to the protection scheme is circumvented. This makes our project a little easier. To begin with, Archon II must be converted to a normal format. I refer you to Hardcore COMPUTIST No. 21 for the Super IOB controller details. Simply put, and reproduced here, the disk uses data markings of D5 BB CF (in the Archon article they were identified as DE BB CF. This is incorrect). If you use Super IOB then use this controller.

The controller is as follows:

Controller

```
1ØØØ REM ARCHON II CONTROLLER
1Ø1Ø TK = Ø :ST = Ø :LT = 35 :CD = WR
1Ø2Ø T1 = TK : GOSUB 49Ø : IF TK > 3 THEN RESTORE
     : GOSUB 21Ø
1Ø3Ø GOSUB 43Ø : GOSUB 1ØØ :ST = ST + 1 : IF ST <
     DOS THEN 1Ø3Ø
1Ø35 IF TK = 2 THEN GOSUB 21Ø
1Ø4Ø IF BF THEN 1Ø6Ø
1Ø5Ø ST = Ø :TK = TK + 1 + (TK = 4 ) * 2 : IF TK <
     LT THEN 1Ø3Ø
1Ø6Ø GOSUB 31Ø : GOSUB 23Ø : GOSUB 49Ø :TK = T1
     :ST = Ø
1Ø7Ø GOSUB 43Ø : GOSUB 1ØØ :ST = ST + 1 : IF ST <
     DOS THEN 1Ø7Ø
1Ø8Ø ST = Ø :TK = TK + 1 + (TK = 4 ) * 2 : IF BF =
     Ø AND TK < LT THEN 1Ø7Ø
1Ø9Ø IF TK < LT THEN 1Ø2Ø
11ØØ HOME : PRINT : PRINT "DONE" : END
5ØØØ DATA 213 ,187 ,2Ø7
5Ø1Ø DATA 9^ CHANGES
5Ø2Ø DATA 2 ,3 ,71 ,17Ø
5Ø3Ø DATA 2 ,3 ,81 ,173
5Ø4Ø DATA 1 ,15 ,Ø ,24
5Ø5Ø DATA 1 ,15 ,1 ,96
5Ø6Ø DATA 1 ,15 ,2 ,221
5Ø7Ø DATA 4 ,6 ,1Ø7 ,24
5Ø8Ø DATA 4 ,6 ,1Ø8 ,96
5Ø9Ø DATA 4 ,6 ,1Ø9 ,24Ø
51ØØ DATA 4 ,6 ,11Ø ,126
```

controller checksums

```
1000  - $356B     5000  - $41C1
1010  - $3266     5010  - $3E6F
1020  - $2E67     5020  - $8177
1030  - $3866     5030  - $2B67
1035  - $7B0B     5040  - $9E34
1040  - $2B80     5050  - $6F94
1050  - $7275     5060  - $D78B
1060  - $0803     5070  - $1690
1070  - $0006     5080  - $879D
1080  - $8D0D     5090  - $08A7
1090  - $4CD7     5100  - $4F2E
1100  - $DDA1
```

What this basically does is convert the disk over to a normal DOS 3.3 format and performs a sector edit on track $02, sector $03, byte $47 from BB to AA and byte $51 from CF to AD.

OK, now we are ready to take out the main protection. As far as the first routine, it hasn't moved anywhere. But for a change of pace, I will show another way to avoid it that sometimes works. This involves disabling the actual track check routine. Doing this does not always work, but if it does, it is easier. It does work for Archon II.

Almost all of Electronic Arts' protection schemes are initiated with a 4C 69 xx where xx is the page that it resides. The boot has its code located at $A000, so there we will find a 4C 69 A0. By putting an 18 60 there, we would skip the protection code, but not fool the checksum routine. If in monitor you add 4C+69 and then that result +A0, you will see what we need to have as a final number to balance. This is accomplished by placing at $A000 an 18 60 DD:

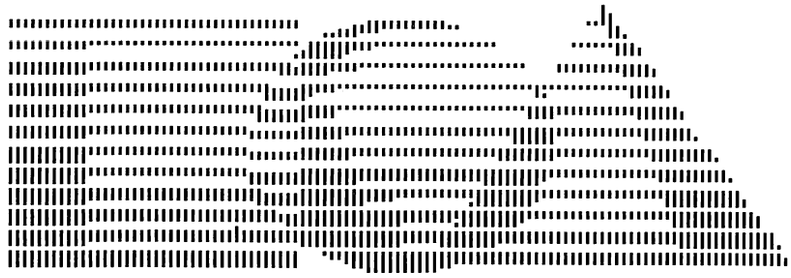
A000:18 60 DD

On the disk, this is track $01, sector $0F, byte $00-$02. Make this change with a sector editor. Now that we know what we are looking for as far as the protection code is concerned, we can scan the disk for any 4C 69's and see if they involve the protection scheme.

In summary, there is one more on track $04, sector $07 at bytes $00-$01. However, this time an 18 60 plus the balance will not work. We must go to the sure-fire method. So, we look at track $04, sector $06 (the code loads in reverse order). At byte $6B we see the beginning of the call to the protection scheme. To eliminate this, we need a two byte balance along with the 18 60 because the carry needs to be set after our addition. 18+60 = 78, but does not set the carry flag. So, we use 18 60 F0 7E. The sum of these four bytes is equal to the sum of 20 1D F9 B0, which was there previously. This is all that is needed to de-protect Archon II.

Summary

Convert the disk format using Super IOB or some other method. The Super IOB controller with this article includes the following sector edits. Otherwise, you will need to do this with a sector editor.



track	sector	byte	from	to
$01	$0F	$00	$4C	$18
$01	$0F	$01	$69	$60
$01	$0F	$02	$A0	$DD
$02	$03	$47	$BB	$AA
$02	$03	$51	$CF	$AD
$04	$06	$6B	$20	$18
$04	$06	$6C	$1D	$60
$04	$06	$6D	$F9	$F0
$04	$06	$6E	$B0	$7E

That's it!

Next up:

Adventure Construction Set

Boy, these are getting easy, aren't they? Well, with Adventure Construction Set, we don't even have to convert the format! It is in a copyable format to begin with, much like Seven Cities of Gold. In fact, it is the same format! So, copy sides 2, 3, and 4 with any normal copy program. For side 1, copy the disk and ignore errors on tracks $05 and $06, or skip them completely. We will disable the first call to the protection scheme in almost the same fashion as well. Just the balance bytes need to be modified. So on your copy of side one, edit track $01, sector $0E, byte $47-$4A to 18 60 80 70. OK, now to find some more protection code....

Unfortunately, they have modified the code slightly so that it looks different when executed in memory. The actual routines we want are encrypted on the disk. After a long round of detective work, I discovered that the other protection scheme code loaded in at $BD00. The call resides within a routine at $4054. This routine is encoded on the disk and then decoded after being loaded in. Every other byte is EORed with an increasing value. A very interesting scheme indeed! The routine is accessed via lookup table. The bytes 54 40 are stored at $4052, right before the actual routine. At the end of the routine, it jumps out to $D37. My idea was to change the lookup table from 54 40 to 37 0D, and bypass the entire mess. However, changing the two bytes would throw their checksum off considerably, so I took another approach. The 54 in the table is a 53 when loaded and the 40 is left unchanged. The jump to $D37 is at $4073, so I thought, why not just have the lobyte point to 73 instead of 54? OK, well the checksum must balance encoded and decoded, so I had to come up with two bytes that would do so. By changing $4052 from 53 to 74 will allow it to decode into 73 instead if 54. That's part of the solution. But I have added $21 to the checksum in the encoded form and $1F to it in decoded form. So I must change another byte to reverse that. It so happens that at $4056 is a 25 that gets decoded to a 2C, by changing it to a 04 completes the solution! All of this is found on track $07, sector $0F, byte $52 and $56. Make these modifications and you are done!

Summary

1) Copy all four sides using any decent copy program. On side one, ignore errors on tracks $05-$06, or just skip them.

2) With a sector editor, make the following modifications to your copy of side one:

track	sector	byte	to
$01	$0E	$47	$18
$01	$0E	$48	$60
$01	$0E	$49	$80
$01	$0E	$4A	$70
$07	$0F	$52	$74
$07	$0F	$56	$04

Now you now have a deprotected copy of Adventure Construction Set!

Grolier Software

How to deprotect The Isle of Mem (both sides), Wonderquest, Informaster and others written in Pascal.

by Jay O'Donnell

Requirements:
48K Apple][and up
A sector editor
COPYA
Blank disk(s)
Isle of Mem, Informaster, WonderQuest or other Grolier disks

The Knowledge Explorer Series by Grolier is designed to teach young children how to use the encyclopedia. This is done by the use of games or tutorials and a volume of the New Book Of Knowledge Encyclopedia.

The Isle of Mem and the Troll Forest of Mem (side two) are like a Trivial Pursuit game for kids. You must collect twenty Mem stones to build your house before the hurricane comes. You receive a Mem stone each time you answer a trivia question. The answer can be found in a volume of the encyclopedia.

WonderQuest is used to learn about different people, places, and things. This is done by narrowing down the subject, by going through different sub-topics, until you find what you are looking for. It then tells you where to find it in the encyclopedia.

Informaster is a database which includes a tutorial on how to use it. It allows you to do most database tasks but it's not another DB Master.

These disks are great for schools or for a family who got "taken in" by an encyclopedia salesman and want their kids to learn how to use them. Their graphics are nice and they are written to be very user-friendly.

There are two different types of Grolier disks. The above mentioned and some more, written in Pascal. Others are in Applesoft and machine language. If you wish, skip the explanation on how I did it and go to the section marked "The Softkeys" to deprotect your Grolier disk.

If the disk boots with a BASIC prompt (]), then your disk only has a modified DOS. Go to the section on BASIC disks to deprotect these, because they are easily dispatched with Super IOB.

If the disk boots like Wizardry, that is, if the screen fills full of inverse @'s on the boot then it is written in Pascal. These disks can normally copied with COPYA, but the copy will not work. This indicates that they have nibble counts.

In order for a nibble count to read the disk, it must first turn the drive on. This is done most commonly by a LDA $C08C,X but there are other ways. With this in mind and armed with my sector editor I searched for 8C C0. On The Isle of Mem, I found this on track 1F, sector E (see listing with this softkey).

It turns on the disk drive and reads a value off the disk. Then it compares the value read to the real value. If it is not the same number, it will crash. The routine does this several times to be sure that the disk is an original.

The Softkeys

Below is how to deprotect The Isle of Mem (both sides), WonderQuest, Informaster and others written in Pascal.

Isle of Mem side 1: Copy disk with COPYA and read track 1F sector E. Change byte 3B from a BD to a 60.

Side two: COPYA the disk and read track 1E sector 4. Change byte 49 from a BD to a 60.

WonderQuest: COPYA the disk and read track 22 sector 5. Change byte 9F from a BD to a 60.

Informaster: COPYA the disk and read track 1E sector 1. Change byte 07 from BD to a 60.

Graphmaster: COPYA the disk and read track 16 sector 2. Change byte C7 from a BD to a 60.

If the disk is written in Pascal and is not listed, follow these steps:

1) Use a sector editor with searching capabilities such as Tricky Dick and search for 8C C0. It may turn up on several tracks so write them down.

2) Disassemble the sector(s) by whatever means you have, and compare these to the accompanying listing to find the one that looks most like it.

3) Once you have found the nibble count, put a $60 (RTS) at the beginning of the first LDA C08C,X, that is, on the first $BD of the check. It should now work.

Basic Prompt Disks

If the disk boots with a basic prompt then use the standard swap controller with Super IOB. (Refer to other Swap softkeys for a way to capture the RWTS.) The disks I tested this on work fine with no changes. Make sure you use a fast DOS on your copy, or it will take eons to load.

Listing of Grolier's Copy Protection

```
93B-  LDA $C08C,X   ;Read disk and
93E-  BPL $93B      ;look for
940-  CMP #$A6      ;A6
942-  BNE $0931

944-  LDA $C08C,X   ;Read disk and
947-  BPL $0944     ;look for
949-  CMP #$BC      ;BC
94B-  BNE $0931

94D-  LDA $C08C,X   ;Read disk and
950-  BPL $094D     ;look for
952-  CMP #$95      ;95
954-  BNE $0931     ;
956-  JSR $01DE     ;If not then crash

959-  LDA $C08C,X   ;Read disk and
95C-  BPL $0959     ;look for
95E-  CMP #$95      ;95
960-  BNE $96F      ;
962-  JSR $01DE     ;If not then crash

965-  LDA $C08C,X   ;Read disk and
968-  BPL $0965     ;look for
96A-  CMP #$95      ;95
96C-  BNE $096F     ;

96E-  RTS           ;return
```

softkey for...

Xyphus

by Glenn Schmottlach

Xyphus
Penguin Software, Inc.
830 4th Ave.
P.O. Box 311
Geneva, IL 60134
$34.95

Requirements
48K Apple][and up
Super IOB v1.2
Two blank disks or one notched disk
One or two disk drives

Xyphus is a fantasy role-playing game written by Robert Waller and Dave Albert. It occupies both sides of a double-sided disk and is unfortunately copy protected. For a brief review of the game see Hardcore COMPUTIST No. 18 on page 19. You may skip to the instructions from here if you wish.

The Protection

If you listen and watch the Xyphus game boot, it appears to resemble a normal DOS 3.3 disk except for the fact that it boots a little bit faster. With that idea in mind I used Copy II+ V4.4D to view the raw track nibbles on the program disk. Another good program to use to view raw track nibbles is the Nibbler which was published in Hardcore COMPUTIST No. 19 on page 25.

After comparing the data, address, prologue, and epilogue marks on the protected disk to that of a normal DOS 3.3 disk, I noticed that both the end-of-address and end-of-data marks had been changed from DE AA EB to DA AA EB on all the tracks on both sides of the Xyphus game disk. These various types of marks are placed on the disk when it is initialized so that DOS can keep track of where a sector and other important information begins.

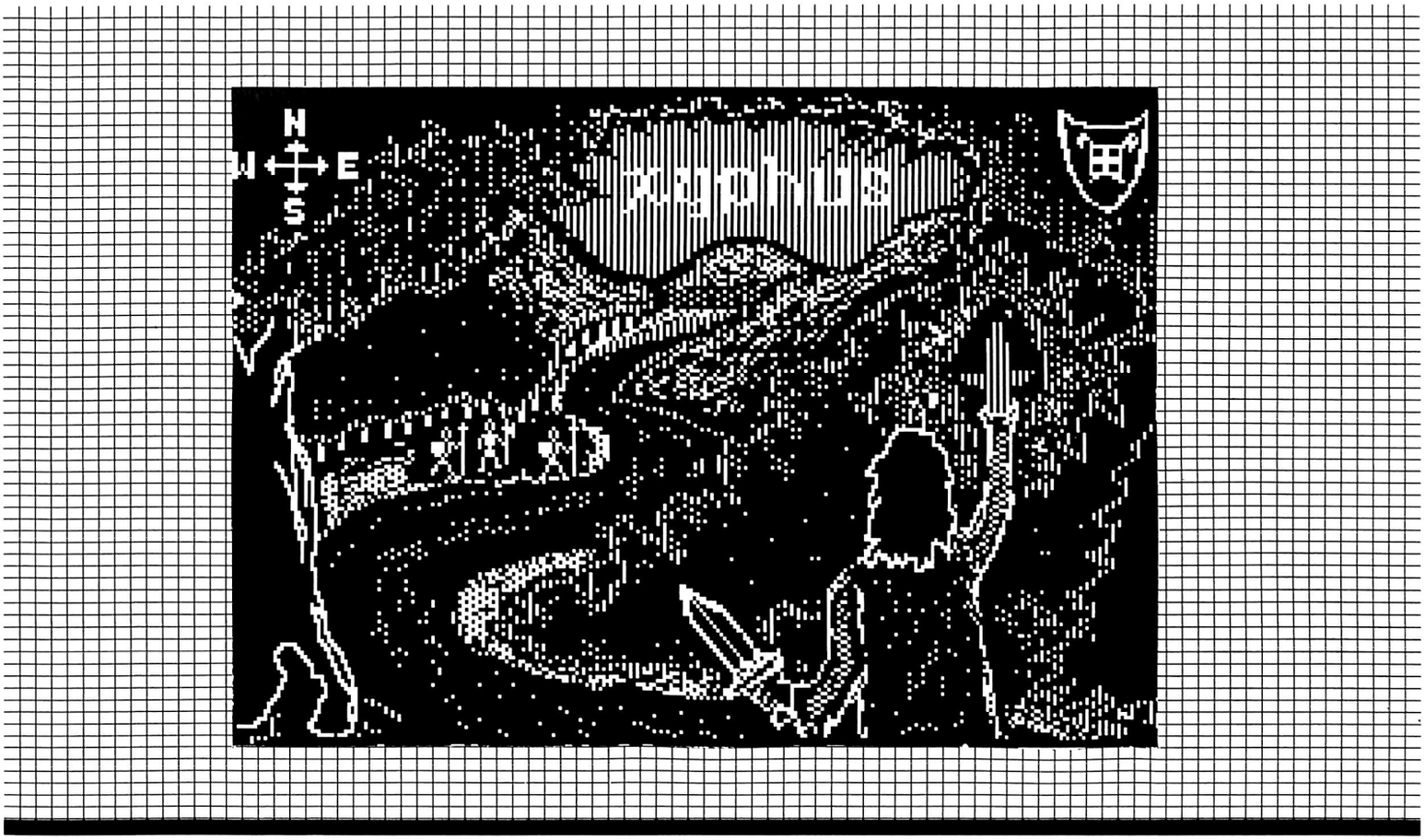
Along the same line I noticed something strange about about the start of address marks on the protected disk. These marks alternated between the standard DOS 3.3 values of D5 AA 96 on even numbered tracks and then changed to D4 AA 96 on odd numbered tracks. The second difference I found was that the program side of the Xyphus disk only used tracks $0-$11 and the scenario side used tracks $0-$20 with the rest of both sides of the disk being unformatted. Also the volume number of the scenario side of the Xyphus disk is 2 while the program side has a volume of 254. The program uses this fact to differentiate between the two sides.

By this time I thought I had figured out all the program's protection, so using Super IOB I wrote up a controller for the game. All worked smoothly and it booted up on the first try. When it came time to make a new player disk I ran into some problems. Whenever the program tried to copy the deprotected scenario disk to the player disk, the disk drive would make some recalibration noises and the program would stop. It occurred to me that the routine that was responsible for copying the scenario side to the player disk was trying to read the deprotected version using the old marks. Essentially the routine was trying to read the unprotected scenario side as if it was still in its original protection. The marks wouldn't match so the copying routine wouldn't know where the track data began.

Since the program side of the Xyphus disk was also deprotected I started looking for a likely file on it that would contain the copying routine. The file I came up with was a binary file called DRIVE. After disassembling the file and working it over with my assembler I came up with the changes that would correct the problem the program had with copying the deprotected scenario side.

What it all came down to was changing the values of a few bytes which represented marks altered from standard DOS 3.3 values. All I had to do was change them to the correct values so the copying routine could match the values correctly and therefore find valid data on the tracks.

This may sound confusing but try to grasp the basic concept. These changes in the DRIVE file have been incorporated into five sector edits in the controller program.



The Instructions

Follow these steps to deprotect the Xyphus game disk:

1) Boot up a normal DOS 3.3 disk.

2) Type "FP" and then insert a blank disk.

3) Initialize the blank disk.

INIT SHIMMER

4) Install the accompanying controller in Super IOB.

5) Run Super IOB. When it asks you if you want to initialize a disk press Return (for "NO").

6) Copy the Program side of Xyphus.

7) After the copy is completed retype the following lines of the controller as shown.

1010 TK=0:ST=0:LT=33:CD=W
1040 IF BF THEN 1080

8) Get your other blank disk out and run Super IOB again.

9) When you get to the prompt that asks if you want to initialize the duplicate disk type "Y" and give it a volume number of 2.

10) Copy the Scenario side of Xyphus onto that blank disk.

You now have a deprotected Xyphus game disk. Use it as you normally would. There is a miniscule bug on the deprotected version of the Xyphus game disk. After you have made a player disk and it tells you to insert the program disk and press a key, the program will exit to BASIC instead of booting the disk. This is because of the way the copying routine exits. What it does is make a jump to the reset vector at $3F2. Program control usually only jumps there when you press Reset. If the Xyphus program disk had been allowed to use its protected DOS when it was booted it would have set the vector to jump to a routine that would have rebooted the disk. On the other hand normal DOS 3.3 will return the user to BASIC.

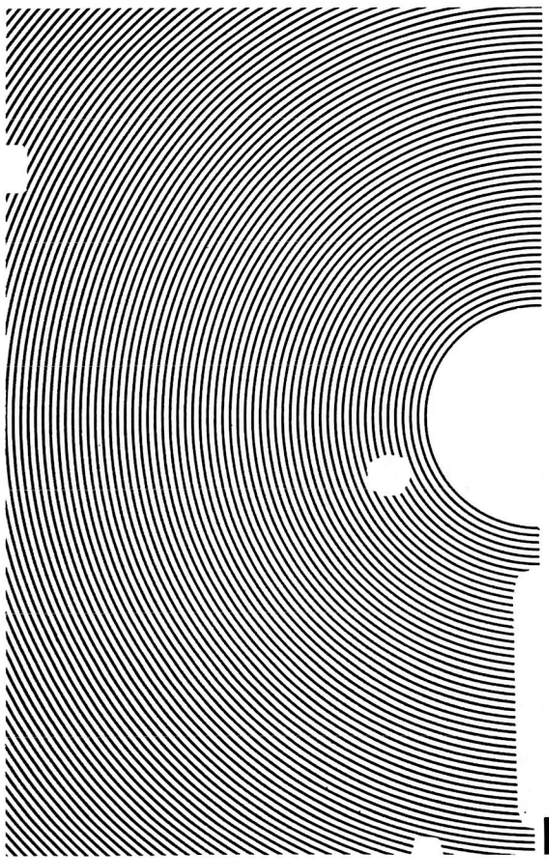
To get the game going again just reboot the program disk. For the adventurous souls out there who would like to make your characters into gods, you can find the information that holds your characters attributes on track $01 and sectors $0C-$0E of the player disk. With a little studying you should be able to decipher what numbers correspond with certain attributes. I hope you enjoy the game!

controller

```
1000 REM  XYPHUS CONTROLLER
1010 TK = 3 :ST = 0 :LT = 18 :CD = W : POKE 47445
     ,212
1020 T1 = TK : POKE 47505 ,218 : POKE 47413 ,218
     : GOSUB 490
1030 GOSUB 430 : GOSUB 100 :ST = ST + 1 : IF ST <
     DOS THEN 1030
1040 RESTORE : GOSUB 310 : IF BF THEN 1080
1050 ST = 0 :TK = TK + 1 : IF TK = LT THEN 1080
1060 IF TK / 2 = INT (TK / 2 ) THEN POKE 47445 ,213
     : GOTO 1030
1070 POKE 47445 ,212 : GOTO 1030
1080 GOSUB 230 :TK = T1 :ST = 0 : GOSUB 490
1090 GOSUB 430 : GOSUB 100 :ST = ST + 1 : IF ST <
     DOS THEN 1090
1100 ST = 0 :TK = TK + 1 : IF BF = 0 AND TK < LT THEN
     1090
1110 IF TK = LT THEN 1140
1120 IF TK / 2 = INT (TK / 2 ) THEN POKE 47445 ,213
     : GOTO 1020
1130 POKE 47445 ,212 : GOTO 1020
1140 HOME : PRINT "COMPLETED^ COPYING" : GOSUB
     230 : END
5000 DATA 5^ CHANGES
5010 DATA 7 ,9 ,143 ,222
5020 DATA 7 ,9 ,249 ,222
5030 DATA 7 ,8 ,85 ,222
5040 DATA 7 ,8 ,192 ,222
5050 DATA 7 ,8 ,252 ,0
```

controller checksums

```
1000  - $356B      1110  - $1B8B
1010  - $57EC      1120  - $E1B4
1020  - $1461      1130  - $E58D
1030  - $0260      1140  - $09A6
1040  - $9434      5000  - $9B2A
1050  - $4F61      5010  - $E586
1060  - $955F      5020  - $BF5A
1070  - $3FCB      5030  - $1325
1080  - $47FB      5040  - $E2D6
1090  - $62F0      5050  - $A0D0
1100  - $42B6
```



Direct Sector

by Bryan Farlow and Robert Knowles

Requirements:
At least 48K
DOS 3.3
A scratch disk to practice on

Have you ever wanted to get a sector from a disk without having to start up a sector editor, make your own IOB (Input/Output Block) routine, or even having to learn how to access sectors on your own? Well, here's the answer to your problems.

Type in the hexdump at the end of this article. BSAVE it as SREAD/SWRITE with

BSAVE SREAD/SWRITE,A$300,L$3A4

Most any time you need it, you can simply BRUN it. The commands will be ready to use. It takes up some memory in the $300 page, but after BRUNing it, you will still have memory from $300 to $35C free to use.

This little addition to DOS creates two new commands for DOS called **SREAD** and **SWRITE**, at the expense of the little-used commands CHAIN and APPEND. The routine is relatively small and convenient, and the commands are pretty handy (in my opinion).

The new command SREAD will fetch a sector from the disk and put it at the address you specify. SWRITE is exactly the same, except that it will store 256 bytes starting at the address you give, and put them in the sector you indicate.

Practice on a scratch disk before you do anything with your new commands.

The syntax for SREAD and SWRITE is:

SREAD Ttt,Sss,Aaaaa

where you replace **tt** with the track number, **ss** with the sector, and (of course), **aaaa** with the address to load the sector to or save the sector from. You may use decimal or hex numbers like you do with BLOAD and BSAVE (preceding hex numbers with "$").

In order to have a "T" (Track) keyword, "V" (volume) was renamed. V was chosen because it is not used much in a system with just floppy drives (more on that later). Notice that you use the "S" for both Sector and Slot. SREAD/SWRITE will operate only in slot 6, and the other commands will still think that "S" means Slot. The range of allowable values for "S" has been extended from the original 1-7 to 0-15 so you can use it for Sectors.

How It Works

The program, when first executed, stores the names of SREAD and SWRITE in place of CHAIN and APPEND, respectively. Then "V" is renamed to "T" and the range for "S" is extended by putting new values in the

Access From DOS

keyword range table. The syntax for SREAD/SWRITE is changed from what CHAIN and APPEND had, to allow the keywords "T" (formerly "V"), "S", and "A". The last step to installing the commands is to modify the actual CHAIN and APPEND routines to jump to the new commands instead. A JuMP to SREAD ($365) is put at the beginning of CHAIN, and JuMP to SWRITE ($35D) is put in APPEND.

When all this is done, the commands are officialy installed. The installing part of the program is now disposable and can be erased, overwritten, or ignored. The next part is the actual command handler. If DOS finds the word SREAD or SWRITE while sorting a command line, control will be passed to SREAD or SWRITE after checking syntax and storing keyword values.

Private IOB

SREAD/SWRITE keeps its own private IOB (Input/Output control Block) to perform its operations. When it is entered at SWRITE, the command code for Write (2) is stored in the IOB, and the program skips to the main part. SREAD is the same, except that the command code for Read (1) is stored.

The command now finds the number we specified for "T" (DOS thinks it's Volume) and puts it in the IOB as the track number. It will do the same for "S" (Sector) and "A" (Address), put the address of the IOB in the A and Y registers, calls RWTS (Read/Write a Track and Sector), which loads in the desired sector, and returns to DOS.

Source Code for Sread/Swrite

```
*--------------------------------------------------------------------*
*                  DOS 3.3 SREAD AND SWRITE PATCH                    *
*                          BY BRYAN FARLOW                           *
*--------------------------------------------------------------------*
      *
03D9- RWTS      .EQ $3D9      RWTS ENTRY POINT
AA66- VAL.VOL   .EQ $AA66     VOLUME SPECIFIED WITH "V"
AA6A- VAL.SLOT  .EQ $AA6A     SLOT SPECIFIED WITH "S"
AA72- VAL.ADRL  .EQ $AA72     ADDRESS SPECIFIED WITH "A"
AA73- VAL.ADRH  .EQ VAL.ADRL+1 HIGH BYTE OF ADDRESS
A893- N.CHAIN   .EQ $A893     LOC OF "CHAIN" NAME IN DOS
A8C6- N.APPEND  .EQ $A8C6     LOC OF "APPEND"
A941- LTTR.V    .EQ $A941     LOC OF "V"
A95D- RANGE.S   .EQ $A95D     VALID RANGE TABLE FOR "S"
A911- K.CHAIN   .EQ $A911     VALID KEYWORDS FOR CHAIN
A925- K.APPEND  .EQ $A925     KEYWORDS FOR APPEND
A4F0- CHAIN     .EQ $A4F0     ADDR OF CHAIN HANDLER
A298- APPEND    .EQ $A298     ADDR OF APPEND HANDLER
*--------------------------------------------------------------------*
*              ENTER HERE TO INSTALL SREAD & SWRITE                  *
*--------------------------------------------------------------------*
              .OR $300
*                                .TF OBJ.SREAD/SWRITE                *
0300: A0 04     PATCHIN  LDY #4       CHANGE NAME OF CHAIN
0302: B9 48 03  .1       LDA D.SREAD,Y - TO "SREAD"
0305: 99 93 A8           STA N.CHAIN,Y
0308: 88                 DEY
0309: 10 F7              BPL .1
030B: A0 05              LDY #5       CHANGE "APPEND"
030D: B9 4D 03  .2       LDA D.SWRITE,Y - TO "SWRITE"
0310: 99 C6 A8           STA N.APPEND,Y
0313: 88                 DEY
0314: A0 D4              LDA #$D4     STORE A "T" (TRACK)
0316: B9 4A 03           LDA D.T,Y    - IN PLACE OF "V" (VOLUME)
0318: 8D 41 A9           STA LTTR.V
031B: A0 03              LDY #3       CHANGE RANGE OF "S"
031D: B9 53 03  .3       LDA DATA.S,Y - FROM 1-7 TO 0-15
0320: 99 5D A9           STA RANGE.S,Y
0323: 88                 DEY
0324: 10 F7              BPL .3
```

Warning!

It can be BRUN to install it at most any time. However, for safety's sake it would be wise to use it with only a normal DOS, and not one of the speedy ones available on the market, because it uses locations specific to DOS 3.3.

You should specify Track, Sector, and Address every time you use the commands, or the results may be quite unpredictable. As presented, It will work properly only on 48K DOS 3.3, floppy disk only. Hard disk systems running modified DOS use Volume for their own purposes, and may mistake Track for volume, with dangerous results.

Caution!

Watch out for the Slot/Sector parameter. DOS will allow attempts to use non-existent slots, and the system will hang if you try. You will not be able to access any slot other than 6 with SREAD/SWRITE.

Do not INIT after installing SREAD/SWRITE. The DOS stored on the disk will contain all the changes, but will not contain the actual SREAD/SWRITE routine.

Don't be afraid

Don't let the limitations scare you. Most of the time, you will never need them, but if you need a quick substitute for a sector editor, you can use these new commands almost immediately.

Advanced programmers should be able to easily modify this to live anywhere in memory they need it, including inside DOS.

hexdump

```
0300: A0 04 B9 48 03 99 93 A8   $193C
0308: 88 10 F7 A0 05 B9 4D 03   $3C10
0310: 99 C6 A8 88 10 F7 A9 D4   $CBF8
0318: 8D 41 A9 A0 03 B9 53 03   $2EF7
0320: 99 5D A9 88 10 F7 A9 40   $9E0F
0328: 8D 11 A9 8D 25 A9 A9 71   $C6CD
0330: 8D 12 A9 8D 26 A9 A0 02   $B7E1
0338: B9 57 03 99 F0 A4 B9 5A   $C8D4
0340: 03 99 98 A2 88 10 F1 60   $683F
0348: 53 52 45 41 C4 53 57 52   $347F

0350: 49 54 C5 00 00 0F 00 4C   $81BA
0358: 65 03 4C 5D 03 A9 02 8D   $6D85
0360: 9B 03 4C 6A 03 A9 01 8D   $CAC6
0368: 9B 03 AD 66 AA 8D 93 03   $FC54
0370: AD 6A AA 8D 94 03 AD 72   $279F
0378: AA 8D 97 03 AD 73 AA 8D   $0A53
0380: 98 03 A9 03 A0 8F 20 D9   $5265
0388: 03 A9 06 8D 6A AA 60 01   $B00B
0390: 60 01 00 00 00 A0 03 00   $D64A
0398: 00 00 00 00 00 00 60 01   $C70A

03A0: 00 01 EF D8               $8F9B
```

```
0326: A9 40           LDA #$40     CHANGE SYNTAX OF SREAD/SWRITE
0328: 8D 11 A9        STA K.CHAIN  - FROM S,D,V,TO T,S,A
032B: 8D 25 A9        STA K.APPEND - BY STORING $40 71 IN
032E: A9 71           LDA #$71     - EACH ENTRY IN ALLOWED
0330: 8D 12 A9        STA K.CHAIN+1 - KEYWORDS TABLE
0333: 8D 26 A9        STA K.APPEND+1
0336: A0 02           LDY #2
0338: B9 57 03  .4    LDA RDJMP,Y
033B: 99 F0 A4        STA CHAIN,Y  COPY JMP READ & JMP WRITE
033E: B9 5A 03        LDA WRJMP,Y  -INSTRUCTIONS FROM DATA
0341: 99 98 A2        STA APPEND,Y - TO REPLACE BEGINNING
0344: 88              DEY          - OF ORIGINAL CHAIN & APPEND
0345: 10 F1           BPL .4
0347: 60        EXITPTCH RTS       DOS PATCHED. RETURN TO CALLER.
* ------------------------------------------------------------------------ *
*                            DATA USED IN PATCH                            *
* ------------------------------------------------------------------------ *
0348: 53 52 45
034B: 41 C4     D.SREAD  .AT "SREAD"
034D: 53 57 52
0350: 49 54 C5  D.SWRITE .AT "SWRITE"
0353: 00 00 0F
0356: 00        DATA.S   .HS 00000F00 NEW RANGE FOR "S"
0357: 4C 65 03  RDJMP    .DA #$4C,SREAD JMP INSTRUCTION TO SREAD
035A: 4C 5D 03  WRJMP    .DA #$4C,SWRITE JMP TO SWRITE
* ------------------------------------------------------------------------ *
*                         NEW SECTOR ACCESS ROUTINES                       *
* ------------------------------------------------------------------------ *
035D: A9 02     SWRITE   LDA #2       COMMAND= WRITE
035F: 8D 9B 03           STA CMD      STORE IT IN IOB
0362: 4C 6A 03           JMP MOVSECT  PERFORM COMMAND
0365: A9 01     SREAD    LDA #1       COMMAND= READ
0367: 8D 9B 03           STA CMD
036A: AD 66 AA  MOVSECT  LDA VAL.VOL  TRACK STORED IN VOLUME
036D: 8D 93 03           STA TRK
0370: AD 6A AA           LDA VAL.SLOT SECTOR # STORED IN SLOT
0373: 8D 94 03           STA SCT
0376: AD 72 AA           LDA VAL.ADRL ADDRESS IS FOUND NORMALLY
0379: 8D 97 03           STA BUFLO
037C: AD 73 AA           LDA VAL.ADRH
037F: 8D 98 03           STA BUF
0382: A9 03              LDA /TABLETYP SET UP TO USE RWTS
0384: A0 8F              LDY #TABLETYP
0386: 20 D9 03           JSR RWTS     READ SECTOR AS SPECIFIED
0389: A9 06              LDA #6
038B: 8D 6A AA           STA VAL.SLOT RESTORE SLOT TO 6
038E: 60                 RTS          RETURN TO DOS
* ------------------------------------------------------------------------ *
*                      PRIVATE IOB FOR SREAD AND SWRITE                    *
* ------------------------------------------------------------------------ *
038F: 01        TABLETYP .HS 01       INDICATES IOB TABLE
0390: 60        SLT      .HS 60       SLOT TO ACCESS
0391: 01        DRV      .HS 01       DRIVE # (0 OR 1)
0392: 00        VOL      .HS 00       VOLUME (0=255)
0393: 00        TRK      .HS 00       TRACK
0394: 00        SCT      .HS 00       SECTOR
0395: A0 03     DCTPTR   .DA DCT      POINTER TO DCT
0397: 00        BUFLO    .HS 00       LOW BYTE OF BUFFER ADDR
0398: 00        BUF      .HS 00       HIGH BYTE OF BUFFER ADDR
0399: 00        NOTHING  .HS 00       UNUSED
039A: 00        BYTCOUNT .HS 00       # OF BYTES TO LOAD IN (0=256)
039B: 00        CMD      .HS 00       RWTS COMMAND
039C: 00        ERRCODE  .HS 00       ERROR FOUND
039D: 00        OVL      .HS 00       LAST VOLUME NUMBER
039E: 60        OLDSLT   .HS 60       LAST SLOT
039F: 01        OLDDRV   .HS 01       LAST DRIVE
03A0: 00 01 EF
03A3: D8        DCT      .HS 0001EFD8 DEV CHARACTERISTICS
```

.....end of

softkey for...

F-15 Strike Eagle

By Larry Jasonowicz

F-15 Strike Eagle
MicroProse Software
120 Lakefront Dr.
Hunt Valley, MD 21030
(301) 667-1151
$34.95

Requirements
Apple][Plus with 64K, //e or //c
F-15 Strike Eagle
Super IOB v1.5
One blank disk

F-15 Strike Eagle is a cross between an arcade game and a flight simulator. It has three levels of difficulty. Your objective as the manual puts it is "to complete each mission by destroying the primary targets and returning successfully to base". You must be able to continually fly the jet plus shoot and evade the enemy. It's easier said than done. If you are not interested in the copy protection technique and only want to back up F-15, then skip to the section on typing in the controller.

Overview From The Cockpit

F-15 uses a protection scheme which consists of formatting track $06 to look like track $05. There is absolutely no information on track $06 but it's address information looks like track $05. The disk is COPYAable except for track $06.

When the disk boots it eventually goes to tracks $04,$05,$05.5 and $06 and looks for all of them (except track $04) to be track $05. The drive jumps back and forth between these tracks a total of 6 times to perform this check. The program does this check once more later on during the program load. The first check is executed from code that is loaded in at $213-$292 (located on disk at track $20, sector $00).

The people at MicroProse decided to try and hide the RWTS in the RAM card. I discovered this after noticing many JSR's to $F800-$FFFF that looked so similar to the normal RWTS AT $B800-$BFFF. The IOB table used by this RWTS is at $BFD5-$BFE5. Here is the protection code with comments:

```
213- STA $C083
216- STA $C083    ENABLE RAM CARD
219- LDA #$04
21B- STA $BFD9    SET UP FOR TRACK 4
21E- LDA #$D0     EOR $D0 WITH $EA
220- EOR $0200    AND STORE RESULT
223- STA $0200    AT $200
226- LDX #$00
228- STX $BFE1    DRIVE TO SEEK
22B- STX $BFD8    MATCH ANY VOLUME
22E- LDY #$06
230- LDA #$DB
232- STA $0201    STORE #$DB AT $201
235- STY $02AE    STORE #$06 AT $2AE
238- JSR $03E3    LOADS A&Y REG. WITH
                  IOB TABLE ADDRESS
23B- STA $C081    ROM ENABLE
23F- JSR $03D9    USE RWTS IN RAM TO
                  SEEK TRACK 4
241- STA $C083
244- STA $C083    ENABLE RAM CARD
247- LDX $F7F7    SLOT #
24A- STA $C089,X TURN DRIVE ON
24D- LDA #$04
24F- ASL          STORE CURRENT TRACK,
250- TAY          $04 ($08/2 PHASES)
251- STY $0478    AT $478
254- INY          INCREMENT 1/2 TRACK
255- INY          INCREMENT 1/2 TRACK
256- TYA
257- PHA          STORE LAST TRACK
258- JSR $F9A0    SEEK $5,5.5 OR 6
25B- JSR $F944    RWTS READ ADDRESS
25E- BCS $026B    BRANCH IF READ ERROR
260- JSR $F8DC    RWTS READ SECTOR
263- BCS $026B    BRANCH IF READ ERROR
265- LDA #$05
267- CMP $2E      SEE IF ON TRACK $05
269- BEQ $0270    IF READ OK, OTHERWISE
26B- LDA #$C0     LOAD BAD VALUE INT0
26D- STA $0201    $201
270- PLA
271- TAY
272- CPY #$0C     BRANCH BACK TO $255
274- BNE $0255    TWO TIMES
276- DEC $02AE    USED AS COUNTER
279- LDA #$04
27B- ASL          SET UP FOR TRACK 4
27C- JSR $F9A0    SEEK TRACK 4
27F- LDY $02AE    BRANCH BACK TO
282- BNE $0235    $235 5 TIMES
284- STY $48      IOB POINTER
286- STA $C088,X STOP DRIVE
289- STA $C081    ROM ENABLE
28C- LDY #$02     ?
28E- LDA #$94     ?
290- JMP ($0200) $200 MUST HOLD $DB3A
```

The heart of the copy protection lies at $265-$26F. This checks to see if your drive is on track $06 (made to look like track $05). If there is an error, it loads $C0 into $201 instead of $DB, like it's supposed to be. If this happens, when you get to $290 you will jump incorrectly to $C03A. If everything is ok, then the jump will be to $DB3A. $201 will also get incorrectly loaded if there is a read error at $25B or $260.

Later on during the program load, (after the menu selection) another access is made to tracks $$05,$5.5 and $06. The code for this is at $B700-$B764 (track $1F, sector $06). The code is so very, very similar to the previous code that it would be redundant to go over it.

Now it is just an easy matter to bypass this protection. Just replace the STA $201 ($26D/E/F) with three EA's (track $20, sector $00, bytes $71-73). Now, even if the program senses any errors, it will not change $201. The bytes to change for the second check are at $B748/9/A. Change these three bytes from 8D 0D 6A to three EA's (track 1F, sector $06, bytes $DE-E0).

Making the Controller

There are only two changes that are made to the fast Super IOB controller. One is to skip track $06. The other is to perform the sector edits. Type in the following controller and run it on F-15 STRIKE EAGLE.

controller

```
1000 REM FAST CONTROLLER
1010 TK=0:LT=6:ST=15:LS=15:CD=WR:FAST
     =1
1020 GOSUB 490:GOSUB 610:LT=35:RESTORE:T1
     =TK:TK=PEEK(TRK)-1:GOSUB 310:TK=T1
1030 GOSUB 490:GOSUB 610:IF PEEK(TRK)=LT
     THEN 1050
1040 TK=PEEK(TRK):ST=PEEK(SCT):GOTO 1020
1050 HOME:PRINT "COPYDONE":END
5000 DATA 6CHANGES
5010 DATA 31,6,222,234,31,6,223,234,31,6
     ,224,234
5020 DATA 32,0,113,234,32,0,114,234,32,0
     ,115,234
```

controller checksums

```
1000 - $356B      1050 - $B56A
1010 - $F776      5000 - $2009
1020 - $E3D6      5010 - $6B7F
1030 - $94A1      5020 - $3AD1
1040 - $6CB6
```

Keep a firm hand on the stick and keep a close lookout for the missiles!

Injured

By Clay Harrell

Imagic

Requirements:
Apple][,][Plus, //e, //c
At least one disk drive
COPYA from the DOS 3.3 System Master disk
A sector editor
2 blank disks
Injured Engine

What a concept! I can remember when I was young, building a clear plastic model of an internal combustion engine. It gave you a cut away view of a car engine, and with some batteries, you got an operational demonstration. But the thing kept breaking and falling apart, and the batteries wore out... what a mess. Not to mention you had to put the thing together!

Finally, the same concept is available on the Apple. Injured Engine is an excellent graphics program, complete with icons, pull down screens, and double hi-res (if you have 128k). You don't have to put any plastic parts together or buy any batteries either.

The program is not only a simulation but also a game. You can also be presented with 5 engine problems that you have to correct using a minimum amount of time and money. In addition, there are complete descriptions of each part of the engine, if you don't understand a particular part or function.

Overall, this program receives a 9 out of 10 on my scale. The only thing I was unimpressed with, was the 48/64K Apple][version.

Because of the "interrogation routine" that decides if you have 128k, the program runs better on a //e or //c with 128k. If you are running on a][Plus and go back to the options screen and choose another game, Injured Engine reboots! This did not occur when running on a 128k //e or //c. Unfortunately, I was unable to fix this bug, but while trying, I managed to circumvent the protection, and end up with an unprotected version (but still with the same bug!). Oh well...

Injured Engine used only the RWTS portion of DOS to load the program. This is evident from the lack of an Applesoft prompt upon booting the disk. To confirm this, I reseted into the monitor during the load and examined $B700-BFFF. There was a pretty standard RWTS there. As it turns out, most of the disk is unprotected. Only track 6 was unreadable by normal DOS, and we'll find out why in a minute.

My first action was to trace the boot. Pretty much a standard boot. After the disk controller card loaded track 0, sector 0 into $800-8FF, this routine loaded in RWTS and jumped to $B700. A few instructions from $B700 there was a JSR $BEAF (jump subroutine at $BEAF).

Following this routine led me to a JSR $B500 (jump subroutine at $B500). Now this routine was suspicious. It checked for normal DOS address and data markers. Remember that these markers tell DOS what track and sector it is trying to read (address markers), and where the data actually starts on the disk for that sector (data markers). A pretty standard protection is to change these markers from a normal DOS format, so copy programs can not accurately tell where the data actually is on a track.

OK, but why was there this routine that checked for **normal** DOS address and data markers? Shouldn't it be checking for some perverted format on that unreadable track 6? After all, RWTS has its own routines to check for normal data and address markers. Why not use those?

Well, they are checking for normal DOS address and data markers on track 5 and track 5.5. But why are they doing that, and why does that make track 6 unreadable?

To understand this we must understand the 35 track, standard Apple disk drive. A pretty common trick is to use half tracks in protection schemes. But you can not get 70 tracks by using track 1, 1.5, 2, 2.5, etc. The reason is that the drive head on the Apple can not write with that much precision. If you try to write to track 2 and then track 2.5, you get "track bleeding", and get very unpredictable results.

Engine

So if you use half tracks you still end up with 35 tracks, but on whole track increments (1.5, 2.5, 3.5, etc.). If you want to skip back to whole tracks, you have to skip a track, like using track 6.5 and then track 8.0. This is because track 7 or 7.5 is too close to tracks 6.5 or 8, respectively.

But if adjacent half tracks were written reliably (with very accurate drive equipment) you could READ them back reliable with a standard Apple drive. So if you had the drive equipment, you could produce a disk that used adjacent half tracks (i.e. 6.5, 7, 7.5, 8, etc.).

Uncopyable Copy Protection

This is what Imagic has done. They used some very accurate drive equipment to reliably write tracks 5 and 5.5 (but not track 6, hence wiping it out). Then their protection scheme just reads these tracks back, checking that they are readable and in the correct (normal DOS) format.

This is what the routine at $B500 does. It reads tracks 5 and 5.5, and if they are not BOTH readable, it reboots. If they are readable, it continues along and loads the title page.

This is an uncopyable protection scheme! Regardless of the copy program you use, you can not make a copy of the original Injured Engine disk since your standard Apple drives will not write tracks 5 and 5.5 reliably.

But fortunately, we can defeat the routine that ultimately decides if both tracks 5 and 5.5 were read correctly. All we have to do is to NOP three bytes at $B5B3 (NOP represents No OPeration to the 6502). This defeats the whole protection scheme. By the way, there is no valid data on tracks 5, 5.5, or track 6. The routine at $B500 only checks to see if tracks 5 and 5.5 are readable in normal DOS format.

Now we must find this code on the disk, and use our sector editor to change it. I used the disk search utility in the Inspector to find the code. It is on track 0, sector 5, bytes $B3 to $B5.

The only thing left to think about is how to copy the whole disk except track 6. Many disk utilities will do this for you (like Locksmith 5.0 Fastcopy), but I will explain how to do it with COPYA, since everyone has COPYA.

Cookbook Instructions

Here are the Cookbook steps to unprotecting Injured Engine:

1) Boot your normal DOS 3.3 System Master.

2) Run COPYA by typing:

RUN COPYA

3) After COPYA is loaded and asking for slot and drive specifications, press:

4) You should now be in BASIC. We have to defeat the UNABLE TO READ error. Type the following:

CALL-151
3A1:18
3D0G

5) Now delete line 70 of COPYA and run the program by typing:

70
RUN

6) Copy the original Injured Engine disk to a blank disk. Note that your drive will spit and shudder on track 6. Just ignore this and let the copy finish.

7) Reboot your DOS 3.3 System Master and type:

RUN COPYA

8) Now copy side 2 of Injured Engine to a blank disk. Side 2 is unprotected.

9) After the copy is done, run your sector editor and edit your COPYAed Injured Engine. Change side 1, track 0, sector 5, bytes $B3-B5 from E8 F0 3C to EA EA EA.

10) Don't forget to write the sector back out to your COPYAable Injured Engine.

And you're all done!

Essential Data Duplicator (EDD) Parameter List #3-7-1

Utilico Microware
3377 Solano Ave., Suite 352
Napa, CA 94558
(707) 257-2420

Continuing the Hardcore COMPUTIST tradition of providing up-to-date parameter information, Utilico Microware has been kind enough to share the following information with us.

Utilico Microware compiles this list from information gathered from EDD owners all around the world. So, if you can back up copy-protected software packages not on this list, or if you have a different way of backing one up, send the information to them (near the beggining of this article) so they can add'em to the next list (be sure to include the company name).

The updated Essential Data Duplicator program information lists are published approximately every 2 to 3 months and are available only to registered EDD owners. If you would like to receive the next list, send in a self addressed stamped business (#10) size envelope with your *Registered EDD Serial number*, along with one dollar and make sure you include the number of your most current list (so they don't send you one that you already have). They will either send you the current list, or keep your envelope on file for the next list when it's published.

Or, if you prefer faster (and more expensive) service and are connected to The Source (via modem),you can now download the current EDD parameter list, contained in the Source file; "PUBLIC 176 DIRECT". This service is provide by Michigan Office Supply.

Finding Instructions for Copying Disks

NOTE: *If you are backing up Apple III software, remember to always use one of the synchronize track processing modes; mode#2, #5, or #6. If you are using a //e or //c, the CAPS LOCK key must be in the DOWN position for EDD to run properly.*

This parameter listing is different from most which contain the program name, the publishers name, and all known instructions for making back up copies of that program. If it were like that, there probably wouldn't be enough space in this issue for the whole listing. Instead, this list is divided into two sections; Programs Listed By Name and Protections Used By Companies.

The "**Programs Listed By Name**" section is an alphabetical order listing of protected programs by program name. To the right of each name is an acronym which refers you to the software company and a letter which indicates which protection scheme the company used for that disk. With this reference, you would look up the software company in the "**Protections Used By Company**" section of the list to actually find information for copying that disk.

Since many software companies will use the same protection on all or most of their disks, if the name of the disk you are trying to copy is not located in the "Programs Listed By Name" section, try locating the company who publishes that disk in the "Protections Used By Company" section of the list. You have a very good chance that one of the instructions will work for that particular disk. If so, be sure to tell Utilico Microware, so they can add that program to the next list.

Here is an example for using this list to find the instructions for a disk. Suppose you want to make a back up copy of the disk named, "MICRO COURIER". First, look up MICRO COURIER in the "Programs Listed By Name" section of the list. It says, "MICRO COURIER:MICA#a". This tells us that the protection used on this disk is "MICA#a". Now, look up "MICA" in the "Protections Used By Company" section of the list. This shows that we used the abbreviation "MICA" for the company "MICROCOM INC." (who is the publisher of this disk). Since we know that the protection used is protection "#a"; locate protection #a for this company. Here, we find the instructions for copying this disk:

```
a. t22
   tØ-t21 parm 28=3
```

How To Use The Instructions Found In The List

To make a back up copy of a program found in the list, you will need to know the coding used:

```
key:   t      = TRACK START and/or END
       inc    = INCREMENT TRACK value
       parm   = PARAMETER CHANGE
       mode#  = PROCESS MODE#
       normal = NORMAL; use only default
                values (press "return"
                for all prompts).
```

Here is an example: Let's say you want to copy a program with the instructions:

```
tØ-t23
```

To copy this disk, you will need to copy the range of tracks from track "Ø" through track "23". So, when copying the disk, enter the value "Ø" when EDD asks you for the START TRACK (it's already preset to "Ø"), and enter the value "23" when EDD asks for the END TRACK. Since the instructions don't tell you to change anything else, don't. Simply just press "return" for all the other prompts.

Here is more involved instruction example:

```
tØ parm 28=1
t1-t9 inc4
tA-t22 mode#2
```

You will notice that these instructions use three lines of information. Since there are three lines to this instruction and each line starts with a "t" (track) this means that there are three ranges of tracks to copy on this disk. The first range, "tØ parm 28=1", means that you will need to change the parameter "28" to the value of "1" (see OPTION 2 in the EDD manual if needed). After the parameter is changed (any parameters that need to be changed for a range of tracks are always changed first), enter a "Ø" for the START TRACK. Since "tØ" (track "Ø") is the only track specified, you will also need to enter it for the END TRACK. There is no additional information for this range, so, just press "return" for all the other prompts. After EDD is done processing track "Ø", EDD will say "process done". At this point, one range of tracks has been copied.

The second range of tracks says, "t1-t9 inc4". Enter the value "1" for the START TRACK, and a "9" for the END TRACK". When EDD asks you for the INC TRACK value, enter a "4". After you copy this second range of tracks, EDD will again say "process done". The third range of tracks, "tA-t22 mode#2" is the last range that needs to be copied. Enter an "A" when EDD asks for the START TRACK, and a "22" for the END TRACK. When EDD asks for the PROCESS MODE, enter a "2" (synchronize tracks mode).

NOTE: *You MUST copy the ranges of tracks in the order they are listed. One reason for this is because any parameter that may have been changed for a previously copied range of tracks stays changed for the next range. If the list tells you to "write-protect before running", be sure you put a write-protect sticker on the duplicate disk covering the notch, BEFORE attempting booting that disk! A good rule of thumb is: If an original disk has a write-protect sticker on it, always put a sticker on the duplicate disk before running it. Disk drive speed can be very critical on some disks. If you receive many "C" or "L" error codes, refer to OPTION 5 in the EDD manual for drive speed adjustments.*

Programs Listed By NAME

ABM:MUSE#a
ACCOUNTS PAYABLE:STAT#a
ACCOUNTS RECEIVABLE:STAT#a
ACE CALC:ARTS#a
ACE WRITER:ARTS#a
ADDITION MAGICIAN:LEAR#d
ADDRESS BOOK:MUSE#a
ADVANCED BLACKJACK:MUSE#a
ADVENTURE:APPL#a
ADVENTURE CMPTR LTRCY:normal
ADVENTURE WRITER:CODE#a
AE - SIDE A:BROD#j
 Side B:BROD#a
AGENT USA:SCHO#e
AIRSIM-1:MINS#b
ALI BABA&4Ø THIEVES:QUAL#a
ALIEN ADDITION:DLMS#a
ALIEN RAIN:BROD#a
ALIEN TYPHOON:BROD#a
ALGEBRA I:EDUW#a
ALGEBRA II:EDUW#a
ALGEBRA III:EDUW#a
ALGEBRA IV:EDUW#a
ALGEBRA V:EDUW#a
ALGEBRA VI:EDUW#a
ALKEMSTONE:DAKA#a
ALLIGATOR MIX:DLMS#a
ALPHABET ZOO:SPIN#a or #b
ALPINE SKIER SERIES:normal
AMAZON:TRIL#a or b
APPLE "21":SOFA#a
APPLE AT PLAY:APPL#a
APPLE CIDER SPIDER:SIER#a
APPLE CILLIN:SIER#a
APPLE FORTRAN:APPL#a
APPLE GALAXIAN:BROD#a
APPLE GRAD BOOK:JSSO#a
APPLE LINK:normal
APPLE LOGO V1.Ø:APPL#a or d
APPLE MUSIC THEORY:APPL#c
APPLE PANIC:BROD#a
APPLE PASCAL:APPL#a
APPLE PRSNTS-ERNIE QZ:APPL#a
APPLE PRSNTS-INSNT ZOO:APPL#a
APPLE PRSNTS-MIX&MATCH:APPL#a
APPLE PRSNTS-SPOTLIGHT:APPL#a
APPLESOFT-PART I:normal
APPLESOFT TEACH ME:normal
APPLE SPELLER III:mode#2
APPLE WORKS:APPL#a
APPLE WORLD:UNIT#a
APPLE WRITER:APPL#a
APPLE WRITER II:APPL#a
APPLE WRITER IIE:APPL#a
APPLE WRITER III:APPL#b
APPLE WRITER TUTRL:CDEX#a
APPLE WRITER PREBOOT:VIDE#a
AQUIRE:AVOL#a
APVENTURE TO ATLANTIS:SYNE#a
ARTIST:SIER#b
ASCII EXPRESS II:SOUD#a
ASTEROID FIELD:CAVA#a
ASTRONOMY DISK:PREN#a
AUDEX:SIRU#a
AUTOBAHN:SIRU#g
AXIS ASSASSIN (old):ELEC#b
AZTEC:DATS#a
A2-FS1:SUBL#b
A2-FS2:SUBL#c
BAG OF TRICKS:QUAL#b
BALTIC 1984:STRA#a
BANK STREET STORYBOOK:MIND#a
BANK STREET STORYBOOK:PIXE#a
BANK STREET WRITER:
 Broderbund version:BROD#h
 Scholastic version:SCHO#d
BARON:BLUE#a
BASIC NUMBER FACTS:CONT#a
BATTLE OF SHILOH:STRA#a
BATTLE NORMANDY:STRA#c
BATTLES:COND#a
BATTLE SIGHT:VERS#a
BE A WORD DETECTIVE:MEDI#a
BEER RUN:SIRU#b
BENDAR:normal
BENEATH APPLE MANOR:QUAL#a
BERMUDA RACE:HOWA#a
BEYOND CASTLE WOLFNSTN:MUSE#a
BIG DOOR DEAL SERIES:normal
BIG MATH ATTACK:SOFG#c
BILESTOAD:DATM#e
BILL BUDGE 3-D GRAPHCS:CALI#b
BILL BUDGE SPACE ALBUM:CALI#a
BILL BUDGE TRILOGY:CALI#a
BIOLOGY TEST MAKER:JSSO#a
BLADE OF BLACKPOOL:SIRU#c
 Back side:SIRU#a
BLAZING PADDLES:BAUD#a
BODY TRANSPARENT:DESI#b
BOLO:SYNE#a
BOOKENDS:SENS#b
BOOK KEEPER #1 & #2:normal
BORG:SIRU#f
BOWLING:DATT#a
BPI VER 1.8:BPIS#a or b
BRIDGE MASTER:DYNA#a
BRIDGE:
 tØ-t23
BRUCE LEE:DATS#c
BUG:SOFG#a
BUG ATTACK:CAVA#c
BUILD BETTER SENTNCS:MILT#a
BUILDING INFRNCE SKILL:MEDI#a
BUMBLE GAMES:LEAR#a
BUMBLE PLOT:LEAR#a
BURGERTIME:ATAR#a
BUSINESS BASIC III:APPL#b
BUSINESS GRAPHICS:APPL#a
BUSINESS GRAPHCS III:APPL#b
BUZZARD BAIT:SIRU
CACTUS GRADE BOOK:DAVI#b
CAMPAIGN TRILOGY:SYNE#a
CANNONBALL BLITZ:SIER#a
CANYON CLIMBER:DATS#e
CARDIAC ARREST SIMLTR:ASPE#a
CAREER DIRECTION:SYST#a
CAREER SCAN IV:NATI#a
CARRIER FORCE:STRA#a
CARRIERS AT WAR:STRT#a
CARTELS&CUTTHROATS:STRA#a
 French version:STRA#a
CASINO:DATM#a
CASTLE WOLFENSTEIN:MUSE#a
CATALYST IIe:QUAR#b
CATALYST III:QUAR#a
CAVERNS OF COLLISTO:ORIG#a
CAVERNS OF FREITAGE:MUSE#a
CCA DATA MANAGEMENT:VISI#a
CCAPP:SYST#a
CEILING ZERO:TURK#a
CENTIPEDE:ATAR#a
CHALLENGE MATH:SUNB#b
CHAMPION LODERUNR:BROD#I or i
CHARLIE BROWN ABC:RAND#a
CHARTS UNLIMITED:GRAP#a
CHECKERS :ODES#a
CHEMISTRY LAB SIMLTR:HIGT#a
CHEMISTRY TEST MAKER:JSSO#a
CHESS 7.Ø:ODES#a
CHILDREN'S CAROUSEL:DYNA#a
CHILDS PLAY:MERE#a
CHOPLIFTER:BROD#i
CHRISTMAS ADVENTURE:BITC#a
CLASSMATE:DAVI#b
CLIP ART:SPRI#a
CODEWRITER:CODE#a
COLLEGE SCAN IV:NATI#a
COLORING SERIES 1:KOAL#a
COMPU CUBE:STON#e
COMPU MATH:mode#3 or #4
COMPUTER AIR COMBAT:STRA#a
COMPUTER AMBUSH:STRA#a
COMPUTER AMBUSH II:STRA#a
COMPUTER BASEBALL:STRA#a
COMPUTER BISMARK:STRA#a
COMPUTER LITERACY:CONT#b
COMPUTER QUARTERBACK:STRA#a
COMPUTER S.A.T.:HARD#a
COMPUTERS IN EVERYDAY:MEDI#a
COMPUTERS-WHAT ARE:MEDI#a
CONAN (both sides):DATS#f
CONGLOMMERATES COLIDE:
 tØ-t2
 t3.25-t22.25 mode#2
CONTINENT-CAPITLIZATN:HART#a
CONGO:SENT#a
COPTS & ROBBERS:SIRU#e
COSMIC BALANCE:STRA#a
COUNTING BEE:EDUW#a
COVETED MIRROR:PENG#a
CRANSTON MANOR:SIER#g
CREATE-A-TEST:CROS#a
CREATURE VENTURE:HIGL#a
CRIBBAGE/SOLITAIRE:normal
CRIME STOPPER:HAYD#a
CRIME WAVE:PENG#a
CRISIS MOUNTAIN:SYNE#a
CRITICL MASS Boot side:SIRU#c
 Back side:SIRU#a
CROSSCLUES:SRAS#a
CROSSFIRE:SIER#c
CROSSWORD MAGIC:
 Side 1-LSCO#a
 Side 2-LSCO#a
CRUSH/CRUMBLE/CHOMP:EPYX#b
CRYPTO-CUBE:DESI#a
CUBIT:MICM#a
CUSTOM MICRO ASMBLR:CUST#a
CUT THROAT:INFC#a
CYBER STRIKE:normal
CYCLOD:SIRU#a
CYTRON MASTERS:STRA#e
DARK CRYSTAL:SIER#a
DARK FOREST:SIRU#a
DATA FACTORY 4.Ø:MICI#a
DATA PLOT:MUSE#a
DATA REPORTER:SYNE#b
DATA TREE:normal
DAWN PATROL:TSRG#a
DAZZLE DRAW:BROD#m
DB MASTER 3.Ø:STON#b
DB MASTER 4 prgm disks:STON#d
DB MASTER 4+ disk#1:STON#c
 disk#2:STON#a
DB MASTER 4+/VISIFILE:STON#b
DEADLINE:INFC#a
DEATH IN THE CARIBN:MICI#a
DECATHLON:MICS#a
DEFENDER:ATAR#a
DELTA DRAWING:normal
DEMOLITION DIVISION:DLMS#a
DEMON DERBY:BROD#a
DEMON'S FORGE:normal
DESKTOP PLAN II:MICP#a
DIC-TION-ARY:SIER#j
DIG DUG:ATAR#a
DINOSAUR DIG:CBSS#a
DISAPPEARING DOLPHIN:SPIN#a
DISK DRIVE ANALYZER:VERB#a
DISK EDIT:SUPE#a
DISK LIBRARY:normal
DISK-O-DOC II:normal
DISK RECOVERY:SENS#e or a
DISK REPAIR KIT V2.2:SENS#a
DOG FIGHT:MICI#a
DOLLARS&SENSE II/IIe:MONO#a
DOLLARS&SENSE IIc:MONO#
DONKEY KONG:ATAR#a
DOS ENHANCER:normal
DOUBLE FEATURE MYSTERY:SCHO#b
DOW JONES MRKT ANLZR:DOWJ#a
DOW JONES NEWS QUOTE:DOWJ#a
DO YOU SEE HOW I SEE?:ORAN#a
DRAGON DIVISION:DLMS#a
DRAGON'S EYE:EPYX#a
DRAGON MIX:DLMS#a
DROL:BROD#g
DUELING DIGITS:BROD#i
DUNG BEETLES:DATS#a
DUNGEON:TSRH#a
DUNZHIN:
 tØ-t22 mode#2
EAGLES:STRA#a
EARLY GAMES:COUN#a
 SPRI#b
EASY COM/EASY GO:TRAN#b
EASY-WRITER:INFO#a
EDIT 65Ø2:LJKE#a
EDU-PAINT:EDUW#a
EDU-WARE DECMLS:EDUW#d
EDU-WARE FRACTN:EDUW#d
EGGS IT:GEBE#c
EINSTEIN COMPILER:EINS#a
ELECTRIC DUET:INSO#a
ELEMENTARY MATH:STER#a
ELIZA:ARTI#a
EMPIRE 1; WORLD BUILDR:EDUW#a
ENCHANTER:INFC#a
ENCYPDIA BRITANICA EDU CORP:
 PHRASES & CLAUSES
 SUBJECTS & PREDICATES
 Dsk#1:ENCY#a Dsk#2:ENCY#b
EPIDEMIC:STRA#f
EPOCH:SIRU#e
EPSON HIRES SCRN DMP:AVAN#a
ESCAPE:SUBL#a
EVELYN WOOD DYNMC READR:TIME#a
EVOLUTION:
 Compress:COMP#a
 Sydney:SYDN#a
EXECUTIVE SECRETARY:SOFS#a
EXPEDITION AMAZON:PENG#a
EXPLORING LOGO:normal
EXTRA, EXTRA:MILT#b
E-Z DRAW:SIRU#a
E-Z LEARNER:SILI#b
FACEMAKER:SPIN#a
FACTORY:SUNB#a
FAHRENHIET 451:TRIL#b
FALCONS:PICC#a
FANTASY 3:normal
FATHOMS 4Ø:DATS#d
FAX:EPYX#c
 Data disks:EPYX#a
FCM:1ST CLASS MAIL:CONI#a
FIFTH ESKADRA:SIMU#a
FIFTY MISSION CRUSH:STRA#a
FIGHTER COMMAND:STRA#a
FINANCE MANAGER:HUME#a
FINANCIAL FACTS:HOWA#a
FIRE BUG:MUSE#a
FLASHCALC:VISI#a or c
FLIGHT SIMULATOR II:SUBL#c
FLIP OUT:SIRU#c
FONT DOWNLOADER:MICW#a

FONTRIX:DATU#a
FONTRIX 2:DATU#a
FONTRIX 3:DATU#a
FONTRIX 5:DATU#a
FORECAST:MONO#b
FORM LETTER:mode#2
FRACTIONS:BASIC CNCPTS:STEW#a
FRACTIONS/DCMLS:EDUW#a or d
FRACTION FEVER:SPIN#a
FREDDY'S PUZZLING ADVTR:DLMS#b
FREEFALL:SIRU#c
FRENCH ACHIEVEMENT I:MICC#a
FRENCH-CLASSRM WORDS:CONT#a
FRENCH-SHOPPING:CONT#a
FRENCH-TRAVEL:CONT#a
FRENCH-VOCAB BUILDER:CONT#b
FRENCH FOR TRAVELERS:SOUD#b
FRONTLINE:SUBL#a
FUZZYWOMP:normal
F-15 STRIKE EAGLE:MICR#a
GALACTIC ADVENTURES:STRA#c
GALACTIC ATTACK:SIRT#a
GALACTIC EMPIRE:BROD#a
GALACTIC GLADIATORS:STRA#e
GALACTIC REVOLUTION:BROD#a
GALACTIC TRILOGY:BROD#a
GALAXY WARS:BROD#a
GAME:RAND#a
GAME OF THE STATES:MILT#a
GAME SHOW & SUBJECTS:ADVA#a
GAMMA GOBLINS:SIRU#b
GATO:SPEC#a
GED TESTS:INTE#a
GEMSTONE WARRIOR:STRA#a
GENERAL LEDGER:
 CONI#a
 SOFC#b
GENETIC DRIFT:BROD#n
GEOMETRY CONCEPTS:VENT#a
GEOPOLTQUE 1990 (both sides):
 STRA#a or d
GERMAN/ENG HANGMAN:GEOR#a
GERMAN FOR TRAVELERS:SOUD#b
GERMANY 1985:STRA#a
GERTRUDES PUZZELS:LEAR#f
GERTRUDES SECRETS:LEAR#f
GHOST BUSTERS:ACTI#a
GIN RUMMY:DATM#a
GOBLINS:HIGL#b
GOLD RUSH:SENT#b
GOLF CLASSIC/COMPUBAR:MILL#b
GORGON:SIRU#e
GO TO HEAD OF CLASS:MILT#b
GRADE MANGMENT 2:BERT#a or b
GRADE MASTER V1.2:normal
GRADE MASTER V1.23:
   t0-t23
GRAMMAR EXAMINER:DESI#b
GRAND PRIX-EST/ROUND:normal
GRAPHICS DEPARTMENT:SENS#a
GRAPHICS SOLUTION:ACCE#a
GREAT MAINE TO CA RACE:HAYD#a
GRUDS IN SPACE:SIRU#a
GUADAL CANAL CMPAIGN:STRA#a
GUIDE TO SIGNS/BLDNGS:MEDI#a
GUINESS BOOK OF WORLD RECORDS:
 ADDITION:SOCI#a
 SUBTRACTION:SOCI#a
GUNS OF FORT DEFRANCE:AVOL#a
HADRON:SIRU#e
HAIL:SYNE#a
HARD HAT MACK (old):ELEC#b
HARTLEY CLOCK:HART#a
HARTLEY MATH CONCPTS:HART#a
HARTLEY NOUN/PRNOUNS:HART#a
HARTLEY NUMBER WORDS:HART#a
HARTLEY PRESIDENTS:HART#a
HARTLEY ROOTS:HART#a
HARTLEY STATES:HART#a
HARTLEY VERBS:HART#a
HARTLEY WORD FAMLIES:HART#a
HEAD-ON:CALI#a
HELL FIRE WARRIOR:EPYX#a or b
HEARTLAB:EDUA#a
HEMODYNAMIC MANAGEMENT:AMER#a
HERCULES:normal
HEY DIDDLE DIDDLE:SPIN#a
HIGH RISE:MICI#a
HIGHWAY WARNING SIGNS:MEDI#a
HIRES FOOTBALL:SIER#a
HIRES GOLF 2 PRO:AVAN#a
HIRES SOCCER:SIER#a
HITCHHKRS GUIDE:INFC#a
HODGE PODGE:ARTW#a
HOME ACCOUNTANT:
 CONI#a
 SOFC#a
HOMEWORD 1.0:SIER#a
HOMEWORD 2.0:SIER#k
HORIZON IV:GEBE#b
HOW'BOUT NICE GAME CHESS:ODES#a
HSD STATS PROGRAMS:HSDS#a
HULK:ADVE#a
HUMAN SYSTEMS DYNMCS:normal
IFR SIMULATOR:normal
ILLUSTRATOR:ISLA#a
I LOVE AMERICA:normal
INCREDIBLE JACK:BUSI#a
INFIDEL:INFC#a
INFORMATION MASTER:HIGT#a
IN SEARCH MOST AMAZE:SPIN#a
INSPECTOR:
 Alpha Logic Systems:ALPH#a
 Omega Microware:OMEG#a
INSTANT ZOO:APPL#a
INTNT'L GRAND PRIX:MUSE#a
INTRO TO MICROCMPTRS:normal
INVASION ORION:EPYX#a
JAWBREAKER:SIER#d
JIGSAW:MICI#a
JUGGLES RAINBOW:LEAR#c
JUMP JET:AVAN#a
JUMP MAN Back:EPYX#a
 Front:EPYX#b
JUNGLEHUNT:ATAR#a
JUNIOR TYPER:AQUA#a
KABUL SPY:SIRU#c
KALEIDO-SOUND:normal
KAMPFGRUPPE:STRA#a
KAVES OF KHAKHN:DAKA#a or b
KEY PERFECT:MICT#a
KIDS ON KEYS:SPIN#a
KID WRITER:SPIN#a
KINDERCOMP:SPIN#a
KINGS QUEST:SIER#a or b
KINGS TESTING GROUND:normal
KITCHEN PLANER:SAVS#a
KNIGHT OF DIAMONDS:SIRT#b
KNOWLEDGE MASTER SRS:ACAM#a
KNOW YOUR APPLE:MUSE#a
KOALAPRINTER:KOAL#a
L.A. LAND MONOPOLY:CONI#a
LABYRINTH:BROD#i
LADY TUT:CALI#a
LAFPAK:
    t0-t22 parm 28=41
LAST GLADIATOR (old):ELEC#b
LAST ONE:DJSY#a
LAZERSILK:GEBE#b
LEARN BRIDGE MADE EZ:CBSS#a
LEARNING AID:EDUC#a
LEARNING WITH LEEPER:SIER#a
LEGACY OF LLYLGAMYN:SIRT#c
LES BATISSEURS D'EMPIRE:
 Side A:SIER#i
 Side B:SIER#a
LETTER PERFECT:LJKE#a
LEXICOM 3.0:MICT#a
LINGUIST:SYNG#a
LISP:DATS#a
LIST HANDLER&UTILITY:SILI#b
LOCK-IT-UP:DOUB#a OR #b
LODE RUNNER:BROD#f
LOLLIPOP DRAGON:normal
LOOKING INSIDE CMPTRS:MEDI#a
LOST TOMB:DATS#a
LUCKY'S MAGIC HAT:ADVA#D
MAGICALC:ARTS#a
MAGIC MEMORY:ARTS#a
MAGIC SLATE:HART#b
MAGIC SPELLS:LEAR#e
MAGIC WINDOW:ARTS#a
MAIL LIST MANAGR III:mode#2
MANAGEMENT EDGE:HUMD#a
MARAUDER:SIER#a
MARK & RECAPTURE:COND#a
MASK OF THE SUN:BROD#a
MASQUERADE:PHOE#a
MASTER DIAGNOSTICS:NICR#a
MASTERING THE SAT:CBSS#a
MASTER MATCH:ADVA#c
MASTERNG PRTS SPEECH:SOCI#a
MASTER TYPE:SCAR#a
MATCH WITS:CBSS#a
MATH BLASTER:
 boot side:DAVI#b (old)
 boot side:DAVI#c (new)
 data side:DAVI#a
MATH CONCEPTS I & II:normal
MATH GAMES:normal
MATH MAZE:DESI#a
MATHWARE SYSTEMS:
   t0-t22
   t3 parm 12=2 mode#3 or #4
MEET THE PRESIDENTS:VERS#a
MEGAFINDER:MEGA#a
MEGASPELL:MEGA#a
MEGAWRITER:MEGA#a
MEGAWORKS:MEGA#a
MELL SCIENCE VOLUMES:MELL#a
MEMORY MATCH:HART#b
MERLIN ASSEMBLER:SOUD#a
MESSAGE CENTER:normal
METEOR MULTIPLCATION:DLMS#a
METEORDS/SPACE:QUAL#a or b
METRI-VERT:EDUW#a
MICKY'S SPACE ADVTR:SIER#I
MICRO BARMATE:SOFC#a
MICROBE:SYNE#a
MICRO COOKBOOK:SOFC#a
MICRO COURIER:MICA#a
MICROILLUSTRATOR:KOAL#c
MICROWAVE:CAVA#a
MIDNIGHT MAGIC:BROD#b, e or i
MILLIKEN MATH:MILL#a or c
MILLIKEN WORD PRCSR:MILL#b
MILLIONAIRE:BLUE#a, b or c
MIND PROBER:HUMD#a or b
MINER 2049ER:MICI#b
MINGS CHALLENGE:
 See Miner 2049ER
MINUS MISSION:DLMS#a
MINIT MAN:PENG#d
M.I.R.V.:DAKA#a
MISSING RING:DATM#a
MISSION ASTEROID:SIER#a
MOLECULAR ANIMATOR:COMP#a
MONEY MONEY:HART#a
MONKEYMATH:ARTW#a
MONTY PLAYS MONOPOLY:CONI#a
MONTY PLAYS SCRABBLE:RITA#a
MOON PATROL:APPS#b
MOPTOWN:LEAR#a
MOPTOWN HOTEL:LEAR#c
MOPTOWN PARADE:LEAR#c
MORLOC'S TOWER:EPYX#a
MOTHER GOOSE FOR YOUNG:BOOK#a
MOTION & ENERGY:JSSO#a
MOUSE ATTACK:SIER#a
MR.COOL:SIER#f
MR.DO:DATS#g
MUFPLOT:BASE#a
MULTIDISK CATLOG III:SENS#a
MULTIPLAN:MICS#a or b
MULTIPLAN TUTRIAL:CDEX#a
MULTIPLOY:REST#a
MURDER BY THE DOZEN (old):
 CBSS#a
MUSIC CONSTRUCTION(old):ELEC#b
MUSIC MAKER:SUBL#a
MUSIC MEISTER:SPRI#a
MUSICOMP:APPL#a
MYSTERY HOUSE:SIER#a or c
 French version:SIER#a
NATO COMMANDER:MICR=a
NEGOTIATION EDGE:HUMD#a
NEPTUNE:BROD#c
NETMASTER:ZOOM#a
NEWSROOM:SPRI#b
NIGHTMARE GALLERY:SYNE#a
NIGHT MISSION PINBALL:SUBL#a
NIGHT STALKER:MATT#a
NIKROM MASTER DGNTCS:NIKR#a
NORTH ATLANTIC 86:STRA#a
NUMBER FARM:DLMS#a
NURSERY STORY:normal
NUMBER STUMPERS:LEAR#h
NURSERY TIME:normal
OBJECTIVE-KURSK:STRA#a
ODYSSEY:SYNE#a
OIL BARONS:EPYX#a
OIL'S WELL:SIER#h
OLDORF'S REVENGE:HIGL#a
OLYMPIC DECATHLON:MICS#a
OLYMPIC INSRNCE SYSTMS:OLYM#a
ONE ON ONE (old):ELEC#b
OO-TOPOS:SENT#a
OPERATION APOCALYPSE:STRA#a
OUTPOST:SIRU#b
PACMAN:ATAR#a
PARTHIAN KINGS:AVAL#a
PDQ DATA BASE:MICO#a
PEEPING TOM:MICI#a
PEGASUS II:SIER#d
PENSATE:PENG#a
PERCENTS:MILT#c
PERSONAL FINANCE MANAGR:APPL#a
PERSONAL NETWORTH:SCAR#aONAL T-
OUCH:OKID#a
PERSON TO PERSON:TRUT#a
PFM:APPL#a
PFS-ACCESS:SOFP#b or c
PFS-FILE:SOFP#b or c
PFS-FILE IIE/IIC:SOFP#b or c
PFS-GRAPH:SOFP#b or c
PFS-MAILLIST:SOFP#b or c
PFS-REPORT:SOFP#b or c or d
PFS-WRITE:SOFP#c or a
PHANTOMS FIVE:SIRU#e
PHASER FIRE:BROD#i
PHI BETA FILER:SCAR#a
PHOTAR:SOFT#a
PHYSICAL SCI-CHEM:JSSO#a
PHYSICS:
 Control Data:CONT#a
 Elementary Mechanics:ELEM#a
PHYSICS TEST MAKER:JSSO#a
PICTUREWRITER:SCAR#a

PIECE OF CAKE:COUN#a
PIE MAN:PENG#a
PILL BOX:normal
PIXIT GRAPHCS PRCSSR:BAUD#a
PINBALL CONSTRCTN (old):ELEC#b
PLANETFALL:INFC#a
PLANT FAMILY I.D:COND#a
PLANTIN PAL:normal
PLATO:CONT#a
POLICE ARTIST:SIRT#d
POOL 1.5:INNO#a
POOYAN:DATS#b
PORTFOLIO MASTER 3.1:INVE#a
POSTER:SCHO#d
PRACTICALC:COMU#a
PREDICTOR 'PRO':PICK#a
PRESIDENT ELECT:STRA#a or b
PRINTER CONTRL PGM:normal
PRINTER POWER:
  tØ-t3
  t4-t5 parm 7=2 mode#2
  t6-t22
PRINTOGRAPHER:SOUD#a
PRINTSHOP (old version):BROD#d
PRINTSHOP LIBRARY:BROD#a
PRINTWHIZ:SIRT#d
PRISONER:SIER#a
PRISONER II:EDUW#b
PROFESSIONAL BLCKJCK:SCRE#a
PROGRAMMER:ADVC#a
PRO TOUR GOLF:STRA#a or e
PROTOZOA:VENT#a
PULSAR II:SIRU#d
PUNCTUATION SKILLS:MILT#a
PURSUIT GREAT SPEE:STRA#g
PUT TOGETHER, TAKE AWAY:MILT#c
PUZZLER:TARA#a
QUEEN OF THE PHOBOS:PHOE#a
QUEST (both sides):PENG#a
QUEST FOR TIRES:SIER#a
QUESTRON:STRA#a
QUICK FILE IIe:APPL#a
RAILS WEST:STRA#e
RANDAMN:MAGN#a or b
RAPID READER:SILI#b
RASTER BLASTER:BUDG#a
RATIOS-PROPORTIONS:MILT#c
RDF 1985:STRA#a
REACH FOR THE STARS:STRT#a
REACTIONS-ACIDS&BASES:JSSO#a
READER RABBIT:LEAR#b
READING BEE:EDUW#a
READING PRIMER:EDUW#a
REAR GUARD:ADVE#a
RECATTA:HOWA#a
REGIONS OF THE U.S:DAYB#a
RELAX:SYNA#a
RENDEZVOUS :EDUW#a or c
RENDEZVOUS WITH RAMA:TRIL#b
REPORTCARD:SENS#a, b or f
REPTON:SIRU#c
RESCUE AT RIGEL:EPYX#a or b
RETURN OF HERACLES:QUAL#b
RICOCHET:EPYX#a
RINGSIDE:STRA#a or c
ROAD TO GETTYSBERG:STRA#e
ROBOT BATTLE:USAS#a
ROBOT ODYSSEY:LEAR#a
ROBOT WARS:MUSE#a
ROCKY'S BOOTS:LEAR#b
ROUTINE MACHINE:SOUD#a
RUBIK'S CUBE:DOUB#a
RUSSKI DUCK:BROD#c
RHYMES&RIDDLES:SPIN#a
SABOTAGE:SIER#d
SALES EDGE:HUMD#a
SAMMY LIGHTFOOT:SIER#d
SANDS OF EGYPT:STRA#a
SARGON II:HAYD#a
SARGON III (old):HAYD#b
SATURN NAVIGATOR:SUBL#d
SCAPE ARCTURUS:normal
SCM:CONI#a
SCREEN WRITER II:SIER#a or e
SEA DRAGON:ADVE#a
SEA FOX:BROD#i
SEA STALKER:INFC#a
SECRETS OF SCIENCE ISL:mode#2
SENSIBLE SPELLER III:SENS#d
SENSIBLE SPELLER IV:SENS#b
SENSIBLE SPLLR DICTNRYS:SENS#a
SENSIBLE SPLLR PRODOS:SENS#c
SENTENCE STRUCTION:mode#2
 write-protect before boot
SERIES FR-2:normal
SERIES RU-2:normal
SERIES SP-2:normal
SERPENTINE:BROD#i
SERPENTS STAR:BROD#a
S.E.U.I.S.:STRA#b
SEX RATED:normal
SIX GUN TERRITORY:STRA#f or g
SHADOWKEEP:TRIL#a
SHATTERED ALLIANCE:STRA#a
SHELIA:HALL#b
SHERWOOD FOREST:PHOE#a
SHIFTY SAM:RAND#a
SIDEWAYS:FUNK#a
SKIING 3-D:CONI#a
SKY ABOVE/WATR BELOW:AQUA#b
SNEAKERS:SIRU#b
SNOOGLE:BROD#a
SNOOPER TROOPS:SPIN#a
SNOOPY SKYWRTR SCRMBR:RAND#a
SOFT PORN ADVNTR:SIER#d
SOLAR SYS ASTRONMY:CROS#a
SONGWRITER:SCAR#a
SORCERER:INFC#a
SORCERER OF CLAYMORGUE:ADVE#b
SORCERER OF SIVA:EPYX#a or b
SPACE:EDUW#a
SPACE EGGS:SIRU#a
SPACE QUARKS:BROD#o
SPACE RESCUE:DAKA#a
SPACE VIKINGS:SUBL#a
SPANISH/ENG HANGMAN:GEOR#a
SPANISH FOR TRAVELRS:SOUD#b
SPECTRE:DATM#a or f
SPEED READER II:DAVI#b
 data disks:DAVI#a
SPELLAGRAPH:normal
SPELL HANDLER:SILI#a
SPELLICOPTER:DESI#a
SPELLIKAZAM:DESI#a
SPELLING BEE:EDUW#a
SPELLING GRADE 3 v2:ZANE#a
SPELLING PRIMR:EDUW#a or b
SPELLING SORCERY:SOUE#a
SPELLING WIZ:DLMS#a
SPELL IT:DAVI#b
SPIDER EATER:KOAL#b
SPITFIRE SIMULATOR:MINS#a
SPY HUNTER:normal
SPY'S DEMISE:PENG#a
SPY STRKS BACK:PENG#a or c
SQUARE PAIR:SCHO#b or c
STANDING STONE (old):ELEC#b
STAR BLASTER:
  tØ
  t7-t2Ø.5 inc 1.5
STAR BLAZER:BROD#i or b
STARCROSS:INFC#a
STARGATE:WILL#a
STAR THIEF:CAVA#b
STAR WARRIOR:EPYX#a or b
STAR WARS ADVENTURE:normal
STATE GAME:DLMS#a
STATE OF THE ART:STAT#a
STATES AND TRAITS:DESI#b
STELLAR DEFENSE:RAIN#a
STELLAR SEVEN:SOFE#a
STEP BY STEP:PROG#a
STOCK PORTFOLIO:SMIT#a
STORY MACHINE:SPIN#a
STORY TREE:SCHO#c
STRIP POKER:ARTW#a
SUCCESS WITH MATH:CBSS#a
SUMMER GAMES:EPYX#a or b
SUNDOG (ver 1.Ø) side#1:FTLG#b
 side#2:FTLG#a
SUPER BUNNY:DATM#a
SUPER COPY III:SENS#a
SUPER DISK COPY:SENS#a
SUPERMAP:SOFG#b
 SONO#a
SUPER PILOT:
  tØ mode#4
  t1-t22
SUPER SPEED READER:MAGN#a
SUPER TEXT:MUSE#a or b
SUPER TEXT PRO:MUSE#a
SUSPENDED:INFC#a
SWAN-GANZ CATHETR SIM:AMER#a
SWASHBUCKLER:DATM#c or d
SWISS FAMILY ROBINSON:WIND#a
SWORD OF KADASH:PENG#a
TACTICAL ARMOR COMND:AVOL#a
TAKE ONE:BROD#a
TAPPER:SEGA#a
TARTURIAN:normal
TAWALA'S LAST REDOUT:BROD#a
TAX ADVANTAGE 1983:CONI#a
TAXMAN:HALL#a
TAX MANAGER:CONI#a
TEASERS BY TOBBS:
  tØ-tC
  tD.5-t22.5
TEDDY AND IGGY:SUNB#b
TEMPLE OF ASPHI:EPYX#a or b
TENNIS ANYONE:normal
TERRAPIN LOGO V1.Ø:TERR#a
TERRORIST:EDUW#a
TERRORISTE:
  tØ-t1F
  t2Ø.75-t22.75
THESEUS & MINOTUAR:TSRH#a
THIEF:DATM#b
THREE MILE ISLAND:MUSE#a
THRESHOLD:SIER#c
THUNDER BOMB:PENG#a
TIC TAC SHOW:ADVA#b
 series disks:ADVA#a
TIGERS IN THE SNOW:STRA#a
TIME MANAGER:IMAG#a
TIME IS MONEY:TURI#a
TIME ZONE side #A:SIER#b
 sides #B-#L:SIER#A
TITAN EMPIRE:MUSE#a
TORPEDO FIRE:STRA#a
TORPEDO TERROR:CONI#a
TRACK ATTACK:BROD#i
TRANSEND:TRAN#a
TRANSEND II:TRAN#a
TRANSYLVANIA:PENG#a
TRAUMA SIMULATOR:MEDE#a
TUBEWAY:DATM#a
TUES MORN QUARTERBACK:EPYX#a
TURTLE TRACKS:SCHO#a
TYCOON:BLUE#a
TYPE ATTACK:SIRU#c
TYPEFACES:ALPS#a
TYPE MASTER:normal
TYPE-WRITER:PROF#a
TYPING TUTOR:MICS#a
TYPING TUTOR II:MICS#a
U-BOAT COMMAND:SYNE#a
ULTIMA:CALI#a
ULTIMA II:SIER#b
ULTIMA III:ORIG#a or b
ULYSES:SIER#a
UNI-SOLVE:EDUW#a
UNPRINTABLE PHYSICS:PREN#a
UTILITY DISK, THE:normal
VAMPYRE CAVES:normal
VERB VIPER:DLMS#a
VERSA-FORM:APPS#a
VIEWMAX-8Ø:normal
 write-protect before booting
  or see Lock-It-Up
VISIBLE COMPUTR;65Ø2:SOFM#a
VISICALC PREBOOT:VIDE#a
VISICALC II:VISI#a or d
VISICALC IIE:VISI#a or d
VISICALC ADVANCD:VISI#a or d
VISICALC III:VISI#b
VISICALC TUTORIAL:CDEX#a
VISIDEX:VISI#a or c
VISIFILE II:VISI#a
VISIFROG:VENT#a
VISIPLOT II:VISI#a
VISISCHEDULE II:VISI#a
VISITERM II:VISI#a
VISITREND/PLOT 1.1:VISI#a
VOCABULARY BUILDERS:CONT#a
VOCBLRY BLDR-FRENCH:CONT#a
VOCBLRY BLDR-GERMAN:CONT#a
VOCBLRY BLDR-SPANISH:CONT#a
VOICE:MUSE#a
VOO-DOO CASTLE:ADVE#a
VORTEX:DATM#a
WAR IN RUSSIA:STRA#a or #c
WARP DESTROYER:mode#2
WARP FACTOR:STRA#a
WAVY NAVY:SIRU#c
WAYOUT:SIRU#c
WHAT'S A MATTER?:ORAN#a
WHOLE NUMBERS:CONT#a
WHO? WHAT? WHERE?:HART#a
WINDOW:normal
WITNESS:INFC#a
WIZARD AND PRINCESS:SIER#a
WIZARDRY:SIRT#a
WIZTYPE:normal
WORD ATTACK:DAVI#b
WORD CHALLANGE:
  tØ-t23 mode#2
WORD HANDLER:SILI#a
WORD INVASION:DLMS#a
WORD JUGGLER III:QUAR#a
WORD MAN:DLMS#a
WORD MASTER:DLMS#a
WORD MENTOR II:CRIT#a
WORDRACE:DONT#a
WORD RADAR:DLMS#a
WORDSPINNER:LEAR#g
WORLD GREATST BLCK-JCK:APPL#a
XPS DIAGNOSTIC II+/IIE:XPSI#a
XYPHUS:PENG#a or b
ZANDER-THE WIZARD LVL 1&2:
  tØ-t23 mode#2
ZAXXON:DATS#c
ZENITH:GEBE#a
ZOOM GRAFIX:PHOE#a
ZORK I:INFC#a
ZORK II:INFC#a
ZORK III:INFC#a

....end of program Names

ACAM=ACADEMIC HALLMARKS
a. normal

ACCE=ACCENT SOFTWARE
a. normal

ACTI=ACTIVISION
a. write-protect before boot
normal

ADVA=ADVANCED IDEAS
a. normal
b. drive speed critical
recopy t1.5-t4.5 until boot
tØ
t6-t22
t1.5-t4.5 parm 28=1
c. tØ.25-t2.25 mode#3 or #4
t3.5-tF.5
t11-t22
d. tØ-t22
t9 parm 28=2Ø 32=AE 33=AF
39=18 3A=1 49=1 4B=Ø
4C=1 4D=2 4F=1 5Ø=1

ADVC=ADVANCED OPERATING SYSTMS
a. normal

ADVE=ADVENTURE INTERNATIONAL
a. normal
or try:
tØ-t21
t22 parm 5=2 mode#3 or #4
b. copy both sides
tØ-t22 mode#2

ALPH=ALPHA LOGIC SYSTEMS
a. normal

ALPS=ALPHA SOFTWARE CORP.
a. mode#2

AMER=AMERICAN EDWARD LABORATRY
a. drive speed critical
normal

APPL=APPLE COMPUTERS
a. normal
b. mode#2
c. mode#5 or #6
d. tØ-t2Ø
t21.25-t22.25 mode#2
or try:
tØ-t21 mode#2
t21.75-t22.75 mode#2
or try:
tØ
t1.75
t2.25-t22.25
or try:
tØ
t1 mode#3
t2-t22

APPS=APPLIED SOFTWARE TECHNLGY
a. normal
b. mode#2

AQUA=AQUARIUS PEOPLE INC.
a. normal
b. mode#5 or #6

ARTI=ARTIFICAL INTELLIGENCE
a. normal

ARTS=ARTSCI
a. normal

ARTW=ARTWORKS
a. mode#2

ASPE=ASPEN SYSTEMS CORP.
a. normal

ATAR=ATARI SOFT
a. drive speed cricital
normal

AVOL=AVOLON HILL
a. normal

AVAN=AVANTE-GARDE
a. normal

BASE=BASE 2 SYSTEMS
a. mode#2

BAUD=BAUDVILLE
a. normal or mode#2

BERT=BERTAMAX, INC.
a. normal
b. mode#3

BITC=BIT CARDS
a. normal

BLUE=BLUE CHIP SOFTWARE
a. normal, or try: tØ-t23
b. tØ-t22 mode#5 or #6
c. tØ.25-t22.25

BOOK=BOOK LURES
a. normal

BPIS=BPI SYSTEMS INC.
a. normal
b. tØ-t22 parm Ø8=18 Ø9=Ø

BROD=BRODERBUND SOFTWARE
a. mode#2, normal, or tØ-t23
some older games try just:
tØ-tF
b. tØ-tB mode#2
tC.25-t1E.25
t2Ø
c. drive speed critical
tØ
t1.25-t22.25 mode#2
d. drive speed critical
recopy t22 until it boots
tØ-t21
t22 parm Ø5=Ø2 28=1Ø 2B=F5
parm 2D=7F 3D=FF 3E=FF
parm 3F=D4 4Ø=D5 41=DE
parm 42=D4 45=F5 46=AA
parm 47=7F 48=7F
e. drive speed critical
tØ-t12
t13.25-t15.25
t22
or try:
tØ-tB
tC.25-t15.25
t22
f. very hard to copy
drive speed critical
tØ
t3-tC
tD.25-t2Ø.75
incl.5 mode#2
g. tØ-4
t2.75
t5-t22 parm 28=4Ø 57=AD
parm 5E=F7 5F=DB
h. drive speed critical
tØ-t1A
t1B-t22 mode#4 or #3
i. hard to copy
try using one disk drive
drive speed critical
tØ-tB parm 28=1 or 3
tC.25-t21.25 mode#2
t22
or try:
tØ-tB parm 28=1 or 3
tB.75-t2Ø.75 mode#2
t22
or try:
tØ-tB
tC.25-tF.25
t1Ø.5-t19.5
t1A.25-t1E.25
t21
j. tØ parm 28=1 or 3
t1.5-tC.5
tE-t1E.5 incl.5
k. drive speed critical
tØ parm 28=1 mode#3
t1.25-t22.25 mode#3
l. drive speed critical
tØ parm 28=1, 2, or 3
t3-tC
tD.25-t22.25 mode#2
m. copy using one drive
drive speed critical
tØ-t1F
t2Ø.25-t22.25 mode#2
or try:
tØ-t1E
t1F mode#3 or #4
t2Ø.25-t22.25 mode#2
n. tØ-t3
t4.5-t6 inc 1.5
t7.5-T12.5
tD
o. tØ-t15
t3.5-t5.5
tA.5-tB.5

BUDG=BUDGE CO.
a. tØ
t3.5-tf.5 inc4
t5-t11 inc4
t6-t12 inc4

BUSI=BUSINESS SOLUTIONS
a. normal

CALI=CALIFORNIA PACIFIC
a. normal
b. normal
write-protect before boot

CAVA=CAVALIER COMPUTER
a. normal
b. tØ-t13
t22 mode#3 or #4
c. tØt21
t1D mode#2
t22 mode#2

CBSS=CBS SOFTWARE
a. normal

CDEX=CDEX
a. normal

CODE=CODE WRITER CORP.
a. normal

COMP=COMPRESS
a. normal or mode#5 or #6

COMPUTER ADVANCED IDEAS
(see ADVANCED IDEAS)

COMU=COMPUTER SOFTWARE ASSCTS
a. normal

COND=CONDUIT
a. normal or mode#5 or #6

CONI=CONTINENTAL SOFTWARE
a. normal

CONT=CONTROL DATA PUBLISHING CORP.
a. normal or mode#2
b. drive speed critical
tØt22 mode#5 or #6

COUN=COUNTERPOINT SOFTWARE
a. normal

CRIT=CRITERION MICROSOFT
a. normal

CROS=CROSS EDUCATIONAL SOFTWARE
a. normal

CUST=CUSTOM MICRO SYSTEMS
a. tØ-t23

DAKA=DAKIN 5
a. normal
b. mode#2

DATM=DATA MOST
a. normal
b. tØ-t22
t4-t5 mode#2
c. tØ-t22 parm 28=1Ø
d. tØ-t22 parm 5=12
e. tØ-t6
t7.5-t1E.5
f. tØ
t1.25-t22.25 mode#2

DATS=DATASOFT
a. normal
b. mode#2
c. very hard to copy
drive speed critical
tØ-t16 parm 28=1
mode#5 or #6
t17-t22
or try:

t0-t22 parm 07=1 28=1
mode#2
d. t1-t22
t0-t11 incl1 mode#3 or #4
e. t0 t0-t3
t11-t17 mode#3 or #4
f. write-protect before boot
drive speed critical
t0-t23 parm 28=1 mode#6
g. t0-t1B mode#4

DATT=DATA SYSTEMS
a. normal

DATU=DATA TRANSFORMS
a. normal

DAVI=DAVIDSON ASSCTS.
a. normal
b. see DOUB#b
(uses Lock-It-Up protectn)
c. write-protect before boot!
t0 parm 28=10 48=00
t1-t22 parm 28=21 2B=DB
parm 2C=7F 2D=AA 54=00
parm 55=00 56=02

DAYB=DAY BREAK SOFTWARE
a. normal

DESI=DESIGN-WARE
a. mode#2
b. normal

DJSY=D.J. SYSTEMS
a. normal

DLMS=D.L.M. SOFTWARE
a. normal or mode #2
b. t0-t22 parm 0A=19

DONT=DON'T ASK SOFTWARE
a. mode#2

DOWJ=DOW JONES SOFTWARE
a. t0-t22 parm 28=3 03=15

DOUB=DOUBLE GOLD
a. normal
b. (Lock-It-Up protection)
recopy t0 until it boots
t1-t22
t0 parm 28=1 29=0
or try:
t1-t22
t0 parm 28=30 2D=AD 2E=AA
parm 3B=0 39=59
or try:
t1-t22
t0 parm 28=30 32=AF 33=AA
parm 3B=0 3C=0
parm 39=6B...6F
when booting...
if ERR1 is displayed:
write-protect disk
if ERR3 is displayed:
add 1 to the value of
parm#39 then recopy t0

DYNA=DYNACOMP INC.
a. normal

EDUA=EDUCATIONAL ACTIVITIES
a. normal

EDUC=EDUCATIONAL COURSEWARE
a. drive speed critical
normal

EDUW=EDU-WARE
a. drive speed cricital
normal
b. t0
t1.25-t22.25 mode#2
c. t1-t22
t0 mode#3 or #4
d. mode#2

EINS=EINSTEIN
a. normal

ELEC=ELECTRONIC ARTS
a. normal
b. t0-t20 mode#2
t21.25-t22.25 mode#2
or try:
t0-t20 mode#2
t20.75-t21.75 mode#2
or try:
t0-t1F
t1F.25-t22.25 mode#2
or try:
t0
t1.25-t22.25 mode#2

ELEM=ELEMENTARY MECHANICS
a. mode#2

ENCY=ENCYCLOPEDIA BRITANICA
a. mode#2
b. mode#3

EPYX=EPYX/AUTOMATED SIMULATION
a. normal
b. t0-t22
t1.25
or try:
t0-t22
t0.75
or try:
drive speed critical
recopy t22 until it boots
t0-t21
t22 parm 00=04 28=20 2B=96
2C=E7 2D=E7 39=01 49=01
4A=01 4E=02 50=01 51=02
53=01 54=02 55=00 56=01
c. t0-t22
t2.75-t3.75

FTLG=FTL GAMES
a. normal
b. mode#3
or try:
t0-t22 parm 28=3 00=0 or 2
mode#3 or #4
c. copy both sides
t0-t21
t22 parm 28=1 29=0

FUNK=FUNK SOFTWARE
a. drive speed critical
recopy t22 until it boots
t0-t21
t22 parm 05=4 mode#5 or #6
or try:
t0-t21
t21.75-t22.75 mode#2 or #5

GEBE=GEBELLI SOFTWARE
a. see BROD#i
b. see BROD#c
c. see BROD#b

GEOR=GEORGE EARL
a. normal

GRAP=GRAPHWARE INC
a. normal

HALL=HAL LABS
a. normal
b. write-protect before booting
normal

HARD=HARDCORT
a. see DOUB#b
(uses Lock-It-Up protectn)

HART=HARTLEY
a. mode#2
b. normal

HAYD=HAYDEN SOFTWARE
a. normal
b. drive speed critical
t0-t22 parm 05=4 0C=9

HIGL=HIGHLAND
a. normal
b. recopy t1B until it boots
normal

HIGT=HIGH TECHNOLOGY SOFTWARE
a. normal

HOWA=HOWARD SAMS
a. normal

HSDS=HSD SOFTWARE
a. normal

HUMD=HUMAN EDGE SOFTWARE
a. t0-t23
b. t0-t22
t21 mode#3 or #4

HUME=HUMAN ENGINEERED SOFTWARE
a. t0-t22 mode#2
t3.25-t4.25 mode#2

IMAG=IMAGE COMPUTER PRODUCTS
a. normal (t0-tF)

INFC=INFOCOM
a. normal (old versions)
or try: (new versions)
drive speed critical
t0-t22 parm 28=21 mode#2

INFO=INFORMATION UNLIMITED
a. normal

INNO=INNOVATIVE DESIGN SOFTWR
a. mode#2

INSO=INSOFT
a. normal

INTE=INTELLECTUAL SOFTWARE
a. drive speed very critical
recopy t13 until boots
t0-t22
t13 parm 03=10 0F=02 10=03
parm 11=03 12=02 28=23
parm 29=FC 2B=FF 2C=7F
parm 2D=7F 49=00 68=40
parm 69=20 6A=10 6B=08
parm 6C=04 6D=02 6E=01
mode#4

INVE=INVESTERS SOFTWARE
a. normal

ISLA=ISLAND GRAPHICS
a. t0-t0.75 inc0.75
t11-t12
t21-t22
t1.5-tD.5 parm 28=40 57=CD
parm 59=D5 5E=7F 5F=7F
tE.75-tF.75
t13-t20

JSSO=J&S SOFTWARE
a. normal

KOAL=KOALA TECHNOLOGIES
a. normal
b. recopy t3 & t4 until boots
t0-t16 mode#2
c. t0-t22
t8.25-tB.25 inc3

LEAR=LEARNING COMPANY
a. normal or mode#2
or try:
t0-t22 parm 28=1 or 3
or try:
t0-t22
t2.75-t4.75 mode#2
b. t0-t22 mode#2
t3.75-t4.75 mode#2
or try:
drive speed critical
t0-t2
t3.25-t6.25 mode#5 or #6
t7-t22
or try:
t0-t2
t3.25-t22.25
or try:
t0
t1.25-t4.25
t5-t22
c. t0-t2 mode#2
t3.25-t20.25 mode#2
or try:
t0-t2 mode#2
t2.75-t21.75 mode#2
d. t0-t10
t2.25

e. tØ-t22 mode#2
t2.75-t3.75 mode#2

f. write-protect before booting
drive speed critical
tØ
t1.25-t22.25
or try:
tØ-t1
t2.25-t3.25 mode#2
t4-tE

g. tØ-t9 mode#2
t1.75-t2.75 mode#5 or #6

h. tØ-t18 mode#2
t1.75-t3.de#5 or #6

LJKE=LJK ENTERPRISES
a. normal

LSCO=L&S COMPUTERWARE
a. tØ-t22 mode#2
or try:
tØ
t1.25-t2.25 mode#2
t3-t22
or try:
tØ-t22
t3.25-4.25 mode#2
or try:
tØ-t22 parm 28=1 mode#2
t3.25 or t3.75
or try:
tØ
t1.25-22.25 mode#2

MAGM=MAGNUM SOFTWARE
a. normal
b. drive speed critical
tØ-t22 mode#2

MATT=MATTEL ELECTRONICS
a. write-protect before boot
normal

MECC=MECC
a. normal

MEDE=MED ED (J.HULEY ASSCTS)
a. normal

MEDI=MEDIA MATERIALS
a. normal

MEGA=MEGAHAUS CORP.
a. drive speed critical
normal

MELL=MELL SOFTWARE
a. normal or mode#5 or #6

MERE=MERESONG
a. normal

MICA=MICROCOM INC.
a. t22
tØ-t21 parm 28=3

MICB=MICROCOMPUTER GAMES
a. normal

MICC=MICROCOMPUTER WORKSHOP
a. normal

MICI=MICROLAB
a. normal
b. t1-t22
tØ parm 28=1 or 3
mode#3 or #4

MICL=MICROLEAGUE SPORTS
a. drive speed critical
normal

MICM=MICROMAX
a. normal
write-protect before boot

MICO=MICROPOWER & LIGHT CO.
a. normal

MICP=MICROPRO
a. normal

MICR=MICROPROS
a. tØ-t22
t1.25-t5.25 mode#2
or try:
t6-t22
t1.25-t5.25 mode#2
tØ-t1

MICS=MICROSOFT
a. normal
b. tØ-t22 parm 28=1 or 3
mode#1 or #3 or #4

MICT=MICROSPARC
a. normal

MICW=MICROWARE
a. normal

MILL=MILLIKEN
a. normal
b. tØ-t22 mode#5
t2 mode#6
c. tØ-t22 parm 28=3

MILT=MILTON BRADLEY
a. tØ-t23
b. mode#2
c. recopy all errors
tØ-t22 parm ØA=19
Ø5=12 or 1Ø 85=3 or 2

MIND=MINDSCAPE SCHOOL SOFTWARE
a. tØ-t22
t11 parm 28=2Ø 32=AE 33=AF
39=18 3A=1 49=1 4B=Ø
4C=1 4D=2 4F=1 5Ø=1

MINS=MIND SYSTEMS
a. normal
b. write-protect before boot
normal

MONO=MONOGRAM
a. drive speed critical
normal
or try:
drive speed critical
very hard to copy
tØ-t22 mode#2
b. drive speed critical
tØ-t22 parm ØØ=4

MUSE=M.U.S.E.
a. normal
b. mode#2

NATI=NATIONAL EDUCATIONL SFTWR
a. normal
or try:
tØ-t22 parm 28=1

NIKR=NIKROM
a. see DOUB#b
(uses Lock-It-Up protectn)

ODES=ODESA
a. normal (ignore "R" errors)

OKID=OKIDATA
a. normal

OLYM=OLYMPIC
a. normal

OMEG=OMEGA MICROWARE
a. normal
b. tØ-t22 normal
tA parm 28=2Ø 32=AA 33=AF
parm 39=18 3A=1 49=1 4B=Ø
parm 4C=1 4D=2 4F=1 5Ø=1

ONLINE (see SIERRA ONLINE)

ORAN=ORANGE JUICE SOFTWARE
a. normal

ORIG=ORIGIN
a. normal (ignore errors)
or try: mode#5 or #6
b. recopy tØ until boots
t1-t11
tØ parm 28=1 or 3
mode#3 or #4

PBIS=PBI SOFTWARE
a. drive speed critical
tØ
tØ.25-t22.25 mode#2

PENG=PENGUIN SOFTWARE
a. normal
b. boot side: tØ-t11 mode#2
game side: tØ-t2Ø mode#2
c. tØ-t11
tE.5
recopy tØ until it boots
d. normal
write-protect before boot
e. mode#5 or #6

PHOE=PHOENIX
a. normal

PICC=PICCADILLY SOFTWARE
a. tØ-t4.5 inc 1.5
t5.5-t11 inc B.5
t7-tA
tB.5-t1Ø inc 1.5
t12-t13.5 inc 1.5
t14.5-t19 inc 1.5
t1A-t1B.5 inc 1.5

PICK=PICKAM
a. normal

PIXE=PIXELWORKS
a. normal

PREN=PRENTICE HALL
a. normal

PROF=PROFESSOR, THE
a. tØ-t2Ø
t21.25-t22.25 mode#2

PROG=PROGRAM DESIGN INC.
a. tØ-t22 mode#3
t5 & t6 & tA mode#2

QUAL=QUALITY SOFTWARE
a. normal
b. drive speed critical
tØ-t14 parm Ø5=2 or 12

QUAR=QUARK
a. mode#2
b. tØ-t22 parm 5=12

RAIN=RAINBOW COMPUTING
a. normal

RAND=RANDOM HOUSE SOFTWARE
a. normal

REST=RESTON PUBLISHING
a. tØ-t22
t23 parm Ø7=1

RITA=RITAM CORP.
a. normal

SAVS=SAVSOFT
a. see DOUB#b
(uses Lock-It-Up protectn)

SCAR=SCARBOROUGH
a. see DOUB#b
(uses Lock-It-Up protectn)

SCHO=SCHOLASTIC
a. normal
b. drive speed critical
tØ-t22
t3.25
or try:
tØ-t22
t3.25-t4.25 parm 28=3
or try:
tØ-t22
t1.75-t2.75
c. drive speed critical
tØ-t2
t3.25-tF.25
t1Ø-t22

d. drive speed very critical
t0-t1C mode#2
t1.25-t3.25 mode#2
or try:
t0-t1C mode#2
t1.75-t2.75 mode#2
e. drive speed critical
t0
t1.25-tA.25 mode#2
or try:
t0
t1.25-t3.25 parm 0F=10
t4-t1C

SCRE=SCREEN PLAY
a. normal

SEGA=SEGA
a. normal

SENS=SENSIBLE SOFTWARE
a. normal
b. very hard to copy.
drive speed critical.
recopy t1 until it boots.
t0-t22
t1 parm 0F=02 10=03 11=03
parm 12=02 28=03 29=FC
parm 68=40 69=20 6A=10
parm 6B=08 6C=04 6D=02
parm 6E=01 mode#3 or #4
c. hard to copy
recopy t0 until it boots
t1-t22
t0 parm 28=2 or 3
d. t2-tF
t0 parm 28=2 or 3
e. drive speed critical
t0
t1.25-t22.25 mode#2
f. very hard to copy.
drive speed critical.
recopy t6 until it boots.
t0-t22
t6 parm 0F=02 10=03 11=03
parm 12=02 28=03 29=FC
parm 68=40 69=20 6A=10
parm 6B=08 6C=04 6D=02
parm 6E=01 mode#3 or #4

SENT=SENTIENT SOFTWARE
a. normal
b. t0.25-t10.25

SIER=SIERRA ONLINE
a. normal
b. recopy t0 until boots
t1-t22
t0 parm 28=1 or 3
mode#3 or #4
c. t0-t22
t1 mode#3 or #4
d. t0-t22
t3 mode#3 or #4
e. t0-t22 parm 28=41
or
t0-t22 parm 5=2
f. mode#2
g. t0-t22
t18 mode#3 or #4
h. t0-t22 inc2
t1.25-t21.25 inc2
i. t0-t20
t21.25-t22.25
j. t0 mode#3 or #4
t1-tF
t10 mode#5 or #6
k. drive speed critical
mode#2, #5, or #6
l. t0-t22 parm 28=40

SILI=SILICON VALLEY SYSTEMS
a. very hard to copy
t11-t22
t0-tA parm 28=2
mode#3 or #4
tB.25-t10.25 parm 0=1
mode#2
or try:
t0-tA parm 04=10
mode#3 or #4
tB.25-t10.25 mode#2
t11-t22
b. t0-t8
t9-t22 mode#2
or try:
t0-t8
t9.25-t22.25 mode#2
t0-t11
c. very hard to copy
t1-t11
t12.25-t22.25
t0 parm 28=2
d. t0 parm 28=1, 2 or 3
20=AE mode#6 or #2
d. recopy t12.25-t13.25 if
disk doesn't work
t0-t5
t6.5-t22.5
t12.25-t13.25
parm 28=3 mode#2
e. very hard to copy
drive speed critical
write-protect disk
t0-t12

STRA=STRATEGIC SIMULATN INTRNL
a. normal
b. mode#2
c. t1-t22
t0 mode#3 or #4
d. t0-t22 parm 28=40 57=D4
parm 59=B7
e. hard to copy
recopy t0 until it boots
t0 parm 28=1 29=0
t1-t20 parm 28=0
t22.5 mode#2
t21.75 mode#2
t21.25 mode#2
t20.75 mode#2
f. t0
t1.25-t22.25 mode#2
g. t0 mode#4
t1.25-t22.25 mode#6

STRT=STRATEGIC STUDIES GROUP
a. normal

SUBL=SUB-LOGIC
a. normal
or try: parm 28=1
b. t0-t6 incl.5
t7-t8
t9.5-t1A.5
tC-t21 incl.5
c. mode#4
d. t1-t22
t0 mode#3 or #4
t6.75 mode#3 or #4

SUNB=SUNBURST COMMUNICATIONS
a. t0-t8 mode#2
t9.5-t10.5 mode#2
t11.75-t17.75 mode#2
t19.5-t22.5 mode#2
t18.5 mode#6
b. recopy tracks with errors
t0-t10
t11.5-t22.5

SUPE=SUPER SOFT
a. t0
t1.5-t5.5
t21.25-t22.25

SYNA=SYNAPE
a. normal

SYDN=SYDNEY
a. t0.25-t18.25

SYNE=SYNERGISTIC SOFTWARE
a. normal
b. mode#5 or #6

SYST=SYSTEM SOFTWARE ASSCIATES
a. normal

TARA=TARA LTD.
a. normal

TERR=TERRAPIN
a. write-protect before boot
normal
or try:
t0-t5 mode#5 or #6
t6-t22 mode#2

TIME=TIMEWORKS
a. normal

TRAN=TRANSEND CORP.
a. normal
b. recopy t0 until boots
normal

TRIL=TRILLIUM SOFTWARE
a. drive speed critical
t0-t22 parm 0=4 5=2
b. recopy t10 until boots
t0-t22
t10 parm 04=10 08=2 09=0
mode#3 or #4

TRUT=TRUTEC SOFTWARE
a. normal

TSRG=TSR GAMES
a. normal

TSRH=TSR HOBIES INC.
a. normal

TURI=TURNING POINT SOFTWARE
a. t0-t22 parm 5=4
or try:
t0-t21 parm 5=4
t21.75

TURK=TURNKEY SOFTWARE
a. normal

UNIT=UNITED SOFTWRE OF AMERICA
a. t0-t23

USAS=USA SOFTWARE
a. normal
or try:
t0-tF mode#2

VENT=VENTURA EDUCATION SYSTEMS
a. normal

VERB=VERBATIM
a. drive speed critical
mode#2

VERS=VERSA COMPUTING
a. normal

VIDE=VIDEX
a. normal

VISI=VISI CORP
a. normal
b. mode#2
c. t0-t22 parm 28=3 mode#2
d. t0-t2
t3-t22 parm 28=40 59=B5
parm 5E=7F 5F=7F

WILL=WILLIAM'S ELECTRONICS
a. normal

WIND=WINDHAM CLASSICS
a. recopy t0 until it boots
t0-t22 parm 0=4 05=12 08=5
09=0 28=60 2B=FC 2C=FF
2D=FF 4A=0 4B=2 4C=2

XPSI=XPS INC.
a. t0-tA mode#2
t3 parm 12=5 16=8 or 16=14
mode#2
or try:
t0-tA
t2-t3 mode#5 or #6

ZANE=ZANER-BLOSER SCHOOLWARE
a. t0-t22
t9.75

ZOOM=ZOOM TELECOMMUNICATIONS
a. t0-t23

...end of EDD parms index

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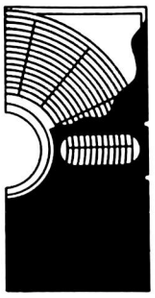

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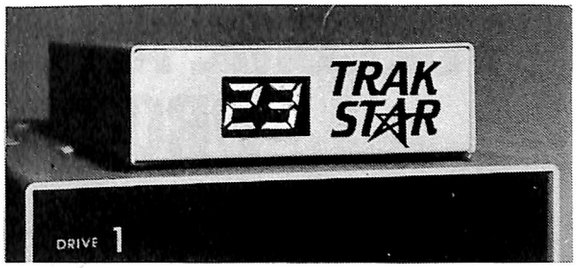

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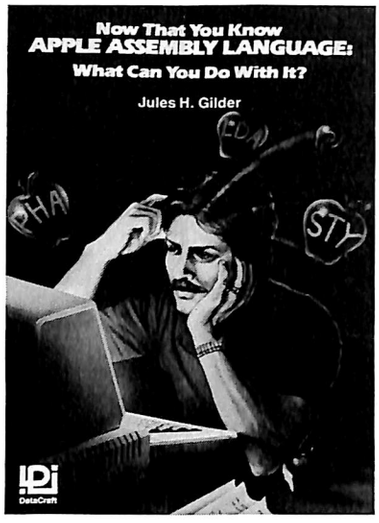

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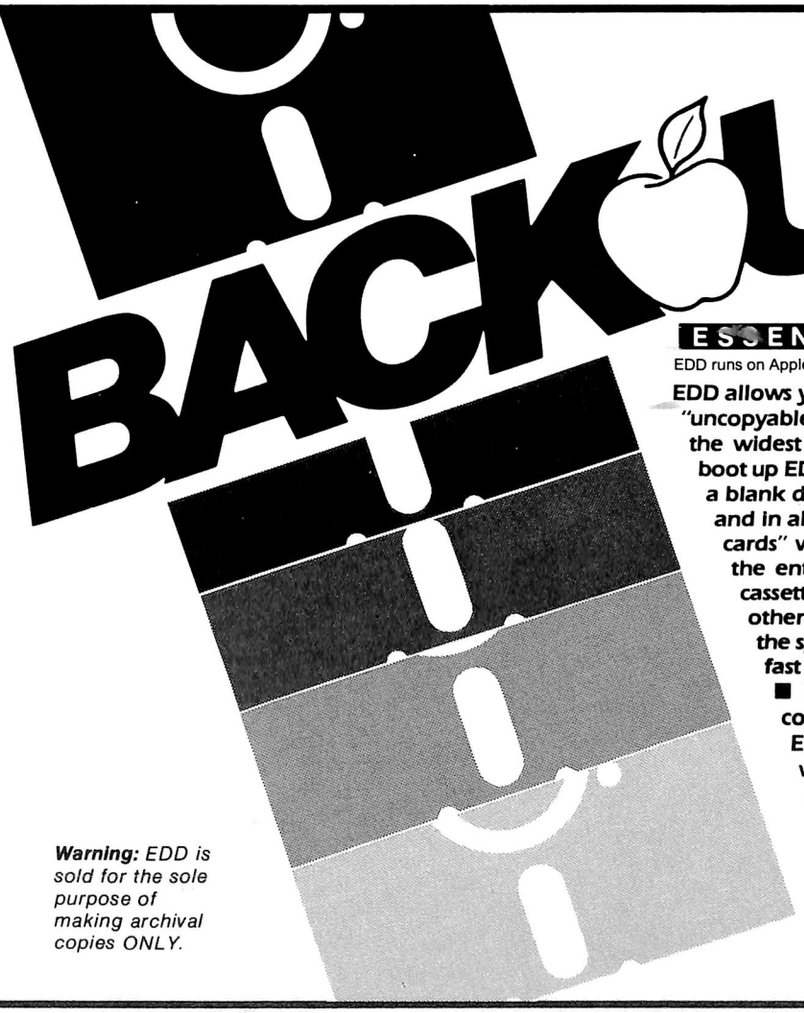

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