

HOW TO BACKUP, UNLOCK, OR MODIFY COPY-PROTECTED SOFTWARE

Hardcore

COMPUTIST

Issue No. 11

\$2.50

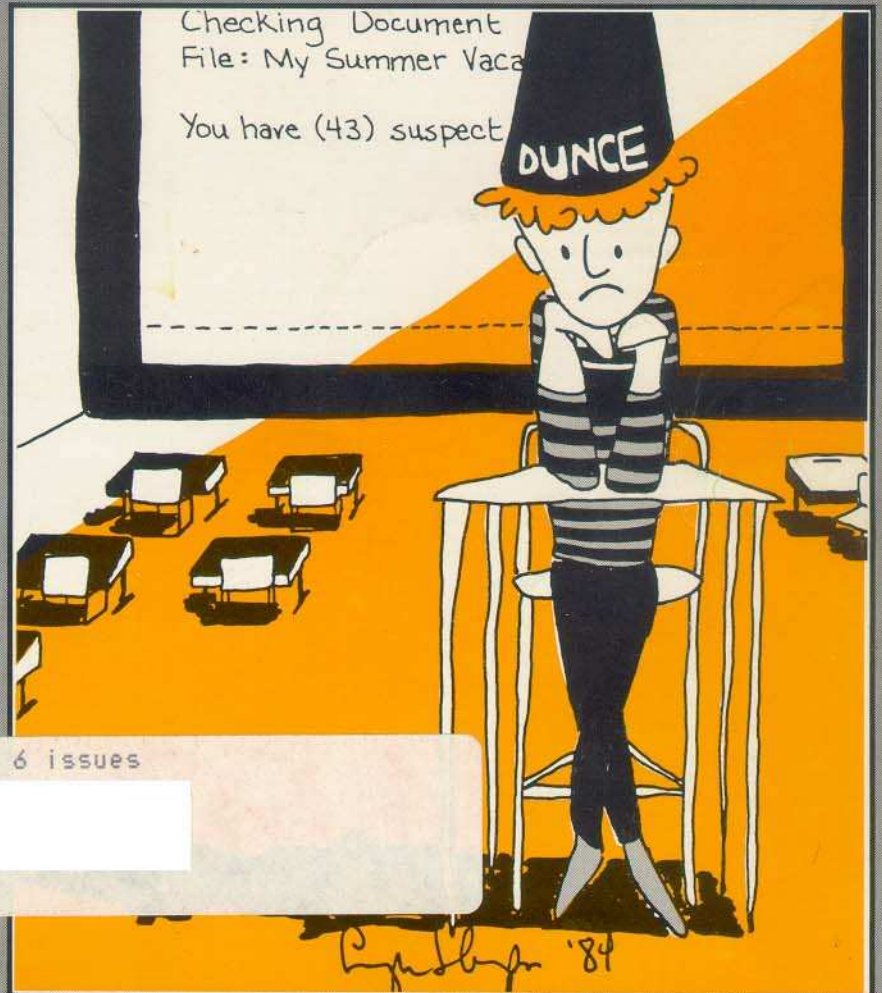
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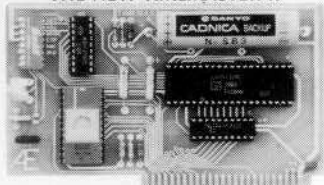
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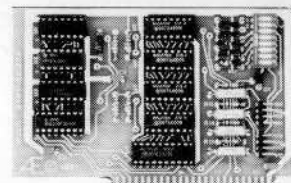
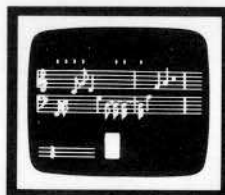
NEW 1984 DESIGN
An official PRO-DOS Clock

- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- A rechargeable NiCad battery will keep the TIMEMASTER II running for over ten years.
- Powerful 2K ROM driver — No clock could be easier to use.
- Full emulation of most other clocks, including Thunderclock and Appleclock (but you'll like the TIMEMASTER II mode better). We emulate other clocks by merely dropping off features. We can emulate them but they can't emulate us.
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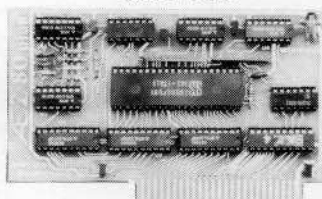
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- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
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- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
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Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

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

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

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- Permits your IIe to use the new double high resolution graphics.
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- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.

MemoryMaster IIe 128K RAM Card

- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
 - Documentation included, we show you how to use all 192K.
- If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)
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- AppTut 1 Teach Yourself BASIC
- Math&Stats 61 Regressions, Permutations, And Quadratics
- Math&Stats 59 Statistics, Curves, And Calculus
- Educ 28 School Daze
- Hello&Menu 58 HELLOHELLOHELLOHELLO
- Game 41 Star Trek
- Music&Sound 65 Music & Mozart

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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 center CORE section which generally 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.

New readers are advised to read over the rest of this page carefully in order to avoid frustration when following any of the softkeys or typing in any of the programs printed in this issue. Longtime readers should know what to do next: Make a pot of coffee, get out some blank disks and settle in for a long evening at the keyboard.

What Is a Softkey Anyway?

A softkey is a term which we coined to describe a procedure that removes, or at least circumvents, any copy protection that may be present on a disk. Once a softkey procedure has been performed, the disk can usually be duplicated by the use of Apple's COPYA program which is on the DOS 3.3 System Master Disk.

Following A Softkey Procedure

The majority of the articles in Hardcore COMPUTIST which contain a softkey will also include a discussion of the type of copy protection present on the disk in question and the technique(s) necessary to remove that protection. Near the end of the article, a step-by-step "cookbook" method of duplicating the disk will appear. Generally, the appropriate actions for the reader to perform will appear in bold-face type. Examples are:

1) Boot the disk in slot 6

PR#6

or

2) Enter the monitor

CALL -151

It is assumed that the reader has some familiarity with his or her Apple, i.e. knowing that the RETURN key must be hit following the commands illustrated above.

Hardcore COMPUTIST tries to verify the softkeys which are published, although occasionally this is not possible. Readers should be aware that different, original copies of the same program will not always contain an identical protection method. For this reason, a softkey may not work on the copy of a disk that you own, but it may work on a different copy of the same program. An example of this is Zaxxon, by Datasoft, where there are at least 3 different protection methods used on various releases of the game.

Software Recommendations

Although not absolutely necessary, the following categories of utilities are recommended for our readers who wish to obtain the most benefit from our articles:

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

Three programs on the DOS 3.3 System Master Disk, COPYA, FID and MUFFIN, also come in very handy from time to time.

Hardware Recommendations

Certain softkey procedures require that the computer have some means of entering the Apple's system monitor during the execution of a copy-protected program. For Apple II+ owners there are three basic ways this can be achieved:

- 1) Place an INTEGER BASIC ROM card in one of the Apple's slots.
- 2) Install an old monitor or modified F8 ROM on the Apple's motherboard. The installation of a modified F8 ROM is discussed in Ernie Young's article, "Modified ROMS", which appeared in Hardcore COMPUTIST no. 6.
- 3) Have available a non-maskable interrupt (NMI) card such as Replay or Wildcard.

Longtime readers of Hardcore COMPUTIST will vouch for the fact that the ability to RESET into the monitor at will, greatly enhances the capacity of the Apple owner to remove copy protection from protected disks.

A 16K or larger RAM card is also recommended for Apple II or II+ owners. A second disk drive is handy, but is not usually required for most programs and softkeys.

Requirements

Most of the programs and softkeys which appear in Hardcore COMPUTIST require an Apple II+ computer (or compatible) with a minimum 48K of RAM and at least one disk drive with DOS 3.3. Occasionally, some programs and procedures have special requirements such as a sector editing program or a "nonautostart" F8 monitor ROM. The prerequisites for deprotection techniques or programs will always be listed at the beginning article under the "Requirements:" heading.

Recommended Literature

The Apple II and II+'s come bundled with an Apple Reference Manual, however this book is not included with the purchase of an Apple //e. This book is necessary reference material for the serious computerist. A DOS 3.3 manual is also recommended.

Other helpful books include:

Beneath Apple DOS, Don Worth and Peter Lechner, Quality Software. \$19.95.

Assembly Lines: The Book, Roger Wagner, Softalk Books. \$19.95.

What's Where In The Apple, Professor Lubert, Micro Ink. \$24.95.

Typing in BASIC Programs

When typing in basic programs, you will often encounter a delta ("Δ") character. These are the spaces you MUST type in if you wish your checksums to match ours. All other spaces are merely printed for easier reading and don't have to be typed unless they are after a DATA statement. Any spaces after the word DATA that aren't delta characters MUST be omitted!

It is a good idea to SAVE your BASIC program to disk frequently while typing it in to minimize the loss of data in the event of a power failure.

Checksoft

Checksoft is a Binary program that checks Applesoft programs to ensure that you have keyed them in properly. Every bin program we print has companion checksums which consist of the Applesoft program's line numbers and a hexadecimal (base 16) number for each line. After keying in a BASIC program, BRUN checksoft and compare the checksums for every line that Checksoft generates with those at the end of the program. If you use Checksoft and make a typing error, your checksums will differ from ours beginning at the line where you made the error.

Typing in Binary Programs

Binary programs are printed in two different formats, as source code and as object code in a hexadecimal dump. If you want to type in the source code, you will need an assembler. The S-C Macro Assembler is used to generate all the source code which we print, although any assembler whose use you understand will do just fine for entering source code. Binary programs can also be entered directly with the use of the Apple monitor by typing in the bytes listed in the hexdump at the appropriate addresses. Be sure to enter the monitor with a CALL -151 before entering the hexdump. Don't type the checksums printed at the end of each line of the hexdump and don't forget to BSAVE binary programs with the proper address and length parameters listed in the article.

Checkbin

Like Checksoft, Checkbin also generates checksums, but was designed to check binary (machine language) programs.

Whenever Hardcore COMPUTIST prints a hexdump to type in, the associated Checkbin generated checksums are printed after every 8 bytes and at the end of every line.

Checksoft and Checkbin were printed in Hardcore COMPUTIST no. 1 and the Best Of Hardcore Computing and are sold on Program Library Disk No. 1 and the Best Of Hardcore Library Disk.

Let Us Hear Your Likes and Gripes

New and longtime readers of Hardcore COMPUTIST are encouraged to let us know what they like and don't like about our magazine by writing letters to our INPUT column. Our staff will also try to answer questions submitted to the INPUT column, although we cannot guarantee a response due to the small size of our staff. Also, send your votes for the softkeys you would like to see printed to our "Most Wanted List."

How-To's Of Hardcore

If you are reading our magazine for the first time, welcome to Hardcore COMPUTIST, a publication devoted to the serious user of Apple II and Apple II compatible computers. We believe 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 back up 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.

Hardcore

COMPUTIST

THIS ISSUE:

Publisher/Editor

Charles R. Haight

Technical Editors

Gary Peterson Ray Darrah

Production & Graphics

Lynn Campos-Johnson

Circulation

Valerie Robinson Michelle Frank

Business Manager

Ken Fields

Advertising

Attn: Valerie Robinson
Advertising Department
3710 100th Street SW
Tacoma, WA 98499

Printing

Grange Printing, Inc.
Seattle, WA

Publishing

Softkey Publishing
P.O. Box 45201
Tacoma, WA 98445
USA

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Apple usually refers to the Apple II or II Plus computer and is a trademark of Apple Computers, Inc.

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INPUT INPUT INPUT

Word Searching on the //e

After receiving Hardcore COMPUTIST No. 9, I saw the CORE Word Search Generator by Barry Palinsky and decided to type it in. After everything was saved and stored safely, I attempted to RUN it, but it would always freeze after the input questions and never generate the puzzle. I finally looked up in the Reference Manual Addendum: Monitor ROM Listings, and found that on the //e, the subroutine (CLEOL2 .EQ \$FCA0) used in the Word Searcher was not in the Apple //e ROMs. So, here is an update to Barry Palinsky's Word Search Generator to make it run on the //e:

Fix the Word Search source code by:

- 1) Deleting line 1190
- 2) Adding lines 2210-2250

```
2210 CLEOL2 STA (BASL),Y
2220     INY
2230     CPY $21
2240     BCC CLEOL2
2250     RTS
```

If you don't have the S-C Assembler, then here is an updated hexdump:

```
0390:FB A9 AE A4 FE 20 AE 03
0398:68 69 00 C5 FB 90 EE A9
03A0:28 85 21 60 68 A8 68 A6
03A8:DF 9A 48 98 48 60 91 28
03B0:C8 21 90 F9 60
```

Also, at the end of line 670, THEN W = TW should be THEN WO = TW.

Wesley Bylsma
Holly MI

Screenwriter Again?

Re. "Softkey For Sierra On-Line Software", Hardcore COMPUTIST No. 9.

I have been trying to backup my Screenwriter II version 2.0 for several months without success. Your article brought on a new burst of effort. Unfortunately, none of the addresses offered for version 2.2 helped on mine. Since I have not yet completed Lesson 1 on Machine Language, I was unable to follow the article's logic. Fortunately, another source helped me out. Courtesy of the Back-Up Book published by Central Point Software in conjunction with their COPY II PLUS, I got the following formula:

- 1) Copy entire disk with "COPYA"

2) Change

TR	SEC	ADDRESS	FROM	TO
03	0	94	20	EA
		95	00	EA
		96	7F	EA
13	04	4D	20	EA
		4E	00	EA
		4F	6D	EA

All the addressed bytes showed up as advertised, and the changes worked! Thought you might be interested. Keep up the good work.

Jack Weiss
Sarasota FL

Infocom Update

Just a short note to bring you up-to-date on my method for copying Infocom Adventures, outlined in COMPUTIST No. 5, "Backing Up Starcross". The method I've used here will work on all the Infocom games. Here is the complete list of games and the tracks to copy.

Zork I	1-24 (\$01-\$18)
Zork II	1-24 (\$01-\$18)
Starcross	1-24 (\$01-\$18)
Infidel	1-26 (\$01-\$1A)
Zork III	1-28 (\$01-\$1C)
Planetfall	1-28 (\$01-\$1C)
Suspended	1-28 (\$01-\$1C)
Witness	1-28 (\$01-\$1C)
Deadline	1-30 (\$01-\$1E)
Enchanter	1-30 (\$01-\$1E)
Sorcerer	1-30 (\$01-\$1E)

Aside from the track differences, the copy method for each of these disks is the same as in the article, including the sector modification.

Jeff Rivett
London, Ontario
Canada

Parms for Facemaker

Re. L.P. William's letter (West Warwick RI) in issue No. 9.

I have not been able to unprotect the Facemaker program from Spinnaker Software, but I have been able to back it up. First, copy the disk with COPYA. Then track 0 must be recopied with any of the following methods depending on which copier you prefer.

- 1) EDD synchronized

2) Locksmith 5.0 synchronized (Default on all other options)

- 3) Copy II +
34=1 36=2A 37=1B 38=FC 3E=2

The copy protection involved here seems to involve a bit-insertion routine which causes part of the track to be written in self sync-bytes. The backup routine listed above may also work with other Spinnaker programs but I have not yet experimented with this.

Rocky Giovinazzo
Nashua NH

Help With Applewriter //e

The Gila Valley Apple Growers Association maintains a AWIIe voice helpline for Applewriter TM IIe users at (602) 428-4073. There is no cost for this service except for the usual phone charges. Best calling times are 8-5 weekdays, Mountain Standard Time. The association also can supply an AWIIe toolkit package consisting of eight crammed-full diskette sides. Included are such goodies as patches for NULL, "shortline", and //c de-trashing, answers to hundreds of most-asked helpline questions, microjustify and proportional space, cameraready secrets, a complete and most thorough disassembly script, sourcecode capturing info, self-prompting glossary secrets, and much more. Individual NULL, "shortline" and "//c De-Trashing" patches are available free on written or phone helpline request. Their mailing address is Box 809, Thatcher AZ 85552.

Don Lancaster
Thatcher AZ

Don Lancaster is the well known author of such books as TTL Cookbook and Enhancing Your Apple II, Vol. 1. Don could use some help from our readers because Howard Sams has been delaying the publication of Enhancing Your Apple II, Vol. 2. Call or write Bill Oliphant at Howard W. Sams, 4300 West 62nd St, Indianapolis, IN 46268, 317-298-5612 and tell him you want to see this book in print immediately.

Don's company, Synergetics, also sells a RESET modification kit for the Apple //e which will allow you to RESET into the monitor at will.

More Parms for Wanted List

The Super IOB program in Issue #9 is really useful, and I hope that you will publish

new controllers soon. I have some good news for those of you who own "Nibbles Away II". I have some parms for programs on the Most Wanted List.

To copy DB Master 4.0:

- 1) Copy tracks 0-22 Address = D5 AA 96
Override Standardizer
- 2) Gap byte 1 = C0, 2 = D0
- 3) Filter = C0-C8 (no inverse)

For Visiblend:

- 1) Copy 0-22 Address = D5 AA 96 (Errors on tracks 3&4, OK)
- 2) Modify sector [F = 16, C = OFF, T = 00, S = 03]
- 3) Change address 84 from 4C to AD
85 from BE to E9
86 from AE to B7

Hope these are of use to some of you. Also, for those who have Disk Muncher 1.0 or 1.1, it will copy all Infocom games and some Synergistic Software programs. I'll keep the parms rolling in.

Geoff Allen
Toronto, Ontario
Canada

Word Processor Recommendation

I would like to commend you on providing practical applications and reviews. I was getting very frustrated with the "graphics" issues because they were very limited in scope. If possible, I would like to see a soft-key for the BPI accounting packages, in particular, the general ledger program. Backups are \$30 from the company and I feel that this should be provided in the already inflated price of the program. As far as word processing goes, I have tried several: Super Text, Screenwriter, AppleWriter, Magic Window and now I have found a simple, complete, unprotected, high quality word processor in "The Write Choice" by Roger Wagner. \$44.95 is an extremely low price for such a versatile package, which includes program and style manuals as well as a typing tutor.

Dale Perrymore
Fort Smith AR

Dale: In a trend we hope more publishers will follow, Roger Wagner Publishing has both lowered the prices and removed the copy-protection of its software.

Integer Card In A //e

I am sure everyone realizes the benefits of having an Integer firmware card in their machine-instant access to the monitor. If you are like me though, you have an Apple //e with all the slots filled, including an 80-column card. There is one slot empty, but everyone knows you can't use slot 3 if you

have an 80-column card...or can you? Turns out that if you remove the switch from the firmware card and carefully make a three-wire "extension cord" for it so you have access to it outside the case, the card will fit in slot 3 and permit instant monitor resets without apparent interference of any kind in the operation of the 80-column firmware! The only drawback is that the card is not accessible by the normal DOS "INT" command. However, that too is easily fixed. There are three ways to "repoint" DOS to slot 3. One is to POKE 23112,176 and POKE 23104,177 in a "HELLO" program. Another is to go into the monitor directly and put a \$B0 in location \$A5B8 and a \$B1 in location \$A5C0. If you want to make the change permanent, either "INIT" with the POKEd DOS or use a sector editor to directly change Track 1, Sector 4, byte \$B8 to \$B0 and byte \$C0 to \$B1. You now have the ability to use Applesoft from the motherboard, Integer from ROM, use the "language card" in its usual fashion, and instant access to the monitor all in an Apple //e. Not bad!

Kenneth W. Watters, Jr.
Bellevue WA

Hardcore for IBM? MacHardcore?

How about a Hardcore Computist for the IBM PC and compatibles? It can be just as much a problem there to make backups for one's software as with the Apple's. The IBM's market is growing even faster than Apple's, is it not?

Does subscription to your magazine have any advantage to an Apple Macintosh user? Program modifications? Real software reviews? How to get around Microsoft's nutty protected disks? How to build new programs? Please advise.

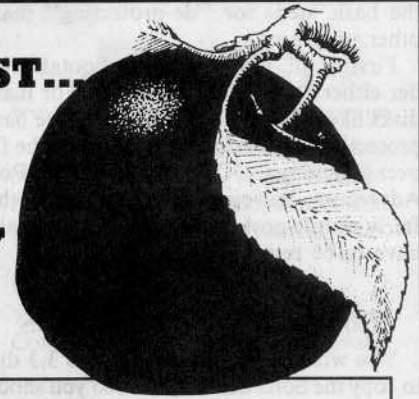
NOTE: The two letters above are representative of numerous letters we have received recently requesting copy protection information for computers other than the Apple II series. At this time we have no definite plans to cover other computers, although we heartily agree that there is a need for this type of information.

Please let us know whether you would like to see Hardcore COMPUTIST include information related to copy protection on any of the other popular micro's.

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- Make backups more easily
- Move software from floppy to hard disk
- Add custom modifications such as fast-DOS to speedup LOADs and SAVEs

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READERS' SOFTKEY & COPY EXCHANGE

Softkey For SoftPorn Adventure By Wes Felty

SoftPorn Adventure
Sierra On-Line Systems
36575 Mudge Ranch Road
Coarsegold, CA 93614

Requirements:

SoftPorn Adventure
One blank disk
Copy II+ or MUFFIN

After several sojourns into the semi-sleazy world of Sierra On-Line's SoftPorn Adventure, I attempted to SAVE a game in progress, but was only rewarded with an "I/O error." I then decided that this disk needed to be moved to a normal DOS. The steps are quite simple and illustrate some of the basic steps for "de-protecting" many other programs.

First of all, this program is bootable under either DOS 3.2 or DOS 3.3. For many disks like this, all it takes to break the basic protection scheme is to "MUFFIN" the file over to a normal DOS 3.3 disk. On SoftPorn Adventure, however, there are some other fairly simple protection schemes which also have to be removed.

Conversion to Normal DOS

You will need a formatted DOS 3.3 disk to copy the SoftPorn files onto so you should INIT a blank disk if you don't already have one at hand. Then, either BRUN MUFFIN from the DOS 3.3 System Master or the normal copy mode of COPY][+. If you use COPY][+, set the source disk to DOS 3.2 and the destination to DOS 3.3. Copy (or MUFFIN) all files except 'HELLO' to the 3.3 disk using the wildcard character ("=").

Unusual File Names

An old method of protecting files on a disk was to include control characters within the name or the use of characters that couldn't be entered from the keyboard.

SoftPorn Adventure's files are named "CHAIN", "HELLO", "\\\\", "\\\\", "\\\\", "\\\\", "\\\\", and "\\\\".

Modern copy programs such as COPY][+ have no trouble displaying titles like this or copying the programs. The Apple //e allows direct entry of these characters, but on an Apple II or II+ about the only way to get control characters and characters not on the keyboard is to do a CATALOG and then

use ESC I's and the right arrow key to trace over the file names. Of course, if you have a disk editor you can use it to change the file names directly on the directory sectors, although I would not recommend doing this to an original disk. The use of the wildcard character when transferring files using FID eliminates the any problems caused by the use of unusual file names.

I recommend not renaming the files on the SoftPorn Adventure disk. If you wish they can be easily LOADED and LISTed by CATALOGing and using ESC I and the right arrow key. If you change the names then you will also have to change the names inside the programs. A "\\" shows up in a program as "LOG" and "_" shows up as "SIN". In "_____", lines 550, 560, and 580 refer to "\\\\". Lines 520, 530, and 540 refer to "_____" and line 610 refers to "____". In program "____", line 2011 refers to "\\\\". Line 510 in the program "\\\\" refers to "____".

Nibble Count

SoftPorn's first line of defense actually isn't its DOS, but the use of a nibble count. Checking through the HELLO program, I found that its only real function was to perform the nibble count. Therefore, don't bother copying it or delete it after transfer. RENAME "_____" on your new disk as HELLO. Next, LOAD HELLO and DELETE line # 347 which again checks the nibble count, and SAVE HELLO again.

The RESET Vector

The last step in the deprotection of this program is the disabling of the "on RESET, BOOT" command. To do this, type LOAD HELLO and then list line 0(LIST 0,1). Delete the "POKE 1011,0" and the "POKE 1012,0" commands. These pokes set up the RESET vector so that it will BOOT when RESET is pressed. Save HELLO again and you have a fully broken SoftPorn ADVENTURE.

Advanced Pornography Technique?

The deprotected SoftPorn Adventure disk works just like the original, except that you can now save a game in progress, even onto the game disk itself. Just ignore the prompts to switch disks. You may also list the BASIC programs by LOADING them using the right arrow retype. You can also read the Text files using COPY][+'s "VIEW FILES/TEXT" option for some clues for playing the game. You can even RESET from within a game, give yourself a million dollars (enter M = 10000), and enter CONT to get back into the game. One final clue to the game. As the serpent told Eve: "One

man's garbage is another man's gain."

Recapping, here are the necessary steps for making a backup of SoftPorn Adventure.

1) Use MUFFIN from the DOS 3.3 Master disk to transfer all the files except "HELLO" from the original SoftPorn Adventure over to a formatted DOS 3.3 disk. Use the wildcard character ("="), with prompting, when making the transfer

BRUN MUFFIN

Alternatively, the normal file transfer utility from COPY][+ can be used if the original DOS is set to 3.2 and the copy DOS is set to 3.3.

2) RENAME the file called "_____" on the copied disk as "HELLO."

RENAME _____,HELLO

If you have an APPLE II or II+ you will need COPY][+ or a disk editor to change the file name. CATALOGing the disk and then using ESC I's and the right arrow key will also work.

3) The final step removes the nibble count check from the "HELLO" program and keeps it from rebooting if the RESET key is hit during play of the game. We will remove line 347 completely, and remove the commands POKE 1011,0 and POKE 1012,0 before resaving the file.

LOAD HELLO

347

0 POKE 34,0: POKE 35,24: CLEAR
SAVE HELLO

Softkey For The Einstein Compiler Version 5.3 By Marco Hunter

The Einstein Compiler
The Einstein Corporation
11340 W. Olympic Blvd.
Los Angeles, CA 90064

Requirements:

48K Apple II+ or equivalent
One disk drive with DOS 3.3
A blank disk COPYA program on DOS 3.3
System Master
A sector editing program
The Einstein Compiler 5.3

Although it has a few shortcomings, the Einstein Compiler is probably the best of its kind available. The compiler produces a file which is usually saved as a huge Applesoft program and tricks DOS into thinking it is

Softkey For MASK OF THE SUN (A Correction)

By Gary Wolfe

Requirements:

Apple II+ or equivalent
One disk drive
Backup of Mask Of The Sun disk
Sector Editor such as DiskEdit or ZAP

After following the procedure described by John J. Liska in his article "Softkey For Mask Of The Sun" (Hardcore COMPUTIST 7, Vol. 3, No. 3) page 27, I discovered a minor flaw in the backup procedure. When I tried to save the game, I found myself in the monitor looking at the contents of A, X, Y, and S. The 6502 had evidently executed a BReak instruction (op code 00) which displays the contents of the various 6502 registers. Leaving a BRK instruction in finished code is not considered good programming practice.

Looking things over, I discovered that the problem was in a routine that switches from the protected DOS used on Mask Of The Sun to standard 3.3 DOS so that the games can be saved onto normal disks. This routine is nestled into some free space in DOS at \$BA69-\$BA95. Since the backup procedure produces a disk that uses normal DOS 3.3, this routine is not present, nor is it needed.

To make your backup work properly when you want to save a game you need to put some valid code in the \$BA69-\$BA95 area to prevent the crash. This code won't do anything except perform a RTS (Return From Subroutine) instruction when it is called. This change can be made with a sector editing program. The necessary steps are detailed below.

Making The Correction

- 1) Boot up your sector editor and read in track \$0, sector \$C of the backup copy of Mask Of The Sun. This sector is read into page \$BA of memory.
- 2) Change bytes \$69-\$94 all to EA's (NOP instructions) and byte \$95 to a 60 (RTS).
- 3) Rewrite the sector back to the disk.

Your backup copy of Mask Of The Sun will now work just like the original did, including the SAVE GAME command. However, it is still up to you to figure out how to get past the snake.

loading an Applesoft file, when it is actually loading a compiled program as well as a library of subroutines. But that is for a review, and this is a softkey. Suffice it to say that Einstein is most likely your best bet in Applesoft compilers.

Einstein is a program which resides on an essentially normal disk. The infamous nibble count technique is used to ensure that an original disk is being used. The procedure for locating a nibble count usually involves much time, knowledge of assembly language and assembly language tricks. A little luck can also come in handy. Fortunately, all nibble counts involve some method of accessing the disk. Since a disk controller card can reside in any of the Apple's slots, the nibble count must adjust itself to the slot being used. The most popular method is to load the X or Y register with the slot number (technically the slot number * 16) and then to access the location C08C + X or C08E + X. In assembly language, it would look like this.

```
LDA $C08C,X LDA $C08E,X  
LDA $C08C,Y LDA $C08E,Y
```

Note: other options include LDY \$C08E,X and LDX \$C08C,Y.

Since both the register loaded and the index used can change, it is best to search for C08C or C08E. Because two byte addresses are always reversed in machine language the bytes to search for are 8C C0 and 8E C0. After locating these bytes on a disk, preferably with a disk search utility such as Bag of Tricks or The CIA, you should disassemble the code to find out if it is truly a nibble count. Try to avoid searching tracks 0-2 because these generally contain DOS or some type of RWTS which are usually full of 8CC0's, but not nibble counts. Many times the code around a nibble count will contain many PLA's and PHA's. The software companies hope that by playing around with the stack they can fool most people.

Once you have located a nibble count, you can eliminate it in several ways. You could either put an RTS (return from subroutine) at the beginning, NOP (no-operation, which does nothing) the entire routine, jump out of it, or avoid jumping into it in the first place. Keep in mind, however, that some companies also protect their disks by including checksum routines which can detect the presence of altered code. Sierra On-Line is one company known to do this (See the article "Softkey for Sierra On-Line Software" on page 24 of Hardcore COMPUTIST No. 9).

Of course, some knowledge of assembly language is an invaluable aid when tracking down protection schemes. If you don't happen to know any assembly language yet, it would be well worth your time to pick up a good book on it. Assembly language is not as mysterious and hard to learn as many people would have you believe. If you can just learn the hexadecimal number system and

condition yourself to think in it when necessary, half the battle of learning assembly language will be behind you. Even if you never write a single assembly language program, just being able to follow code written by others is a valuable skill.

Well, enough talk. On to the process!

I located the bytes on Einstein and figured out a way to jump around the routine, so that everything went as normal.

- 1) Make a copy of Einstein with COPYA.
- 2) Use your sector editor to modify:

track	sector	byte	old	new
08	04	2A	BD	4C
08	04	2B	8C	E2
08	04	2C	C0	91



Bugs In Hardcore COMPUTIST No. 9 & 10

The SUPER IOB article in issue No.9 contained two typographical errors that may have caused problems for some. Here is a correction of them:

Page 14, column 1

The first line number in the Standard Controller should be 1000, not 0000.

Page 22, column 1

In line 380 of the program there should be a blank space after the word copy and the equal sign (=). Line 380 should have read:

```
380 A$ = "VOLUME^NUMBER^FOR^  
COPY^=>254" : HOME :  
GOSUB 450 : HTAB 32 :  
INPUT "" ;VL$ :VL = VAL (   
VL$) : IF VL$ = "" THEN  
VL = 254
```

This error does not affect the functioning of SUPER IOB, but it will produce a program with checksums that do not match the ones which we printed.

We also neglected to include a byline on the title page of the article, "Softkey for The Bank Street Writer". The article was co-authored by Earl Taylor and Steve Morgan. Our apologies to Earl and Steve.

Copy II Plus (4.4C)

By Dr. Phillip Romine

Update Of
An Old Friend

The recently released version of Copy Two Plus (4.4C) looks very much like Version 4.1 in its display and external characteristics, and most of the parameters remain unchanged. But don't be misled by externals. In default copying performance the new Copy Two Plus has made a quantum leap and now compares favorably with the very best of the other bit copiers.

GENERAL FEATURES

The relatively few changes in appearance and format definitely make Version 4.4C easier to use, the most important of which are questions that allow the user to choose synchronization and/or nibble count preservation directly from the menu (the older version required a parameter change). The queries about slot number have also been omitted. The parameters which have been changed are also definite improvements: the default header value of D5 AA B5 on the older version has been changed to D5 AA 96 for the more common DOS 3.3 disks and the parameter which instructs the copier to clean the sync fields now defaults to off. The manual update describes a few other positive parameter modifications.

An important improvement which is not evident from viewing the title page and menu (nor mentioned in the manual update) is that Version 4.4C will read and write quarter and three-quarter tracks. The only visible evidence of this new capability appears after the user has typed in a quarter or three-quarter track instruction. When the copier begins to function, the display which shows the track currently being read (upper left on the monitor screen) does display the appropriate .25 or .75.

By failing to mention this useful feature, the authors run the risk that a customer could use Copy Two Plus for months and never realize that it will handle quarter tracking.

Copy Two Plus 4.4C will copy itself with parameters left at their default settings. Central Point Software has frequently been commended for this positive backup philosophy, and happily it has continued.

Finally, the excellent collection of D.O.S. utilities on the older II Plus are unchanged on the new disk.

PERFORMANCE

How good is Copy II Plus 4.4C? It's now one of the two best bit copiers available. I recently compared the performance of five

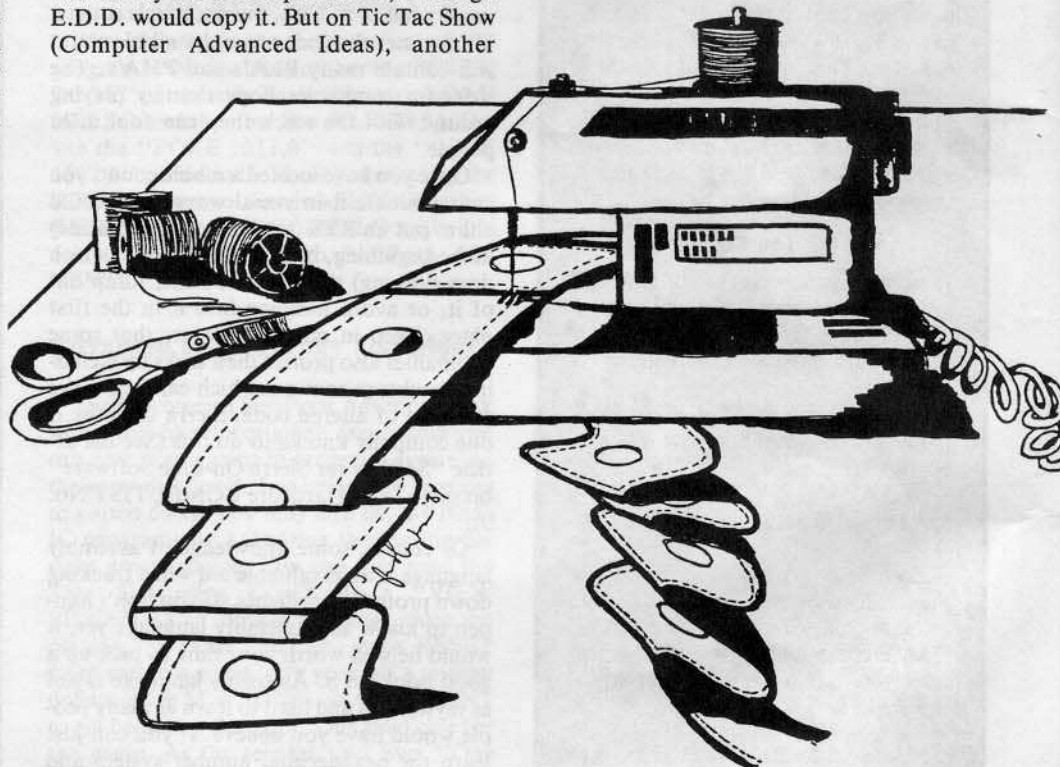
of the most popular bit copiers across a sample of 20 disks ranging from barely protected to heavily protected (Hardcore COMPUTIST, Issue No. 8). Upon receiving the updated Copy II+, I used it on these same 20 disks to judge its relative performance against its competitors. I can say unequivocally that it out-performed the old Copy II+, Nibbles Away II (C3), Back It Up III, and Locksmith 5.0, all by a wide margin. Its strongest competitor was Essential Data Duplicator III. Copy II+ handled one more of these disks than E.D.D. with parms at their default settings, but there was one disk (Seafox from Broderbund) which I could not copy with II+ but could copy with E.D.D. I also found one disk outside this sample of 20 that E.D.D. would copy in its default condition that Copy II+ wouldn't handle - Locksmith 5.0, Revision Level D. However, the regular copy program from the II+ disk will copy this version of Locksmith faster and more easily than E.D.D.

Overall, the two copiers were so close in performance on these 20 disks that I scrounged up several more difficult disks to compare further, but was still unable to establish a clearcut winner. On the Sensible Speller IV (Sensible Software), Copy II+ was clearly the better performer, although E.D.D. would copy it. But on Tic Tac Show (Computer Advanced Ideas), another

difficult disk, E.D.D. was better. And so it went through several other disks, on to a dead heat. Generally, with the exceptions mentioned earlier, both copiers will copy the same disks, but one often does so more easily than the other. And undoubtedly Copy II+ would handle the Seafox disk if I had the proper parameter settings - those provided in the listing are for another version of Seafox/-Choplifter.

From this experimentation, I was able to form some general impressions: Copy II+ finds the track start/end better than E.D.D. on most disks. There are fewer error codes and fewer tracks to recopy. On the rare occasions that these copiers need address or data headers, Copy II+ seems to work better after the header has been provided.

Copy II+ also has the more precise syncing. On some of the Plato disks (Control Data) E.D.D., in addition to choosing



the sync option, needs Parm 17 set to FF to tighten up the syncing and get copies which work. Likewise, Back It Up III needs global parm 8F7E set to BA for the same purpose. Copy II+ requires no parameter changes beyond choosing the sync option.

Table 1

BACK IT UP III (Sensible Software)

Tracks 0 and 03 with sync
Tracks 04-12, normal

CAREER DIRECTIONS (Systems Design Associates)

Tracks 0.25 thru 22.25
Parm 3E=2 on all tracks
Program disk and data base disk are the same

MICROSUBTRACTION (Hayden Software)

Tracks 00-22 with sync
Parms 00=4, 30=06, 3E=2 for all tracks
(Track 05 may have to be recopied repeatedly; error code OK.)

TIC TAC SHOW (Computer Advanced Ideas, Inc.)

Tracks 6-22, normal
Track 0 with sync
Tracks 1.5-4.5 with sync
(Recopy tracks 0, 1.5-4.5 repeatedly if necessary. Erasing first may help.)

SENSIBLE SPELLER IV (Sensible Software)

Tracks 0, 2-22, normal
Tracks 01 with keep track length (nibble count) option
Recopy track 1 (the "dongle" track) repeatedly if necessary.
Use the same drive for the nibble count if necessary.

SCREENWRITER II (Sierra On-Line)

Tracks 0-22
Parm 3E=2 on all tracks
(Note: There are other versions with slightly different protection.)

PFS GRAPH (Software Publishing Co.)

Tracks 0-22, normal.

WHOLE NUMBERS: PLATO (Control Data Corp.)

Tracks 0-22 with sync
Parm 30=06 for all tracks

GERMAN SHOPPING VOCABULARY: PLATO (Control Data Corp.)

Tracks 0.25-22.25, normal

BANK STREET WRITER (Scholastic)

Track 0, normal
Tracks 1.25-1C.25, normal
(Note: This *is not* the Broderbund version of BSW)

On the other hand, E.D.D. has the better automatic nibble counting routine. Copy II+ is much more prone to give a nibble count error, although the copied disk will sometimes work anyhow. Probably the nibble count tolerance required by some disks is less than the Copy II+ default tolerance setting. Unless drive speeds are almost exactly the same, it is often better to use only one disk drive with Copy II+ to preserve a nibble count. This is no problem when only one track is involved, but can be laborious if much nibble counting is necessary. E.D.D. is also faster, although not by much.

— COST EFFECTIVENESS —

Copy II+ 4.4C wins this competition hands down. Its price from Central Point Software has been held to \$39.95, the same as the 4.1 Version. I'm sure the discounters will have it for less very soon. Thus, with roughly equivalent performance, and with many additional features on its diskette which E.D.D. doesn't offer, Copy II Plus 4.4C is only half the price of E.D.D. Compared with Locksmith 5.0, Copy II+ is a virtual bonanza, offering clearly superior performance, features, and parameters at little more than one third the Locksmith price.

— PARMS —

After a quick scrutiny, it would be easy to conclude that the parameter listing for the 4.4C version is sparse. This really isn't true, however, because Central Point also provides a copy of their final parameter listing for Version 4.1. This listing, in my opinion the most complete for any bit copier, can be used with Copy II+ 4.4C when necessary. Often it isn't needed because of the superior default performance of the new version.

In trying out Copy II+ 4.4C, I've discovered a few parms not in the listing which I'll pass along. See **Table 1**.

— SUMMARY —

Copy II+ 4.4C is, in my judgement, the most cost effective and versatile of all the popular bit copiers, and also one of the two best copiers now available. My sample of disks was not randomly selected, and obviously cannot be free from bias, so I honestly can't say whether I'd choose Copy II+ or E.D.D. if I could have only one of them. The fact is that I wouldn't be without either one!

ATTENTION ADVENTURERS!

Adventure Data Base

Hardcore COMPUTIST is looking for more adventure hints to any of the popular adventure/fantasy games sold for the Apple II, II Plus or //e. These will be used in our regular column, **ADVENTURE TIPS**.

Your Clues, Please

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

How & Where

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

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

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

ADVENTURE TIPS



Essential Data Duplicator Parameter List #3-3.1

Before you attempt to make a backup copy of one of your software packages, check to see if it is on this list first. If so, copy it as listed. If not, try using the normal mode. If it still doesn't copy correctly, refer to the EDD manual for possible help.

If the program you are trying to backup is not on this list, look for other programs on this list published from the same company. If you find one, try to backup your program the same way as the one listed. Often a software company will protect all of their disks in the same way. This is especially true of older programs.

If a large percentage of read or write errors occur, try changing parameter 28 to the value of 1 or 3.

This list contains many protected software packages. To make backup copies of these programs you will need to understand the coding used:

key:

t = TRACK START or END
inc = INCREMENT TRACK
parm = PARAMETER
mode# = PROCESS MODE#
normal = NORMAL; use only default values.

If you see t5 on the list, you will need to press 5 when EDD asks for the START TRACK and also when EDD asks for the END TRACK. This way EDD will copy only track 5.

If you see t1-tA on the list, you will need to press 1 when EDD asks for the START TRACK and press A when EDD asks for the END TRACK.

If you see inc 1.5 on the list, you will need to press 1.5 when EDD asks for the INC TRACK.

If you see mode#3 on the list, you will need to press 3(auto nibble count) when EDD asks for the PROCESS MODE.

If you see normal on the list, you will need to change any of the default values. Just press RETURN (keeping the default value) at all prompts.

If the key words inc or mode# are not present, use their default values (just

press RETURN).

Example: Lets say you have BEER RUN, and you want to make a backup copy of this protected disk. You would refer to BEER RUN on the list and it says:

BEER RUN:
t0 parm 28 = 2 or 3
t1.5-tD.5 mode#2

You will need to copy two separate ranges of information from this disk. The first range is t0 parm 28 = 2 or 3. Before copying track 00, first use OPTION 2 (change parameters) from the OPTIONS MENU. Change parameter number 28 to the value of either a 2 or 3. Then copy track 00 by pressing 0 when EDD asks for the START TRACK and also when EDD asks for the END TRACK. To copy the second range; t1.5-tD.5 mode#2, you will need to copy track 1.5 through track D.5 using PROCESS MODE #2. Press 1.5 when EDD asks for the START TRACK, and press D.5 when EDD asks for the END TRACK. Press 2(sync tracks) when EDD asks for the PROCESS MODE.

Note: If the list tells you to "Write-protect before running", be sure there is a write-protect sticker on the copy BEFORE booting that disk!!!

* This parameter list is for EDD version III only. These parameters may not work with earlier versions.

Parameters provided courtesy of Utilico Microware.

A2-FS1 (SL):
t0-t6 inc 1.5
t7-t8
t9.5-t1A.5
tC-t21 inc 1.5
A2-FS2 ver 1.0 (SL):mode-4
ABM (MU):normal
ACE CALC (ART):normal *
ACE WRITER (ART):normal *
ADVENTURE (MIS):normal
ADVENTURES COMPUTER LITERACY (UNK):normal *
AE (BS):
side B:normal
side A: t0 parm 28 = 1 or 3
t1.5-tC.5
tE - t1E.5 inc 1.5

AIRSIM-1 (MS):normal
write-protect before booting?
ALI BABA & 40 THIEVES (QS):normal *
ALIEN ADDITION (UNK):normal *
ALGEBRA I (EW): normal *
ALGEBRA II (EW): normal *
ALGEBRA III (EW):normal *
ALKEMSTONE (UNK):normal
ALLIGATOR MIX (DLM):normal *
ALPINE SKIER SERIES (UNK):normal *
APPLE "21" (UNK):normal
APPLE CIDER SPIDER (SOL):normal *
APPLE CILLIN (UNK):normal *
APPLE FORTRAN (AC):normal *
APPLE LINK (UNK):normal *
APPLE LOGO ver 1.0:(AC) normal *

or try: *
t0 - t20
t21.25-t22.25 mode-2
APPLE MUSIC THEORY (AC):mode-5 or -6 *
APPLE PANIC(BS):normal
APPLE PASCAL (AC):normal *
APPLE PRESENTS-ERNIE'S QUIZ (AC):normal
APPLE PRESENTS-INSTANT ZOO (AC):normal
APPLE PRESENTS-MIX AND MATCH (AC):normal
APPLE PRESENTS-SPOTLIGHT (AC):normal
APPLESOFT-PART I (UNK):normal *
APPLESOFT TEACH ME (UNK):normal *
APPLE SPELLER III (UNK):mode-2 *
APPLE WORLD (USA):*
t0-t23
APPLE WRITER (AC):normal
APPLE WRITER II (AC):normal
APPLE WRITER IIe (AC):normal
APPLE WRITER III:(AC) mode-2 *
APPLE WRITER 80 Column PRE-BOOT (UNK):normal
APVENTURE TO ATLANTIS (SY):normal
ARTIST (SOL):see Miner 2049er *
ASCII EXPRESS II (SDS):normal *
ASTEROID FIELD (UNK):normal
AUDEX (UNK):normal
AUTOBAHN (SRS):*
t0-t6 mode-2
t9.5-tC.5
AXIS ASSASSIN (EA) : *
t0 - t20 mode-2
t21.25-t22.25 mode-2
or try:
t0 - t20 mode-2
t20.75-t21.75 mode-2
AZTEC (DM):normal
BAG OF TRICKS (QS):*
t0-t14 parm 05 = 2 00 = 4
or try:
t0-t14 parm 05 = 12
BANK STREET WRITER (BS):
note: drive speed critical
t0 -t1A
t1B-t22 mode-4 or -3
BASIC NUMBER FACTS (UNK):normal *
BATTLE OF SHILOH (SSI):normal *
BATTLE OF NORMANDY (SSI):see Miner 2049er *
BATTLESIGHT (VER):normal
BEER RUN (SRS):
t0 parm 28 = 2 or 3
t1.5-tD.5 mode-2
BENDAR (UNK):normal *
BENEATH APPLE MANOR (QS):normal *
BERMUDA RACE (SAM):normal *
BIG DOOR DEAL SERIES (UNK):normal *
BILESTOAD (DM):
t0-t6
t7.5-t1E.5
BILL BUDGE 3-D GRAPHICS (CP):normal
write-protect before booting!
BILL BUDGE SPACE ALBUM (CP):normal
BILL BUDGE TRILOGY OF GAMES (CP):normal
BOLO (SY):normal *
BOOKENDS (SEN):see Sensible Speller IV
BOOK KEEPER -1 & -2 (UNK):normal *
BORG (SRS):
t1.5-t1B.5
tD-tE
t0 parm 28 = 2 or 3
BOWLING (Data systems) (UNK):normal *
BPI ver 1.8 (AC):

DEFAULT

t0-t22 parm 08 = 18 09 = 0
 BRIDGEMASTER (DY):normal *
 BROADSIDE (UNK):normal *
 BUG ATTACK:(CC)
 t0-t22
 t1D mode-2
 t22 mode-2
 BUILDING BETTER SENTENCES (UNK):normal *
 BUMBLE GAMES (LC):normal *
 BUMBLE PLOT (LC) :normal
 BUSINESS BASIC III (AC):mode-2 *
 BUSINESS GRAPHICS (UNK):normal
 BUSINESS GRAPHICS III (UNK):mode-2 *
 CAMPAIGN TRILOGY (SY):normal *
 CANNONBALL BLITZ (SOL):normal
 CARTELS AND CUTTHROATS:(SS) normal *
 French version: normal *
 CASTLE WOLFENSTEIN (MU):normal
 CAVERNS OF FREITAGE (MU):normal *
 CCA DATA MANAGEMENT (VCP):normal
 CDEX APPLEWRITER TUTORIAL (CX):normal *
 CDEX MULTIPLAN TUTORIAL (CX):normal *
 CDEX VISICALC TUTORIAL (CX):normal *
 CEILING ZERO (TKS):normal *
 CHECKERS (OD):normal *
 t0-t6
 CHESS 7.0 (OD):normal *
 CHILDREN'S CARROUSEL (UNK):normal *
 CHILDS PLAY (UNK):normal *
 CHOPLIFTER (BS):
 note: hard to copy
 drive speed critical
 t0-tB parm 28 = 1 or 3
 tC.25-t21.25
 t22
 or try:
 t0-tB parm 28 = 1 or 3
 tB.75-t20.75
 t22
 CLOCK (Hartley) (UNK):normal *
 CODEWRITER (UNK):normal *
 COLORING SERIES 1 (UNK):normal *
 COMPU CUBE (UNK):normal *
 COMPUTER AIR COMBAT:(SSI) normal *
 COMPUTER AMBUSH:(SSI) normal
 COMPUTER AMBUSH II (SSI):normal *
 COMPUTER BASEBALL and DATA (SSI):normal *
 COMPUTER BISMARCK (SSI):normal
 COMPUTER LITERACY (UNK): *
 note: drive speed critical
 t0-t22 mode-5 or -6
 COMPUTER QUARTERBACK:(SSI) normal *
 CONGO (SN):normal
 COPTS & ROBBERS (SRS):see Epoch
 COSMIC BALANCE (SSI):normal *
 COUNTING BEE (AW):normal *
 COVETED MIRROR (PEN) (both sides):normal *
 or try:
 t0-t22 parm 28 = 1
 CRANSTON MANOR (SOL):
 t0-t22
 t18 mode-3 or -4
 CREATURE ADVENTURE (HCS):normal *
 CRIME STOPPER (HN):normal *
 CRIME WAVE (PEN):normal (t0-t11) *
 CRISIS MOUNTAIN (SY):normal *
 CRITICAL MASS (SRS) side B:normal *
 side A:
 t0-tA
 t22 mode-3 or -4

CROSSCLUES (UNK):mode-2 *
 CROSSFIRE (SOL):
 t0-t22
 t1 mode-3 or -4
 CROSSWORD MAGIC (both disks) (HLS):
 old version: *
 t0-t22 mode-2
 new version
 t0
 t1.25-t2.25 mode-2
 t3-t22
 or try:
 t0-t22 (front side)
 t3.25 or t3.75
 (back side:normal)
 or try:
 t0
 t1.25-22.25 mode-2
 CRUSH,CRUMBLE & CHOMP (EP):normal *
 CRYPTO CUBE (UNK):normal *
 CUBIT (MM): *
 t0-t22
 write-protect before booting!
 CUSTOM MICRO SYSTEMS ASSEMBLER (UNK): *
 t0-t23
 CYBER STRIKE (UNK):normal *
 CYCLOD (UNK):normal *
 DARK CRYSTAL (SOL):normal
 DARK FOREST (SRS):normal *
 DATA FACTORY 4.0 (ML):normal *
 DATA PLOT (MU):normal *
 DATA REPORTER (SY):mode-5 or 6 *
 DATA TREE (UNK):normal
 DAVID'S MIDNIGHT MAGIC (BS):
 note: drive speed critical
 t0 - t12
 t13.25-t15.25
 t22
 or try:
 t0 - tB
 tC.25- t15.25
 t22
 or see Choplifter
 DAWN PATROL (TSR):normal *
 DB MASTER 3.0 (SW):*
 t0-t5
 t6.5-t22.5
 DB MASTER 4.1 (SW)
 program disks:
 t0-t5
 t6.5-t22.5
 t12.25-t13.25 parm 28 = 3 mode-2
 DEADLINE (IC):normal
 DEATH IN THE CARIBBEAN (ML):normal *
 DEMOLITION DIVISION (UNK):normal *
 DEMON'S FORGE (UNK):normal *
 DESKTOP PLAN II (VCP):normal
 DIG DUG (UNK):normal *
 DISAPPEARING DOLPHIN (UNK):
 t0-t22
 recopy t9 until it boots
 DISK EDIT 2.0 DISK EDITOR (CP/M) (UNK): *
 t0
 t1.5 - t5.5
 t21.25-t22.25
 DISK-O-DOC II (UNK):normal *
 DISK RECOVERY (SEN):normal *
 if that doesn't work try:
 DISK RECOVERY (SEN):*
 drive speed critical

t0
 t1.25-t22.25 mode-2
 DISK REPAIR KIT ver 2.2 (UNK):normal *
 t0
 t1D-t22
 DLM Software (UNK):normal *
 DOG FIGHT (UNK):normal * (t0-t1,t4-t9)
 DOLLARS & SENSE (MON): *
 very hard to copy
 drive speed may be critical
 t0-t23
 t18 mode-3 or -4
 DONKEY KONG (ATR):normal *
 DOS ENHANCER (UNK):normal *
 DOW JONES NEWS QUOTE REPORT (AC):*
 t0-t22
 tC parm 28 = 3
 DRAGON'S EYE (UNK):normal *
 DRAGON MIX (DLM):normal *
 DUNG BEETLES (UNK):normal
 EARLY GAMES FOR YOUNG CHILDREN (LT):normal
 EASY-WRITER (IU):normal *
 EDIT 6502 (LJK):normal *
 EDU-PAINT (EW):normal
 EGGS IT (UNK):see Star Blazer
 EINSTEIN COMPILER (EIN):normal *
 ELECTRIC DUET (IN):normal
 ELEMENTARY MATH (UNK):normal *
 ELIZA (UNK):normal *
 EMPIRE 1; WORLD BUILDERS (EW):normal
 ENCHANTER (IC):normal *
 ENCYCLOPEDIA OF BRITANNICA EDU.CORP (UNK):*
 PHRASES & CLAUSES
 SUBJECTS & PREDICATES
 disk-1:mode-2 disk-2:mode-3
 EPOCH (SRS):
 t0 parm 28 = 2 or 3
 t1.5-t1F.5 mode-2
 EPYX SOFTWARE (EP):normal *
 or try: *
 t0-t22
 t1.25
 ESCAPE (UNK):normal *
 EVOLUTION (SYD): * t0.25-t18.25
 EXECUTIVE SECRETARY (SFS):normal *
 EXPLORING LOGO (UNK):normal *
 E-Z DRAW (SRS):normal
 E-Z LEARNER (UNK):normal *
 or try:*
 t0
 t1.25-t22.25
 FACEMAKER:(SPN) normal *
 FACTORY (UNK): *
 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
 FANTASY 3 (UNK):normal *
 FATHOMS 40 (UNK):
 t1-t22
 t0-t11 inc 11 mode-3 or -4
 FAX Data Disk (UNK): normal *
 program disk: *
 t0 - tD
 t2.75-t3.75
 FCM (1ST CLASS MAIL) (CTS):normal
 FIGHTER COMMAND (UNK):normal *
 FINANCIAL FACTS (SAM):normal *
 FIRE BUG (UNK):normal

FLIGHT SIMULATOR II (SL):mode-4
 FLIP OUT (SRS):
 t0-t20 (ignore errors)
 t21 parm 12=5 mode-3 or -4
 t22 parm 46=0 47=0 48=0 2C=D5
 2D=FF 28=10 39=10
 FRACTIONS (Basic Concepts) (UNK):
 t0-t22 normal or parm 28=20
 FRACTIONS, DECIMALS, & PERCENTS (UNK): *
 t0-t23
 FREE FALL (SRS): *
 t0-tA
 t21-t22 mode-3 or 4
 FRENCH ACHIEVEMENT I (MCW):normal *
 FRENCH-CLASSROOM WORDS (UNK):normal *
 FRENCH-SHOPPING (UNK):normal *
 FRENCH-TRAVEL (UNK):normal *
 FRENCH-VOCABULARY BUILDER (CD):normal *
 GALACTIC ATTACK (SIR):see Wizardry *
 GALACTIC EMPIRE (BS):normal
 GALACTIC GLADIATORS (SSI):*
 note: sometimes hard to copy
 t0-t20
 t22.5 mode-2
 t21.75 mode-2
 t21.25 mode-2
 t20.75 mode-2
 GALACTIC REVOLUTION (UNK):normal
 GALACTIC TRILOGY (UNK):normal
 GALACTIC WARS (UNK):normal *
 GAME SHOW & SUBJECTS (CAI):normal
 GAMMA GOBLINS (SRS):see Beer-Run *
 GUADAL CANAL CAMPAIGN (SSI) *
 t1-t22
 t0 mode-3
 GERMANY 1985 (SSI):normal *
 GERMAN/ENGLISH HANGMAN (UNK):normal *
 GIN RUMMY (UNK):normal *
 GOLD RUSH (SN): *
 t0.25-t10.25
 GORGON:(SRS)
 t0 parm 28=2 or 3
 t1.5-tE.5 mode-2
 GO TO HEAD OF CLASS (UNK):mode-2 *
 GRADE MASTER v1.2 (UNK):normal *
 GRADE MASTER v1.23 (UNK):*
 t0-t23
 GRAND PRIX-EST/ROUND (UNK):normal *
 GRAPHICS SOLUTION (UNK):normal *
 HADRON (SRS):see Gorgon
 HAIL (UNK):normal
 HARDCORE (UNK):normal
 HARD HAT MACK (EA):see Axis Assassin
 HARTLEY MATH CONCEPTS (HRT):normal *
 HARTLEY SOFTWARE (HRT):normal *
 HEAD-ON (UNK):normal
 HELLFIRE WARRIOR (EP):normal
 HERCULES (UNK):normal *
 HEY DIDDLE DIDDLE (UNK):normal *
 HIGH RISE (ML):normal *
 HIRES FOOTBALL (SOL):normal
 HIRES GOLF 2 (pro) (AG):normal *
 HIRES SOCCER (SOL):normal
 HODGE PODGE (UNK):normal *
 HOME ACCOUNTANT (CTS):normal
 HOMEWORD (SOL):normal *
 or try:
 t0-t22 parm 0=1

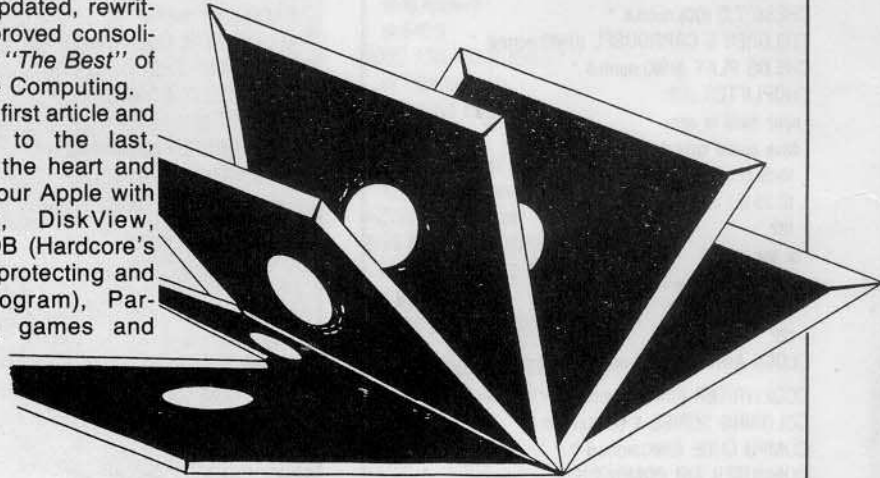
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Continued on page 13

HORIZON IV (GB): *
 t0
 t0.25-t22.25 mode-2
 HOW 'BOUT A NICE GAME OF CHESS (UNK):normal *
 HSD STATS PROGRAMS (HSD):normal *
 HUMAN SYSTEMS DYNAMICS DISKS (HSD):normal *
 IFR SIMULATOR (UNK):normal *
 ILLUSTRATOR (UNK):
 t0-t0.75 inc 0.75
 t11-t12
 t21-t22
 t1.5-tD.5 parm 28 = 40 57 = CD
 59 = D5 5E = 7F 5F = 7F
 tE.75-tF.75
 t13-t20
 I LOVE AMERICA (UNK):normal *
 INCREDIBLE JACK (BUS):normal *
 INFORMATION MASTER (UNK):normal *
 INTERNATIONAL GRAND PRIX (MU):normal (t0-tC) *
 INTRO TO MICROCOMPUTERS (UNK):normal *
 INVASION ORION (UNK):normal *
 JAWBREAKER:(SOL)
 t0-t22
 t3 mode-3 or -4
 JIGSAW (ML):normal *
 JUMP JET (AG):normal *
 JUMP MAN (UNK):back:normal *
 front:
 t0-t21
 t.75
 KABUL SPY (SRS):see Flip Out *
 KALEIDO-SOUND (UNK):normal *
 KAVES OF KARKHAN:normal *
 KEY PERFECT (MSP):normal *
 KINDERCOMP (UNK):normal *
 KNIGHT OF DIAMONDS (SIR):(both sides):
 t9-t22
 t0-t8 mode-2 or -5 or -6
 note: drive speed critical
 write-protect boot side!!!
 L.A. LAND MONOPOLY (CTS):normal
 LABYRINTH (BS):see Choplifter
 LADY TUT (CP):normal *
 LAST GLADIATOR (EA):see Axis Assassin
 LAZERSILK (UNK):see Russki Duck *
 LEARNING BRIDGE MADE EZ (UNK):normal *
 LEARNING WITH LEEPER (SOL):normal *
 LEGACY OF LLYLGAMYN (SIR):*
 note:very hard to copy
 drive speed critical
 write-protect both sides
 boot side:
 t0-t22 mode-3
 scenario side;
 t0-t22 mode-5
 or try: *
 t0.25- t22.25
 LES BATISSEURS D'EMPIRE (SOL): *
 side B:normal
 side A:
 t0 - t20
 t21.25-t22.25
 LETTER PERFECT:(LJK) normal *
 LINGUIST (UNK):normal *
 LISP (DS):normal *
 LIST HANDLER & UTILITIES (SVS):
 note: very hard to copy
 t11

t12.25-t22.25 parm 00 = 2
 t0 parm 00 = 0 28 = 2
 LOCK-IT-UP (UNK):normal
 or try:
 t1-t22
 t0 parm 28 = 1 29 = 0
 or try:
 t1-t22
 t0 parm 28 = 30 32 = AF 33 = AA 3B = 0
 3C = 0 39 = 6B...6F
 if ERR1 is displayed when booting:
 write-protect before booting
 if ERR3 is displayed:
 increase parm 39, recopy t0
 LODERUNNER (BS):
 note: very hard to copy
 drive speed critical
 t0
 t3-tC
 tD.25-t20.75 inc 1.5 mode-2
 LOLLIPOP DRAGON (UNK):normal *
 MAGICALC (ART):normal *
 MAGIC MEMORY (ART):normal *
 MAGIC SPELLS (UNK): *
 t0-t22 mode-2
 t2.75-t3.75 mode-2
 MAGIC WINDOW (ART):normal *
 MAIL LIST MANAGER III (UNK):mode-2 *
 MARAUDER (SOL):normal *
 MASQUERADE (both sides) (UNK):normal *
 MASTER DIAGNOSTICS:(UNK) normal *
 MASTERING PARTS OF SPEECH (UNK):mode-2 *
 MASTER TYPE:(LNS) see Lock-It-Up
 MATCH WITS (UNK):normal *
 MATH CONCEPTS I & II (UNK):normal *
 MATH GAMES (UNK):normal *
 MATH MAZE (UNK):normal *
 MATHWARE SYSTEMS (UNK):
 t0-t22
 t3 parm 12 = 2 mode-3 or -4
 MEGAFINDER (UNK):normal *
 drive speed critical
 MEGASPELL (UNK): normal *
 drive speed critical
 MEGAWRITER (MH):normal *
 drive speed critical
 MERLIN ASSEMBLER (SDS):normal *
 MESSAGE CENTER (UNK):normal *
 METEOR MULTIPLICATION (DLM):normal *
 METEORIDS IN SPACE (UNK):normal *
 t0-3
 t11-t13 inc 2
 METRI-VERT (UNK):normal *
 MICRO BARMATE (UNK):normal *
 MICROBE (SY):normal *
 MICRO COOKBOOK (VC):normal *
 MICRO-COURIER (MC):
 t22
 t0-t21 parm 28 = 3
 MICROWAVE (CC):normal *
 or try: *
 t0-t22
 t11 mode-3
 MILLIKEN MATH SERIES (MPS):normal *
 MILLIONAIRE (BCS):normal *
 MINER 2049er (ML):
 t1-t22
 t0 parm 28 = 1 or 3 mode-3 or -4
 MINGS CHALLENGE (UNK):see Miner 2049er *
 MINUS MISSION (UNK):normal *

MIRV (UNK):normal *
 MISSING RING (UNK):normal *
 MISSION ASTEROID (SOL):normal
 MR.COOL (UNK):mode-2 *
 MOPTOWN (UNK): *
 t0-t22 parm 28 = 3
 MOPTOWN HOTEL (UNK): *
 t0-t1
 t2.25-t1E.25 mode-2
 MOPTOWN PARADE (UNK): *
 t0-t2 mode-2
 t3.25-t20.25 mode-2
 or try: *
 t0-t2 mode-2
 t2.75-t21.75 mode-2
 MORLOC'S TOWER (EP):normal *
 MOUSKATTACK (SOL):normal *
 MULTIDISK CATALOG III (SEN):normal *
 t0-t8
 MULTIPLAN (MIS):*
 t0-t22
 tA mode-3 or -4
 MURDER BY THE DOZEN (CBS):normal *
 MUSIC MAKER (SL):normal *
 MUSICOMP (SL):normal
 MUSIC CONSTRUCTION SET (EA):
 see Axis Assassin
 MYSTERY HOUSE (SOL):normal
 French version:normal *
 NEPTUNE (UNK):see Russki Duck *
 NIGHTMARE GALLERY (SY):normal *
 NIGHT MISSION PINBALL (SL):normal
 NIKROM MASTER DIAGNOSTICS II & II\$ (NIK):normal
 or try:
 t0-t22 parm 7 = 1
 write-protect before booting!
 recopy track 0 until boot
 NORTH ATLANTIC 86 (SSI):normal *
 NURSERY STORY (UNK):normal *
 NURSERY TIME (UNK):normal *
 ODYSSEY (SY):normal
 OIL BARONS (UNK):normal *
 OLDORF'S REVENGE (HCS):normal *
 OLYMPIC DECATHLON:(MIS) normal
 OLYMPIC INSURANCE SYSTEMS (UNK):normal
 ONE ON ONE (EA):see Axis Assassin
 OO-TOPOS:(SN) normal *
 OPERATION APOCALYPSE (SSI):normal *
 OUTPOST:(SRS) see Beer Run
 PARTHIAN KINGS (UNK):normal *
 PDQ DATA BASE (UNK):normal *
 PEEPING TOM (ML):normal *
 PEGASUS II (SOL):see Jawbreaker
 PENSATE (PEN):normal (t0-t11) *
 PERSONAL FINANCE MANAGER (AC):normal
 PFS-FILE (SPC):
 write-protect before booting!!!
 note: drive speed critical
 t1-t22
 t0 mode-3 or -4
 recopy track '0' until it boots
 or try: *
 t0-t22 parm 28 = 40 mode-3 or -4
 PFS-FILE IIe (SPC):see PFS FILE
 PFS-GRAPH (SPC):see PFS FILE *
 PFS-REPORTS (SPC):see PFS File
 PFS-WRITE (SPC):normal *
 or see PFS FILE
 PHANTOMS FIVE:(SRS) see Epoch
 PHOTAR (STP):normal (t0-t8)

PICTUREWRITER:see Lock-It-Up *

PIE MAN (PEN):normal (t0-t12) *

PILL BOX (UNK):normal *

PINBALL CONSTRUCTION SET (EA):normal
or see Axis Assassin

PLANETFALL (IC):normal *

or try: *

t0-t22 mode-2

PLANTIN PAL (UNK):normal *

POLICE ARTIST (SIR):normal *

POOL 1.5 (IDS):mode-2

POOYAN (UNK):mode-2 (t0-tF) *

PORTFOLIO MASTER 3.1 (IS):normal *

PRESIDENT ELECT (SSI):normal *

PRINTER CONTRL PGM (UNK):normal *

PRINTOGRAPHER (SDS):normal *

PRINTWHIZ (UNK):mode-2 *

PRISONER (EW):normal

PRISONER II (EW):*

t0.25-22.25 mode-3

PROFESSIONAL BLACKJACK (INT):normal *

PROGRAMMER (UNK):normal *

PULSAR II (SRS):

t0 - t19

t1A.5-t1D.5

PUNCTUATION SKILLS (UNK):normal *

PURSUIT OF THE GREAT SPEE (SSI):*

t0 mode-4

t1.25-t22.25 mode-6

QUARK CATALYST III (QRK):mode-2 *

QUEEN OF PHOBOS (PH):normal (t0-t1A)

QUEST (both sides) (PEN):normal *

QUEST FOR TIRES (SOL):normal *

RANDAMN (MGN):*

t0-t22 mode-2

drive speed critical

RAPID READER (UNK): *

t0

t1.25-t22.25

RASTER BLASTER (BC):*

t0

t3.5-tF.5 inc4

t5 - t11 inc4

t6 - t12 inc4

REACH FOR THE STARS (UNK):normal *

READING BEE (UNK):normal *

READING PRIMER (UNK):normal *

REAR GUARD (UNK):normal

REGIONS OF THE U.S. (UNK):ormal *

RENDEZVOUS (old) (EW):see Miner 2049er

REPTON (SRS):see Flip Out *

RESCUE AT RIGEL (EP):normal

RICOCHET (EP):normal *

ROBOT WARS (MU):normal

ROCKY'S BOOTS (LC):*

t0-t2

t3.25-t6.25 mode-4

t7-t22

or try: *

t0-t2

t3.25-t22.25

ROUTINE MACHINE (SDS):normal *

RUBIK'S CUBE (UNK):normal *

RUSSKI DUCK (GB): *

note: drive speed critical

t0

t0.25-t22.25 mode-2

SABOTAGE (SOL):see Jawbreaker *

SAMMY LIGHTFOOT (SOL): *

note: drive speed critical

t0 mode -3

t1-t22 mode -2

SARGON II (HN):normal

SCREEN WRITER II:(SOL) normal

SEA FOX (BS):see Chopflifer

SEA STALKER (UNK):normal *

or try:*

t0-t22 parm 28 = 21 mode-2

SENSIBLE SPELLER III (SEN):

t2-tF

t0 parm 28 = 2 or 3

SENSIBLE SPELLER IV (SEN):

very hard to copy.

drive speed critical.

t0-t22

t1 parm 0F = 02 10 = 03 11 = 03 12 = 02

28 = 03 29 = FC 68 = 40 69 = 20

6A = 10 6B = 08 6C = 04 6D = 20

6E = 01 mode-3 or -4

recopy track 1 until it boots.

SENTENCE STRUCTION (UNK):mode-2 *

write-protect both sides before boot!

SERIES FR-2 (UNK):normal *

SERIES RU-2 (UNK):normal *

SERIES SP-2 (UNK):normal *

SERPENT'S STAR (ULS):normal *

write-protect before booting!

Continued on page 23

ADVENTURE TIPS

Dark Crystal Sierra On-Line

Looking for Ursu? Check out the cave. Those shadows point to the circle of stones.
In the Gelfling village, read the writing on the wall.

Enchanter Infocom, Inc.

Something's cooking in the shack. Thirsty, too? How about that nice bubbling brook.
If you're looking for light, now's the time for magic.
Don't look for a bedroom out here. Look in that castle.

Kabul Spy Sirius Software

Have a death wish? Read the sign and then go East anyway.
Or take a bus ride. Need to buy a ticket. Join the chain gang for a valuable clue. What is that drawing on the ground?

Coveted Mirror Penguin Software

Climb up to escape through that hole in the dungeon wall.
The book on the top shelf in the laboratory makes interesting reading. Only in an adventure game would a stained glass window open.
Lost in the forest? You might see something from the top of a tree.

Ulysses and the Golden Fleece Sierra On-Line

You need a crew to sail that ship. Show proper respect to the king and he might reward your efforts.
Hang on to that condor.

ADVENTURE TIPS

Adventureland Adventure International

Is there a dragon in your path? Leave him alone for now.
You can't get out of the quicksand with all those items weighing you down.
Ox stuck in the bog? The ax will give you a clue.
What does "bottomless hole" mean? Better not try it.

Mask Of The Sun Ultrasoft

*Ghosts hate music.
*Hit the skeletons with the amulet.
*In the end, give your enemy what he wants.
*Leopards like music.

Transylvania Penguin Software

*Garlic is not always an advantage.
*Deer antlers are more than just antlers.
*Black boxes can open coffins.
*The wizard's cloak has a tool.
*Gravestones hide more than coffins.
*Contributed by Henry Ou

Zork II Infocom, Inc.

*Buckets are used to bring water up a well. If anything else is in the bucket, it will go up, too.
*Locked boxes can be opened by an explosion.
*When lizards eat, they sleep to digest their meal.
*Magnetic fields make motors go. They also attract things and affect compasses.
*Contributed by Cullen Johnson



Ultimaker III

By Jeff Rivett

Sometimes a BASIC program can be deceiving. Often, it isn't clear (in a printout) exactly how many spaces follow a PRINT or DATA statement. Yet if you want your checksums to be correct and the program to function as the author intended, you must key in the program (spaces between quotes and after DATA statements, especially) exactly.

For this reason, Hardcore COMPUTIST will be printing BASIC listings with delta characters (Δ) in all the places where you must type a space. ALL other spaces are merely inserted into the program for easy reading.

When keying in DATA statements, DON'T type any spaces after the word DATA (even if there is one printed there). If you should find a delta character after the word DATA, type a space. Otherwise, DON'T! This is to ensure that your Checksoft generated checksums will match up with the ones we print for the program.

Requirements:

48K Apple II plus or equivalent
Exodus-Ultima III

Exodus, the latest in the Ultima series, is generally very much like Lord British' previous release, Ultima II. The greatest enhancement is in the amount of detail now included in some aspects of the game. A lot of thought

has gone into the refinements between Ultima II and Exodus (Ultima III).

Player information is once again stored on a "Player Disk", but the technique used to store it is different from Ultima II. A big difference is that now you can store up to twenty characters at a time on a disk instead of just one. Secondly, any four of those twenty (called a party) may go adventuring at the same time.

Six sectors (starting at track 3, sector 7) hold all the player information, the first sector holding the present party. The main list of characters appears next, on track 3, from sector 8 to sector 12. Each sector holds 4 complete characters, and each character takes up 64 bytes.

Exodus, like Ultima II, encodes most of the characters' attributes in BCD (binary coded decimal) format. On values higher than 99, the two most significant digits appear first. The following table shows what the 64 bytes for each character represent. All values in this table are between 00 and 99 unless otherwise noted. If letters are specified for a particular location, then that location holds the ASCII value (high bit set) of the letter (instead of a BCD number).

Table 1

Character Bytes:

Byte	Description	Range
0-12	Character Name in ASCII	
13	???	
14	Cards and Marks	(0-255)
15	Torches	

16	In/Out Status	(In=0, Out=255)
17	Health of Character	(G,P,D,A)
18	Strength	
19	Dexterity	
20	Intelligence	
21	Wisdom	
22	Race	(H,E,D,B,F)
23	Type	(F,C,W,T,P,B,L,I,D,A,R)
24	Sex	(M,F,O)
25	Magic Points	
26-27	Hit Points	(1-9999)
28-29	Maximum Hit Points	(1-9999)
30-31	Experience	(0-9999)
32-33	Food	(1-9999)
34	???	
35-36	Gold	(0-9999)
37	Gems	
38	Keys	
39	Powder	
40	Armour in Use	(0-7)
41	Cloth	
42	Leather	
43	Chain	
44	Plate	
45	+2 chain	
46	+2 plate	
47	Exotic	
48	Weapon in Use	(0-15)
49	Dagger	
50	Mace	
51	Sling	
52	Axe	
53	Bow	
54	Sword	

Cards and Marks

As the above table shows, Card and Mark information is not stored in a BCD format. Instead, each of the bits in byte 14 indicates the possession of a Card or Mark. For example: a value of 255 in this location indicates that all the cards and marks are held. Or, a value of 16 would indicate that the character possesses only the Mark of Force.

Table 2

Bit Card or Mark

0	Card of Love
1	Card of Sol
2	Card of Moons
3	Card of Death
4	Mark of Force
5	Mark of Fire
6	Mark of Snake
7	Mark of Kings

Other Attributes

Here are the attributes of the character which are indicated by a letter of the alphabet.

Table 3

Health	Races	Types	Sexes
(G)ood	(H)uman	(F)ighter	(M)ale
(P)oisoned	(E)lf	(C)leric	(F)emale
(D)ead	(D)warf	(W)izard	(O)ther

- (A)shes (B)obbit (T)hief
- (F)uzzy (P)aladin
- (B)arbarian
- (L)ark
- (I)llusionist
- (D)ruid
- (A)lchemist
- (R)anger

Ultimaker III edits characters from the "Player Disk." Unlike some of the other Ultima III character editors you may have seen, it will allow you to edit characters that are in a party or on an adventure. This requires changing the character's attributes in two places (namely the party sector and the main list sectors).

How to Enter Ultimaker III

First, type in the hexdump on page 18 and save it.

**BSAVE ULTIMAKER.OBJ,
ASE00,LS13E**

Next, type in the BASIC program starting on this page. Be sure to save this one before RUNning it. Also be sure to use a DOS FP and LOAD before matching up the checksums.

SAVE ULTIMAKER III

How to Use Ultimaker III

First of all, remove your Ultimaker disk and insert your player disk when prompted.

Next, a roster of all characters on this diskette (including empty cells) will be displayed. At this point, you have four options. They are:

Commands at Roster

CTRL L - Loads characters from the same disk (in case you mutilate a character beyond recognition) or from another disk (if you have more than one player disk).

CTRL S - Saves characters to the disk after editing. Be careful not to accidentally write the characters on some disk other than your player disk.

A through T - Selects a particular character and places you in the below explained edit mode.

CTRL P - Prints out the stats of a character. Must be followed by the character letter. If in your listing, you get a whole bunch of "80N's", then you should probably change or remove the "PRINT CHR\$(9) "80N";" in lines 1100 and 1110. This is in the program to stop the printer interface card from printing to the screen. The codes to do this may be different for your printer.

The Edit Mode

When you are in the edit mode, the entire character is displayed before you and one section of the character is highlighted. To alter the highlighted section, press the **Left**

and **Right arrow keys**. Once you have decided which section to change, (i.e. pressed the left and right arrow keys until the proper section is highlighted) press **RETURN**.

Entering Numbers

After you've pressed RETURN, the section will switch from inverse to normal text and you will get a flashing cursor at the first item of this section. Typing just RETURN always leaves the item your cursor is on unchanged and moves on to the next one. Pressing one number and then pressing return will change the item your cursor is on to the value you typed. If you type the maximum number of characters allowed for an item (ex. you type 47 for torches) then the number is entered automatically.

Pressing ESC (except for cards and marks) will enter all the modifications you've done so far and re-highlight the current section so that you may choose another section to edit.

When changing the weapon or armour in use, you must press a letter corresponding to the armour or weapon you wish. Pressing RETURN will leave each of them unchanged. Here are the letters that correspond to the weapons and armour:

Table 4

Weapons and Armour Letters

Armour	Weapons
A) Skin	A) Hands I) +2 Axe
B) Cloth	B) Dagger J) +2 Bow
C) Leather	C) Mace K) +2 Sword
D) Chain	D) Sling L) Gloves
E) Plate	E) Axe M) +4 Axe
F) +2 Chain	F) Bow N) +4 Bow
G) +2 Plate	G) Sword O) +4 Sword
H) Exotic	H) 2 h Sword P) Exotic

Now that you have a fighting chance, I suggest you play Exodus to the bitter end.

Ultimaker III

```

10 REM /-----\
20 REM !
30 REM ! ULTIMAKER III !
40 REM !
50 REM ! By Ray Darrah !
60 REM !
70 REM \-----/
80 REM
90 IF PEEK (104) <> 15 THEN POKE
104,15 : POKE 103,63 : POKE
3902,0 : PRINT CHR$(4)
"RUN^ULTIMAKER^III"
100 GOTO 870
110 REM READ CHARACTERS
120 HOME : VTAB 12 : PRINT SPC(11)
"LOADING^CHARACTERS" : POKE
254,01 : B = Z : GOSUB 270 :
GOSUB 190
130 R = Z : IF PEEK (2048) = Z
THEN RETURN
140 HOME : VTAB 12 : PRINT SPC(14)

```

```

) "MOVING^PARTY" : BA = 1984
150 A = 2304 : BA = BA + 64 : IF BA
= (A) THEN RETURN
160 X = Z : FOR B = A TO A + 12 :
IF PEEK (B) = PEEK (BA + X)
THEN X = X + 01 : NEXT : GOTO
180
170 A = A + 64 : GOTO 160
180 P%(R) = (A - 2304) / 64 : R =
R + 01 : FOR B = B TO A + 63 :
POKE B, PEEK (BA + X) : X = X
+ 01 : NEXT : GOTO 150
190 FS = 01 : CALL 3584 : IF PEEK
(255) THEN 330
200 RETURN
210 REM WRITE CHARACTERS
220 IF PEEK (2048) = Z THEN 250
230 HOME : VTAB 12 : PRINT SPC(14)
"MOVING^PARTY" : FOR A = Z
TO 3
240 X = Z : FOR B = P%(A) * 64 +
2304 TO P%(A) * 64 + 2367 :
POKE 2048 + A * 64 + X, PEEK
(B) : X = X + 01 : NEXT : NEXT
250 HOME : VTAB 12 : PRINT SPC(12)
"SAVING^CHARACTERS" : POKE
254,2 : GOTO 190
260 REM
CHECK FOR SAVED CHARACTERS
270 IF FS THEN AS = "Y" : RETURN
280 VTAB 23 : HTAB 01 : CALL 64578
PRINT "WARNING:^CHARACTERS^
NOT^SAVED!!" CG$ = PRINT
"CONTINUE?^(Y/N)" ;
290 GET AS : IF AS <> "Y" AND AS
<> "N" THEN 290
300 IF AS = "N" AND B = Z THEN POP
310 VTAB 23 : HTAB 01 : CALL 64578
: RETURN
320 REM DISK ERROR
330 HOME : PRINT CHR$(7) PEEK
(255) "^^ERROR(S)^HAVE^
OCCURED"
340 PRINT : PRINT "PRESS^RETURN^
TO^TRY^AGAIN^OR^SPACE^TO^^^
ABORT"
350 WAIT - 16384,128 : GET AS :
IF AS <> CM$ AND AS <> "^^"
THEN 350
360 IF AS = CHR$(13) THEN 190
370 RETURN
380 REM GET FOUR DIGIT NUMBER
390 MX = 4 : A1$ = "0" : A2$ = "9" :
GOSUB 480 : IF I$ = "" THEN
RETURN
400 IF LEN (I$) < MX THEN I$ =
LEFT$( "0000",4 - LEN (I$)
) + I$
410 RETURN
420 REM GET TWO DIGIT NUMBER
430 MX = 2 : A1$ = "0" : A2$ = "9" :
GOSUB 480 : IF LEN (I$) = 01
THEN I$ = "0" + I$
440 IF I$ = "" AND AS = CM$ THEN
RETURN
450 IF I$ = "" THEN POP : RETURN
460 FS = Z : POKE FN AD(A),16 *
VAL ( LEFT$( I$,01 ) ) + VAL
( RIGHT$( I$,01 ) ) : RETURN
470 REM INPUT ROUTINE

```

```

480 IS = ""
490 GET AS
500 IF (AS > A2$ OR AS < A1$) AND
(AS < > CM$ AND AS < > CH$ AND
AS < > CU$ AND AS < > ESC$)
THEN 490
510 IF AS = CH$ AND LEN (IS) = Z
THEN 490
520 IF AS = CH$ AND LEN (IS) = 01
THEN IS = "" : PRINT AS; :
GOTO 490
530 IF AS = CH$ THEN PRINT AS; :IS
= LEFT$ (IS , LEN (IS) - 01)
: GOTO 490
540 IF AS = CM$ THEN RETURN
550 IF AS = ESC$ THEN IS = "" :
RETURN
560 IF AS = CU$ THEN AS = CHR$ (
PEEK ( PEEK (40) + PEEK (41)
* 256 + PEEK (36) ) - 128) :
GOTO 500
570 IS = IS + AS : PRINT AS; : IF
LEN (IS) = MX THEN RETURN
580 GOTO 490
590 REM CHARACTER SCREEN SETUP
600 HOME : PRINT "NAME=>" : PRINT
TAB( 21 ) "CARDS:" TAB( 31 )
"MARKS:"
610 PRINT "SEX=>" TAB( 23 )
"LOVE" TAB( 33 ) "FORCE"
620 PRINT "TYPE=>" TAB( 23 )
"SOL" TAB( 33 ) "FIRE" : PRINT
"RACE=>" TAB( 23 ) "MOONS"
TAB( 33 ) "SNAKE"
630 PRINT "HEALTH=>" TAB( 23 )
"DEATH" TAB( 33 ) "KINGS" :
PRINT
640 PRINT TAB( 4 ) "STRENGTH"
TAB( 18 ) "TORCHES" TAB( 32 )
"HIT^POINT" TAB( 4 )
"DEXTERITY" TAB( 18 ) "GEMS" ;
650 PRINT TAB( 32 ) "MAX.^HITS"
TAB( 4 ) "INTELLIG." TAB( 18 )
"KEYS" TAB( 32 ) "EXPERIENC"
TAB( 4 ) "WISDOM" ;
660 PRINT TAB( 18 ) "POWDER" TAB( 32 )
"FOOD" : PRINT TAB( 18 )
"MAGIC" TAB( 32 ) "GOLD" :
PRINT
670 PRINT "ARMOUR=>" TAB( 18 )
"WEAPON=>" : PRINT TAB( 21 )
"DAGGER" TAB( 34 ) "GLOVES" :
PRINT TAB( 4 ) "CLOTH" ;
680 PRINT TAB( 21 ) "MACE" TAB( 34 )
"+4^AXE" : PRINT TAB( 4 )
"LEATHER" TAB( 21 ) "SLING"
TAB( 34 ) "+4^BOW"
690 PRINT TAB( 4 ) "CHAIN" TAB( 21 )
"AXE" TAB( 34 ) "+4^SWORD"
TAB( 4 ) "PLATE" TAB( 21 )
"BOW" TAB( 34 ) "EXOTIC"
700 PRINT TAB( 4 ) "+2^CHAIN"
TAB( 21 ) "SWORD" : PRINT TAB( 4 )
"+2^PLATE" TAB( 21 ) "2^H^
SWORD" : PRINT TAB( 4 )
"EXOTIC" ;
710 PRINT TAB( 21 ) "+2^AXE" :
PRINT TAB( 21 ) "+2^BOW" :
PRINT TAB( 21 ) "+2^SWORD" ;
720 BA = CHAR * 64 + 2304

```

```

730 REM UPDATE CHAR. SCREEN
740 POKE 255 ,BA / 256 : POKE 254
,BA - PEEK (255) * 256 : CALL
3692
750 VTBAB 01 : HTAB 7 : FOR A = Z
TO 12 : PRINT CHR$ ( FN PK(A)
); : NEXT : PRINT TAB( 39 ) :
VTAB 3 : HTAB 6
760 B$ = CHR$ ( FN HB(24) ) :B =
Z : GOSUB 800 : HTAB 7 :B = 2
:B$ = CHR$ ( FN HB(23) ) :
GOSUB 800
770 HTAB 7 :B$ = CHR$ ( FN HB(22)
) :B = 01 : GOSUB 800 : HTAB 9
:B$ = CHR$ ( FN HB(17) ) :B =
3 : GOSUB 800
780 VTBAB 14 : HTAB 9 : PRINT W$(
FN PK(40) ,5) TAB( 18) ; :
HTAB 26 : PRINT W$( FN PK(48)
,4) TAB( 35) ; : RETURN
790 REM
PRINT STRING STARTING WITH B$
800 FOR A = 0 TO 15 : IF LEFT$
(W$(A ,B) ,01) <> B$ THEN
NEXT : PRINT TAB( 19) ; :
RETURN
810 PRINT W$(A ,B) TAB( 19) CM$;
: RETURN
820 REM GET A SPECIFIC CHARACTER
830 IS = IS + ESC$ + CM$
840 GET B$ : FOR A = 01 TO LEN (IS
) : IF B$ <> MID$ (IS ,A ,01
) THEN NEXT : GOTO 840
850 IF B$ = ESC$ THEN POP : RETURN
860 RETURN
870 01 = 1 :B = 01 :Z = 0 :AS$ = ""
:FS = 01 :D$ = CHR$ (4) :
PRINT D$ "BLOAD^
ULTIMAKER.OBJ"
880 CH$ = CHR$ (8) :CM$ = CHR$
(13) :CU$ = CHR$ (21) :ESC$
= CHR$ (27) :CJ$ = CHR$ (10)
:CG$ = CHR$ (7)
890 DIM W$(15 ,5) ,R$(8 ,3)
,P$(3) : DEF FN AD(X) = BA +
X : DEF FN PK(X) = PEEK ( FN
AD(X) )
900 FOR A = 0 TO 5 : READ X : FOR
B = 0 TO X : READ W$(B ,A) :
NEXT : NEXT
910 FOR A = 0 TO 8 : FOR B = 0 TO 3
: READ R$(A ,B) : NEXT : NEXT
: DEF FN HB(X) = PEEK ( FN
AD(X) ) - 128 * ( PEEK ( FN
AD(X) ) > 128 )
920 REM READ IN CHARACTERS
930 HOME : PRINT SPC( 13 )
"ULTIMAKER^III" : VTBAB 10 :
PRINT "INSERT^PLAYER^
SCENARIO^DISK"
940 PRINT "AND^PRESS^A^
KEY" : WAIT - 16384 ,128 : GET
AS$ : GOSUB 120
950 REM PRINT ROSTER
960 HOME : PRINT SPC( 12 )
"CHARACTER^ROSTER" : PRINT :
FOR A = 0 TO 19 : PRINT CHR$
(65 + A) " )^" ;
970 BA = A * 64 + 2304 : FOR B = 0
TO 12 : PRINT CHR$ ( FN PK(B)

```

```

); : NEXT : PRINT : NEXT
980 VTBAB 24 : HTAB 01 : PRINT
"CHARACTER^TO^EDIT^(OR^
COMMAND)^=>" ;
990 GET AS : IF (AS < "A" OR AS >
"T" ) AND AS <> ESC$ AND AS <
> CHR$ (12) AND AS <> CHR$
(19) AND AS <> CHR$ (16)
THEN PRINT CG$; : GOTO 990
1000 IF AS = CHR$ (12) THEN GOSUB
120 : GOTO 960
1010 IF AS = CHR$ (19) THEN GOSUB
220 : GOTO 960
1020 IF AS = CHR$ (16) THEN 1080
1030 IF AS <> ESC$ THEN 1160
1040 REM EXIT?
1050 HOME : VTBAB 12 : PRINT SPC(
14 ) "EXIT^PROGRAM" :B = 01 :
GOSUB 270 : IF AS <> "Y" THEN
960
1060 END
1070 REM PRINTER PRINTOUT
1080 VTBAB 24 : HTAB 01 : CALL
64578 : PRINT "PRINOUT^OF^
CHARACTER^=>" ;
1090 GET AS : IF AS > "T" OR AS <
"A" THEN 980
1100 CHAR = ASC (AS) - 65 : GOSUB
600 : PR# 1 : PRINT CHR$ (9)
"80N"
1110 FOR A = 1 TO 24 : PR# 0 :
VTAB A : PRINT CU$; : PR# 1 :
PRINT CHR$ (9) "80N" ;
1120 PRINT SPC( 20) ; :B = PEEK
(40) + PEEK (41) * 256 : FOR
B = B TO B + 39
1130 PRINT CHR$ ( PEEK (B) - 128
); : NEXT : PRINT CM$;
1140 NEXT : PR# 0 : CALL 1002 :
GOTO 960
1150 REM EDIT PROPER SECTION
1160 CHAR = ASC (AS) - 65 : GOSUB
600 :X = Z
1170 FOR B = 0 TO 3 : POKE 252 + B
,R$(X ,B) : NEXT : CALL 3857
1180 WAIT - 16384 ,128 : GET AS :
IF AS <> ESC$ AND AS <> CH$
AND AS <> CU$ AND AS <> CM$
THEN 1180
1190 IF AS = ESC$ THEN 960
1200 CALL 3857 : IF AS <> CM$
THEN 1220
1210 ON X + 01 GOSUB 1270 ,1330
,1420 ,1450 ,1520 ,1540 ,1570
,1640 ,1700 : GOTO 1170
1220 B = 01 : IF AS = CH$ THEN B =
- 01
1230 X = X + B : IF X > 8 THEN X =
Z
1240 IF X < Z THEN X = 8
1250 GOTO 1170
1260 REM EDIT NAME
1270 VTBAB 01 : HTAB 7 :MX = 13
:A1$ = "A" :A2$ = CHR$ (255)
: GOSUB 480
1280 IF IS$ = "" THEN 740
1290 PRINT TAB( 39 ) :FS = Z : FOR
A = 0 TO LEN (IS) - 01
1300 POKE FN AD(A) , ASC ( MID$
(IS ,A + 01 ,01) ) + 128 :

```



```

NEXT : IF A = 13 THEN RETURN
1310 FOR A = A TO 12 : POKE FN
AD(A) , Z : NEXT : RETURN
1320 REM SEX , TYPE , RACE
, HEALTH
1330 VTAB 3 : HTAB 6 : IS$ = "MFO" :
GOSUB 830 : IF B$ = CM$ THEN
1350
1340 FS = Z : POKE FN AD(24) ,
ASC (B$) + 128 : B = Z : GOSUB
800
1350 VTAB 4 : HTAB 7 : IS$ =
"FCWTPBLIDAR" : GOSUB 830 : IF
B$ = CM$ THEN 1370
1360 FS = Z : B = 2 : POKE FN AD(23
) , ASC (B$) + 128 : GOSUB
800
1370 VTAB 5 : HTAB 7 : IS$ = "HEDBF"
: GOSUB 830 : IF B$ = CM$ THEN
1390
1380 FS = Z : B = 01 : POKE FN
AD(22) , ASC (B$) + 128 :
GOSUB 800
1390 VTAB 6 : HTAB 9 : IS$ = "GPDA"
: GOSUB 830 : IF B$ = CM$ THEN
RETURN
1400 FS = Z : B = 3 : POKE FN AD(17
) , ASC (B$) + 128 : GOTO 800
1410 REM CARDS
1420 VTAB 3 : HTAB 21 : GOSUB 1480
: IF B$ = ESC$ THEN X = 2 :
GOTO 740
1430 FS = Z : POKE FN AD(14) , B +
16 * INT ( FN PK(14) / 16 )
: X = 2 : RETURN
1440 REM MARKS
1450 VTAB 3 : HTAB 31 : GOSUB 1480
: IF B$ = ESC$ THEN X = 3 :
GOTO 740
1460 FS = Z : POKE FN AD(14) , B *
16 + ( FN PK(14) - INT ( FN
PK(14) / 16 ) * 16 ) : X = 3 :
RETURN
1470 REM GET FOUR Y OR N'S
1480 B = Z : IS$ = "YN" + ESC$ + CM$
: FOR X = 0 TO 3 : GOSUB 840
1490 IF B$ = CM$ THEN B$ = CHR$ (
PEEK ( PEEK (40) + PEEK (41)
* 256 + PEEK (36) ) - 128 )
1500 PRINT B$CH$CJ$; : B = B + INT
(2 # X) * (B$ = "Y") : NEXT :
RETURN
1510 REM TRAITS
1520 VTAB 8 : HTAB 01 : FOR A = 18
TO 21 : GOSUB 430 : HTAB 01 :
PRINT IS$ : NEXT : RETURN
1530 REM POSSESSIONS AND MAGIC PTS
1540 VTAB 8 : HTAB 15 : A = 15 :
GOSUB 430 : HTAB 15 : PRINT IS$
: FOR A = 37 TO 39 : HTAB 15
1550 GOSUB 430 : HTAB 15 : PRINT
IS$ : NEXT : HTAB 15 : A = 25 :
GOSUB 430 : RETURN
1560 REM POINTS , FOOD AND GOLD
1570 VTAB 8 : FOR A = 26 TO 35
STEP 2 : IF A = 34 THEN A = 35
1580 HTAB 27 : GOSUB 390 : HTAB 27
: PRINT IS$
1590 IF IS$ = "" AND AS$ = CM$ THEN
NEXT : RETURN

```

```

1600 IF IS$ = "" THEN RETURN
1610 FS = Z : POKE FN AD(A) , 16 *
VAL ( LEFT$ (IS$ , 01) ) + VAL
( MID$ (IS$ , 2 , 01) )
1620 POKE FN AD(A + 01) , 16 * VAL
( MID$ (IS$ , 3 , 01) ) + VAL (
RIGHT$ (IS$ , 01) ) : NEXT :
RETURN
1630 REM ARMOUR
1640 VTAB 14 : HTAB 9 : A1$ = "A"
: A2$ = "H" : MX = 01 : GOSUB
480
1650 IF AS$ = ESC$ THEN RETURN
1660 IF IS$ = "" THEN PRINT : GOTO
1680
1670 HTAB 9 : PRINT W$( ASC (IS$ )
- 65 , 5 ) TAB( 17 ) CM$; : FS =
Z : POKE FN AD(40) , ASC (IS$
) - 65
1680 PRINT : FOR A = 41 TO 47 :
GOSUB 430 : HTAB 01 : PRINT IS$
: NEXT : RETURN
1690 REM WEAPONS
1700 VTAB 14 : HTAB 26 : A1$ = "A"
: A2$ = "P" : MX = 01 : GOSUB
480
1710 IF AS$ = ESC$ THEN RETURN
1720 IF IS$ = "" THEN PRINT : GOTO
1740
1730 HTAB 26 : PRINT W$( ASC (IS$ )
- 65 , 4 ) TAB( 39 ) CM$; : POKE
FN AD(48) , ASC (IS$) - 65
1740 FOR A = 49 TO 57 : HTAB 18 :
GOSUB 430 : HTAB 18 : PRINT IS$
: NEXT : HTAB 18 : GOSUB 430 :
HTAB 18 : PRINT IS$;
1750 VTAB 15 : FOR A = 59 TO 63 :
HTAB 31 : GOSUB 430 : HTAB 31
: PRINT IS$ : NEXT : RETURN
1760 DATA 2 , MALE , FEMALE , OTHER
1770 DATA 4 , HUMAN , ELF , DWARF
, BOBBIT , FUZZY
1780 DATA 10 , FIGHTER , CLERIC
, WIZARD , THIEF , PALADIN
, BARBARIAN , LARK , ILLUSIONIST
, DRUID , ALCHEMIST , RANGER
1790 DATA 3 , GOOD , POISONED , DEAD
, ASHES
1800 DATA 15 , HANDS , DAGGER , MACE
, SLING , AXE , BOW , SWORD , 2^H^
SWORD , +2^AXE , +2^BOW , +2^
SWORD , GLOVES , +4^AXE , +4^BOW
, +4^SWORD , EXOTIC
1810 DATA 7 , SKIN , CLOTH , LEATHER
, CHAIN , PLATE , +2^CHAIN , +2^
PLATE , EXOTIC
1820 DATA 255 , 18 , 0 , 1 , 255 , 16
, 2 , 6 , 19 , 26 , 1 , 6 , 29 , 36 , 1
, 6
1830 DATA 255 , 11 , 7 , 11 , 13 , 23
, 7 , 12 , 25 , 39 , 7 , 12 , 255 , 15
, 13 , 22 , 16 , 39 , 13 , 24

```

Ultimaker III Hexdump

```

OE00: A9 03 8D EC B7 A0 08 8C $7A58
OE08: F1 B7 88 8C ED B7 A9 00 $A69F
OE10: 85 FF 8D F0 B7 8D EB B7 $AFE3
OE18: A5 FE 8D F4 B7 20 E3 03 $6689

```

```

OE20: 20 D9 03 90 02 E6 FF EE $4637
OE28: F1 B7 EE ED B7 AD F1 B7 $666C
OE30: C9 0E 90 E9 60 B1 FE 20 $8162
OE38: DA FD E6 25 A5 25 20 C1 $B987
OE40: FB C6 24 C6 24 C8 CA D0 $6888
OE48: EC 60 86 24 85 25 4C C1 $D245
OE50: FB A2 04 4A 48 A9 D9 B0 $6887
OE58: 02 A9 CE 20 F0 FD C6 24 $B96F
OE60: E6 25 A5 25 20 C1 FB 68 $2CE1
OE68: CA D0 E8 60 A2 14 A9 02 $1C43
OE70: 20 4A 0E A0 0E B1 FE 20 $D694
OE78: 51 0E 48 A2 1E A9 02 20 $3B93
OE80: 4A 0E 68 20 51 0E A2 00 $0790
OE88: A9 07 20 4A 0E A0 12 A2 $6C3A
OE90: 04 20 35 0E A2 0E A9 07 $C439
OE98: 20 4A 0E A0 0F A2 01 20 $4A1B
OEAO: 35 0E A0 25 A2 03 20 35 $9CEA
OEAS: 0E A0 19 A2 01 20 35 0E $71F5
OEB0: A2 00 A9 0F 20 4A 0E A2 $ACD5
OEB8: 07 A0 29 20 35 0E A2 11 $2FCD
OECO: A9 0E 20 4A 0E A0 31 A2 $42B2
OEC8: 0A 20 35 0E A2 1E A9 0E $749D
OEDO: 20 4A 0E A2 05 20 35 0E $CDA4
OED8: A2 18 86 24 A0 1A 20 F7 $5456
OEE0: 0E A0 1B 20 F7 0E A9 1A $37FB
OEE8: 85 24 A0 23 B1 FE 20 DA $E00E
OEF0: FD C8 B1 FE 4C DA FD E6 $4EAA
OEF8: 24 E6 24 A9 07 85 25 20 $C941
OF00: C1 FB A9 04 85 00 A2 01 $ACAF
OF08: 20 35 0E C8 C6 00 D0 F6 $B36E
OF10: 60 A5 FE 85 25 20 C1 FB $575B
OF18: A4 FD B1 28 49 C0 C9 E0 $7C4A
OF20: B0 08 C9 C0 B0 06 C9 20 $D485
OF28: 90 02 E9 40 91 28 88 C4 $DAF2
OF30: FC D0 E7 E6 25 A5 25 C5 $B96C
OF38: FF D0 DA C6 25 60 $251F

```

Ultimaker III Source Code

```

1000 NXT.TRK .EQ $B7EC IOB TABLE T
RACK NUMBER
1010 BUFF .EQ $B7F0 TELLS WHERE
IN MEMORY TO READ TO OR WRITE FROM
1020 ERR.FLAG .EQ $FF TELLS BASIC
ABOUT DISK ERRORS
1030 BASIC.CMD .EQ $FE BASIC TELLS
M.L. WHETHER TO READ OR WRITE
1040 SECTOR .EQ $B7ED IOB TABLE S
ECTOR NUMBER
1050 RWTS .EQ $3D9 RWTS PAGE T
HREE VECTOR
1060 COMMAND .EQ $B7F4 IOB TABLE C
OMMAND CODE LOCATION
1070 CHAR .EQ $FE POINTER TO
CURRENT CHARACTER
1080 VOL .EQ $B7EB
1090 CH .EQ $24 CURSOR HORI
ZONTAL FOR PRINTING
1100 CV .EQ $25 CURSOR VERT
ICAL
1110 PRINTA .EQ $FDDA ROUTINE THA
T PRINTS A AS A HEXIDECIMAL NUMBER
1120 BASCALC .EQ $FBC1 ROUTINE THA
T CALCULATES THE SCREEN LINE BASE ADDR
ESS FOR THE Y POSITION HELD IN A

```

Continued on page 22

The Mapping Of Ultima III

By Jeff Hurlburt

In The King's Library

It's been a rough day battling the innumerable minions of Exodus and, as evening falls, you page through a dusty computerised tome in the king's library. Suddenly a false cover separates and mouldering sheets of velum spill out upon the table. Hardly containing your amazement, you snatch up one, then another and hold it up to the fading light. It's true! Not merely vague scrawls, nor only of Sosaria or Ambrosia-- but exquisitely detailed charts of every town, village, and castle, even the very dungeons...the fabled MAPS OF ULTIMA III are yours!

Of course, in the real world securing such a powerful advantage must involve a little magic with your Apple. The two short programs listed here let you read any map right off any Ultima III Player Diskette and create crystal clear printouts.

Translations

Instead of trying to store and retrieve complete hi-res blocks, Ultima III saves its maps in the form of code bytes which subroutines use to generate the displays. A complete dungeon map consists of eight 16X16 levels, while each continent, town, or castle map is a 64X64 code block. To produce a map using standard ASCII characters, all that's needed is a way to translate the map codes into corresponding print characters. For example, a patch of small forest (code= \$08) might be represented using a "t" or a wall section (code= \$8C) by a "#". A 'Legend' included on each Ultimapper III printout makes it unnecessary to remember what a character means or to refer to a separate guide.

Using the Ultimappers

Once the Dungeon and Large Map programs have been entered and saved on any standard DOS 3.3 compatible diskette, you're ready to start generating printouts.

Upon running Ultimapper III.Large, you are prompted for the name of the continent, town, or castle to be mapped. The only requirement here is that the first three letters of the name be correct (e.g. "EXO" for the castle of Exodus, "CAS" for Lord British's castle, "EAS" for East Montor, etc.). Anything typed after the first three letters will become part of the map title. Therefore, you

can produce maps labeled with dates and/or character names (for example: "SOS Andrea/Igmo/Baywoof" will appear on the map title as "SOSARIA-Andrea/Igmo/Baywoof").

After inputting the place name plus any embellishments, you are prompted for the drive number and then reminded to insert the source diskette. This may be either the Player Master or an active Player Disk. In the latter case, the printout will show the current locations of all monsters, ships, etc. added since play began. Shortly after the program loads a map it will begin the output, so be sure your printer is already on and the paper positioned. To make it easier to produce a series of maps, a form feed is performed after each printing.

The operation of Ultimapper III.Small is virtually identical to the above except that you are prompted for each dungeon level, 1-8. Most printers will be able to fit four levels on a sheet. The programs make limited use of special commands recognized by Epson and compatible printers: specifically, the vertical compression control code. If you have some other type of printer, this line (they are thoroughly REMarked) will probably have to be deleted or modified.

Besides presenting maze layout, the dungeon mapper also locates ladders, fountains, marks, treasures, and even the mysterious Time Lord, but types of fountains and marks are left to be discovered. The challenge, indeed, remains. But with the fabulous maps of Ultima III in hand, your invincibility is all but assured.

Typing It In

Key in the two BASIC programs at the end of this article, and save them.

```
SAVE ULTIMAPPER III.LARGE
SAVE ULTIMAPPER III.SMALL
```

That's all. Have fun!

(See NOTE on page 15)

Ultimapper.Large

```
10 REM [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
20 REM [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
30 REM [ ] ULTIMA III MAPPER [ ]
40 REM [ ] BY JEFF HURLBURT [ ]
50 REM [ ] AND ZEH HURLBURT [ ]
60 REM [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
70 REM [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
80 REM
90 TEXT : FOR I = 0 TO 52 : READ
  BA : POKE 768 + I , BA : NEXT
100 DIM T(20) , S(20) , P$(20)
  :GS = CHR$( 7 )
110 FOR I = 1 TO 14 : READ P$( I )
  : NEXT I
120 FOR I = 1 TO 14 : READ T( I )
  , S( I ) : NEXT I
130 BA = 16384
140 FOR I = 0 TO 255 STEP 4 : READ
  F : FOR J = I TO I + 3 : POKE
  BA + J , F : NEXT J : NEXT I
150 READ CK : IF CK < > 999 THEN
```

```
PRINT : PRINT "DATA^ERROR" :
STOP
160 HOME : IO = 47080 : PRINT TAB(
  7 ) "ULTIMA^III^LARGE^MAP^
  MAPPER" : VTAB 7
170 FOR I = 1 TO 14 STEP 2 : PRINT
  P$( I ) TAB( 20 ) P$( I + 1 ) :
  NEXT : HTAB 1 : VTAB 18
180 INPUT "PLACE^TO^MAP^=>" ; NS
190 FOR N = 1 TO 14 : IF LEFT$( NS
  , 3 ) < > LEFT$( P$( N ) , 3 )
  THEN NEXT : GOTO 160
200 PRINT : PRINT "READ^FROM^
  DRIVE^=>" ; : GET QS : IF QS <
  "1" OR QS > "2" THEN 200
210 PRINT : D = VAL( QS ) : VTAB 17
  : CALL 64578 : PRINT "PUT^
  ULTIMA^III^SCENARIO^DISK^IN^
  DRIVE^" D
220 PRINT : PRINT "<ESC>^=^REDO,^
  ANY^KEY^TO^GO^ON" : GET QS :
  IF QS = CHR$( 27 ) THEN 160
230 PRINT : VTAB 10 : CALL 64668 :
  GOSUB 250 : GOSUB 350 : GOTO
  160
240 REM MAP T/S
250 HOME : PRINT "READING^" P$( N
  ) : PRINT : PRINT
260 S = S( N ) : T = T( N ) : FOR I =
  0 TO 15
270 POKE IO + 4 , T : POKE IO + 5
  , S : POKE IO + 9 , 32 + I
280 POKE IO + 2 , D : POKE IO + 3
  , 0 : POKE IO + 8 , 0 : POKE IO
  + 12 , 1
290 CALL 768
300 S = S + 1 : IF S > 15 THEN S =
  0 : T = T( N ) + 1
310 IF PEEK( 255 ) THEN PRINT
  "ERROR" G$G$G$ : END
320 NEXT I
330 RETURN
340 REM PRINT MAP
350 HOME : PR# 1 : PRINT CHR$( 27
  ) "0" : REM PRINTER SETUP
360 REM NAME
370 NS = NS + CHR$( 0 ) : FOR A =
  1 TO LEN( NS ) - 2 : IF LEFT$(
  P$( N ) , A ) = LEFT$( NS , A )
  THEN NEXT
380 PRINT P$( N ) "^^^" RIGHT$( NS
  , LEN( NS ) - A )
390 POKE 254 , 176 : FOR P = 32 TO
  47 : POKE 796 , P : CALL 785 :
  NEXT
400 PRINT
410 PRINT : PRINT "LEGEND" :
  PRINT : SPS = "^^^^^^" : REM
  SIX SPACES
420 PRINT "^^^AGASS" SPS "T^^
  TOWN" SPS "^^^MOUNTAIN" SPC( 5
  ) CHR$( 244 ) "^^^SMALL^FOREST"
430 PRINT "^^^G^GUARD" SPS "^^^
  WALL" SPS "X^^COMPUTER" SPC( 5
  ) "^^^BIG^FOREST"
440 PRINT "^^^H^^HORSE" SPS CHR$(
  243 ) "^^^SHIP" SPS "M^^
  MONSTER" SPS "W^^WHIRLPOOL"
450 PRINT "^^^=^^TABLE" SPS CHR$(
```



```

(254) "^^FIRE" SPC(5) "(^)^
WATER" SP$ "^^PIRATE^SHIP"
460 PRINT "^^" CHR$(227) "^^
CHEST" SP$ "^^GATE" SP$ "^^
CASTLE" SP$ "^^BRICK^WALK"
470 PRINT "^^S^^SNAKE" SP$ "^^
KING" SP$ CHR$(248) "^^
PERSON" SP$ "^^" CHR$(162) "^^
^FORCE^FIELD"
480 IF N <> 1 THEN 510
490 PRINT : PRINT "^^DUNGEONS" :
PRINT : PRINT "^^1^^ZIGZAG"
SPC(5) "^^DARDIN'S^^
MORINIA" ;
500 PRINT SP$ "^^TIME" : PRINT
"^^5^^FIRE" SP$ "^^6^^CLUES"
SPC(5) "^^7^^SOUTHWEST"
510 IF N <> 2 THEN 540
520 PRINT : PRINT "^^SHRINES" :
PRINT : PRINT "^^1^^
INTELLIGENCE" SP$;
530 PRINT SP$ "^^WISDOM" : PRINT
"^^3^^STRENGTH" SP$SP$ SPC(4
) "^^DEXTERITY"
540 PRINT CHR$(12) ; : REM
FORM FEED
550 PR# 0 : RETURN
560 REM RWTS/LINEPRNT
570 DATA 32,227,3,32,217,3
,169,0,133,72,144,2,169
,255,133,255,96,160,0,32
,142,253,169,64,133,255
,185
580 DATA 0,16,170,189,0,64
,201,192,208,4,230,254
,165,254,32,237,253,200
,240,225,198,255,208,231
,240,222
590 REM PLACES
600 DATA SOSARIA,AMBROSIA,LCB
,LORD^BRITISH^CASTLE,FAWN
,GREY,YEW,DEATH^GULCH
610 DATA DEVIL^GUARD,DAWN,WEST^
MONTOR,EAST^MONTOR,MOON
,EXODUS^CASTLE
620 REM MAPS T/S LIST
630 DATA 3,14,4,15
640 DATA 20,2,22,6,11,2,14
,8,17,14
650 DATA 10,0,12,4,13,6,15
,10,16,12,19,0,21,4
660 REM MAP TRANSLATE CHARACTERS
670 DATA 160,174,244,222,170
,192,212,195,186,227,200
,243,215,205,205,208,248
,248
680 DATA 199,203,248,248,248
,248,205,205,205,205,205
,205,205,216,162,254,164
,163
690 DATA 160,189,193,194,195
,196,197,198,199,200,201
,213,217,204,205,206,207
,208
700 DATA 215,210,211,212,211
,211,162,162,192,248,999

```

Ultimapper.Small

```

10 REM [][][][][][][][][][][]
20 REM [ ] [ ]

```

```

30 REM [ ] ULTIMA III MAPPER [ ]
40 REM [ ] BY JEFF HURLBURT [ ]
50 REM [ ] AND ZEH HURLBURT [ ]
60 REM [ ] [ ]
70 REM [][][][][][][][][][][]
80 REM
90 TEXT : HOME
100 FOR I = 0 TO 38 : READ BA :
POKE 768 + I ,BA : NEXT I
110 FOR I = 1 TO 7 : READ D$(I) :
NEXT I
120 FOR I = 1 TO 7 : READ T(I)
,S(I) : NEXT I
130 DIM N$(20) : FOR I = 2 TO 15
: READ N$(I) : NEXT I
140 N$(0) = ">>>>LEGEND<<<<"
150 BA = 16384 : FOR I = 0 TO 255
: POKE BA + I ,191 : NEXT I
160 FOR I = 1 TO 15 : READ M ,F :
POKE BA + M ,F : NEXT I
170 BA = 47080
180 TEXT : HOME : VTAB 7
190 INPUT "INPUT^DNG#,^LEVEL,^
DRV#^>>>" ;N ,A ,D
200 IF N < 1 OR N > 7 OR D < 1 OR D
> 2 OR A < 1 OR A > 8 THEN
PRINT G$ : GOTO 180
210 IF NN = N THEN 250
220 VTAB 10 : PRINT "INSERT^
ULTIMA^III^SCENARIO^DISK." :
PRINT
230 PRINT "PRESS^ANY^KEY^TO^GO^
ON^>>>" : GET Q$ : PRINT :
VTAB 10 : CALL 64668
240 NN = N : GOSUB 280
250 GOSUB 400
260 GOTO 180
270 REM READ DUNGEON T/S
280 HOME : PRINT "READING^
DUNGEON^#" N : PRINT : PRINT
290 S = S(N) : T = T(N) : FOR I =
0 TO 7
300 POKE BA + 4 ,T : POKE BA + 5
,S : POKE BA + 9 ,16 + I
310 POKE BA + 2 ,D : POKE BA + 3
,0 : POKE BA + 8 ,0 : POKE BA
+ 12 ,1
320 CALL 790
330 S = S + 1 : IF S > 15 THEN S =
0 : T = T(N) + 1
340 IF NOT PEEK (255) THEN 370
350 PRINT : PRINT G$
360 PRINT ">>>^ERROR^<<<" : END
370 NEXT I
380 RETURN
390 REM PRINT DUNGEON LEVEL
400 PR# 1
410 PRINT CHR$(27) "0" : REM
PRINTER SETUP
420 HOME
430 REM EXPANDED PRINT FOR NAME
440 PRINT D$(N) "^^DUNGEON^("N" N
")" TAB(25) "LEVEL^^" A
450 PRINT
460 POKE 776 ,15 + A
470 FOR I = 0 TO 15
480 POKE 769 ,I * 16
490 CALL 768
500 PRINT "^^" N$(I)
510 NEXT I

```

```

520 PRINT
530 PR# 0
540 PRINT : PRINT "PRESS^ANY^KEY^
TO^GO^ON^>>>" : GET Q$
550 RETURN
560 REM RWTS/LNPRNT
570 DATA 160,240,169,16,133
,255,185,0,23,170,189,0
,64,32,237,253,200,198
580 DATA 255,208,241,96,32
,227,3,32,217,3,169,0
,133,72,144,2,169,255
,133,255,96
590 REM NAMES
600 DATA ZIGZAG,DARDIN'S
,MORINIA,TIME,FIRE,CLUES
,SOUTHWEST
610 REM DUNG T/S LIST
620 DATA 7,2,6,0,6,9,8,4,8
,13,7,11,9,6
630 REM DUNGEON LEGEND
640 DATA L^^TIME^LORD,FA^^
FOUNTAIN,W^^STRANGE^WIND,X^^
^TRAP,^^MARK,G^^GREMLIN
,!^^MESSAGE
650 DATA ^^UP^LADDER,V^^DOWN^
LADDER,I^^UP/DOWN^LADDER,$^^
^GOLD,^^WALL,=^^HIDDEN^
DOOR,O^^VISIBLE^DOOR
660 REM MAP ,FIG PAIRS
670 DATA 0,160,1,204,2,198,3
,215,4,216,5,170,6,199
,8,161,16
680 DATA 222,32,214,48,201,64
,164,128,163,160,189,192
,207

```

Ultimapper.Large Checksums

10	- \$BADD	300	- \$ABC3
20	- \$9B13	310	- \$8250
30	- \$4D3B	320	- \$83A4
40	- \$AD92	330	- \$B72F
50	- \$C899	340	- \$CB6F
60	- \$FF65	350	- \$5314
70	- \$A3BF	360	- \$CC0B
80	- \$A900	370	- \$D3F6
90	- \$F6CE	380	- \$C8D9
100	- \$17A0	390	- \$DC94
110	- \$3D36	400	- \$DC30
120	- \$0993	410	- \$F7B2
130	- \$91D4	420	- \$52AB
140	- \$4037	430	- \$D971
150	- \$1343	440	- \$48B0
160	- \$C53E	450	- \$BF56
170	- \$9CF9	460	- \$A4C5
180	- \$B0A4	470	- \$62A0
190	- \$64B6	480	- \$EC15
200	- \$B89B	490	- \$C537
210	- \$AA45	500	- \$FE39
220	- \$517E	510	- \$26F0
230	- \$9A44	520	- \$D9AD
240	- \$F63B	530	- \$62E7
250	- \$A12E	540	- \$753D
260	- \$025F	550	- \$6732
270	- \$7B86	560	- \$B53C
280	- \$9556	570	- \$FBEO
290	- \$1181	580	- \$A58E

Ultima][...

Author: Hardcore COMPUTIST #4 had some good information on Ultima II, but the articles left some memory locations unknown. In this article, I will fill in some of these locations and add more information on how to make use of the internal structure and how to gain control over the monsters of Ultima II.

Before going into the new memory locations, let's look at how Ultima II stores data. It should be obvious that Ultima will save a game for you when you quit, but have you ever wondered why it spins the disk drive whenever you step through a time door or enter a town, village, castle, or tower? Or perhaps you have noticed that after you quit the game, enter a town or castle, or step through a time door, when you return, all of the same monsters are still waiting for you. Everything is exactly as you left it in each time zone; monsters, horses, planes, ships, etc. In fact, if you had hit a monster that took four hits to kill only three times, it would take only one more hit to kill it after your return. So, how does Ultima II remember where everything is, how strong the monsters are, and even what background scene was behind each monster so it can replace the monster with the correct background when it moves or is killed?

All of the information concerning what is stored where (grass, trees, monsters, etc.) for each square of the earth is stored in the MAP. Every time zone has its own MAP.

In memory, this information is stored from \$1000 to \$1FFF (starting Address \$1000, Length \$1000). Whenever the player leaves the scene by quitting, entering a town, village, tower, etc., the MAP is saved to disk. A code for the time zone is also written into the PLAYER's information so Ultima II knows where to return to.

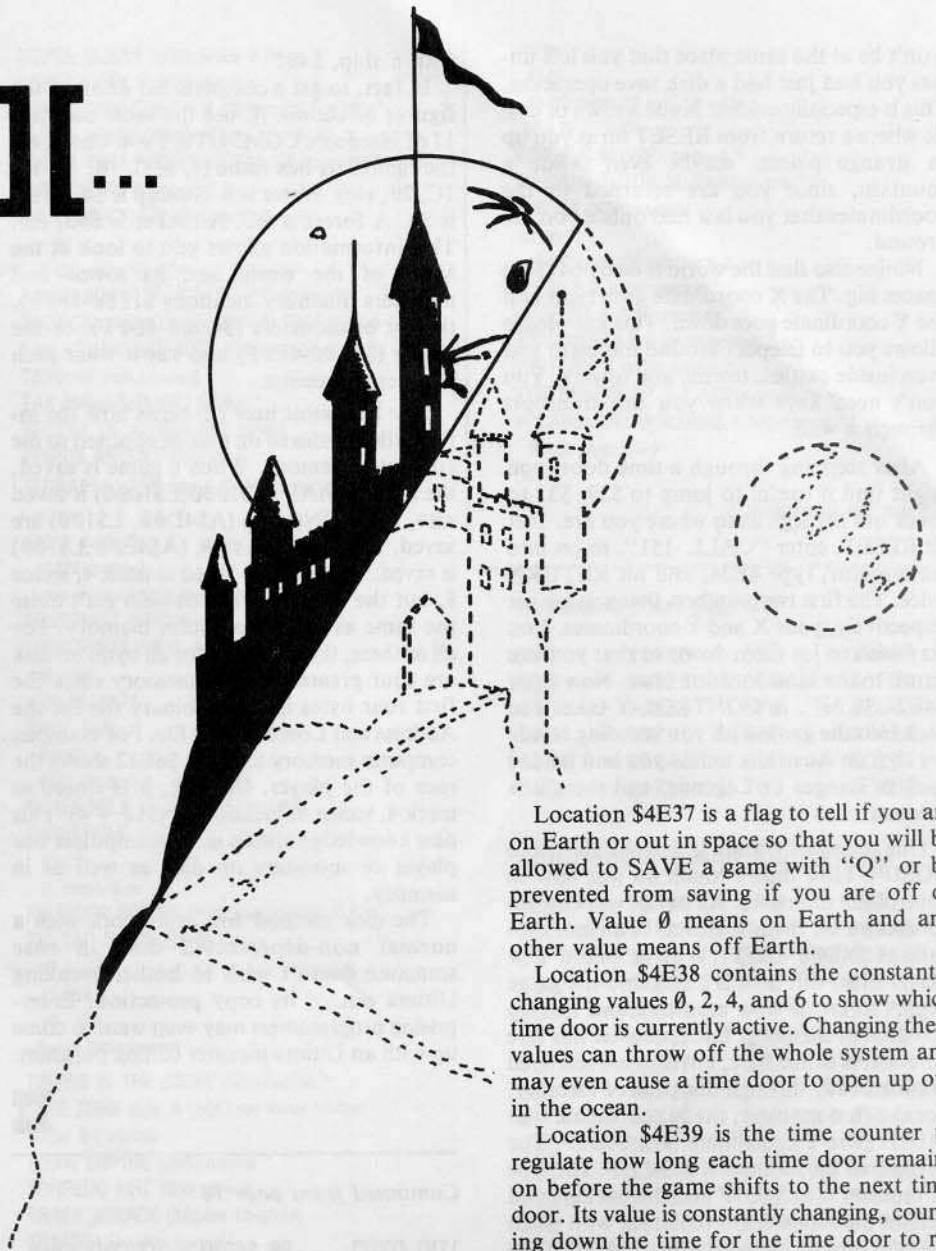
The MAP only stores the images of the monsters' locations. It doesn't have any information that gives them life. This information is stored in the computer's memory at Address \$4D00, Length \$100 and is saved to disk as MON with a different number added for each time zone.

And, just as Hardcore says, the player is saved in memory at Address \$4E00, Length \$100. This information which begins with the active time zone and contains all of the information about the player's status and possessions is stored to disk as "PLAYER".

Now for more details on those unknown memory locations. Location \$4E13 gives the time zone that was last used; 0 for legends, 1 for Pangea, 2 for B.C., 3 for A.D., and 4 for Aftermath. This is stored to disk here to tell the program which Map and set of monsters to load next time you start up

again, leave a town or tower, or step through a time door.

Location \$4E14 is the flag to show if the character is outside on the surface or in a castle, tower, or dungeon. The values are 0 for the surface, 1 for a village, 2 for a town, 3 for a castle, 4 for a tower, and 5 for a dungeon. This flag is necessary so that when you hit a movement key, the game knows whether to move you a space or turn you right or left. You can get some strange results by changing these values, but you can always cast a surface spell, if you have one, to get back "out".



Location \$4E37 is a flag to tell if you are on Earth or out in space so that you will be allowed to SAVE a game with "Q" or be prevented from saving if you are off of Earth. Value 0 means on Earth and any other value means off Earth.

Location \$4E38 contains the constantly changing values 0, 2, 4, and 6 to show which time door is currently active. Changing these values can throw off the whole system and may even cause a time door to open up out in the ocean.

Location \$4E39 is the time counter to regulate how long each time door remains on before the game shifts to the next time door. Its value is constantly changing, counting down the time for the time door to remain open.

Location \$4E1F is also a time counter. It counts down the time until another parcel of food is subtracted.

Issue No. 4 of Hardcore COMPUTIST gave the locations \$4E24 and \$4E25 for the Player's X and Y coordinates. That's not quite true. These two locations contain the X, Y values of where the player was when the game was last saved to disk. Remember that a game is saved whenever you quit, enter a town, village, castle, tower, or dungeon, or step through a time door. Therefore, when you RESET out of the game and return, you

... The Rest Of The Picture

By Wesley R. Felty

won't be at the same place that you left unless you had just had a disk save operation. This is especially evident inside a town or castle where a return from RESET turns you up in strange places, maybe even inside a fountain, since you are returned to the coordinates that you last had outside on the ground.

Notice also that the world is 64 by 64 (\$40) spaces big. The X coordinate goes right and the Y coordinate goes down. This knowledge allows you to teleport around the earth and even inside castles, towns, and towers. You don't need keys when you can transport through a wall.

After stepping through a time door, you might find it useful to jump to \$39, \$33 to check out the sign as to where you are. Just hit RESET, enter "CALL -151", to get into the monitor, type 4E24, and hit RETURN twice. The first two numbers that you see are respectively, your X and Y coordinates. You may wish to jot them down so that you can return to the same location later. Now enter "4E24:39 33". A CONTROL-Y takes you back into the game with you standing beside the sign on Australia unless you had landed back in Pangea or Legends, and there it is obvious.

One aspect of Ultima II that the Hardcore COMPUTIST didn't touch on was how to control the monsters. All of the working information on them is stored in memory locations \$4D00-4DFF. With a brand new player disk, this area is blank and the game begins to create new monsters and fills up this area of memory. Each monster has five parameters stored here, but they are scattered symmetrically through this page of memory. For the first monster, the X coordinate is at \$4D1F. The Y coordinate is at \$4D3F. The strength of the monster is at \$4D5F. The type of monster is at \$4D7F and the background behind the monster (to replace it with when you kill him or he moves) is at \$4D9F. The types of monsters are \$30 for Orcs, \$34 for Daemons, \$38 for Devils, \$3C for Balrons, \$F0 for Fighters, \$FC for Thieves, \$2C for Sea Monsters, and \$40 for Minax herself. The backgrounds are 0 for water, \$4 for Bog, \$8 for Grass, and \$C for woods.

After the first monster is created with its five parameters scattered throughout this page of memory, the second is created with its parameters, each being at a position one byte less than the first. For example the X coordinates for the first three monsters would be stored at \$4D1F, \$4D1E, and \$4D1D respectively. The types of monsters for these three would be stored at \$4D5F, \$4D5E, and \$4D5D. When a monster is killed, the third, fourth, and fifth of these parameters are reset to zero.

Knowing this, you can go into memory and change the strength or type of monster or even kill it. Or an easy way to get into a town, tower, castle, etc is to change the background of an attacking monster to \$18 for a town, \$1C for a tower, or \$20 for a castle. Or, why not replace a Sea Monster, \$2C,

with a ship, \$48?

In fact, to get a complete list of all of the figures in Ultima II, use the table on Page 17 of Hardcore COMPUTIST #4. Count off the figures by hex fours (4, 8, C, 10, 14, 18, 1C, 20, etc). Water is 0. Swamp is \$4. Grass is \$8. A forest is \$C. A rocket is \$50, etc. This information allows you to look at the MAP of the world and its towns and monsters (memory locations \$1000-1FFF), the list of monsters (\$4D00-4DFF), or the player (\$4E00-4EFF) and know what each number represents.

One last point here concerns how the information is stored on disk as opposed to the computer memory. When a game is saved, the current MAP (A\$1000, L\$1000) is saved also, the MON(sters) (A\$4D00, L\$100) are saved, and the PLAYER (A\$4E00, L\$100) is saved. The player is saved at track 4, sector 8, but the address for each item isn't quite the same as in the computer memory. For all of these, the addresses for all bytes on disk are four greater than in memory since the first four bytes in a disk binary file list the Address and Length of the file. For example, computer memory location \$4E12 shows the race of the player. On disk, it is stored at track 4, sector 8, location 16 (\$12 + 4). This new knowledge allows us to manipulate our player or monsters on disk as well as in memory.

The disk method will even work with a normal non-deprotected disk in case someone doesn't wish to bother breaking Ultima out of its copy protection. Enterprising programmers may even want to come up with an Ultima monster editing program.



Continued from page 18

1130	COUT1	.EQ \$FDF0	OUTPUT CHAR
	ACTERS WITHOUT HOOKS		
1140	LEFT	.EQ \$FC	LEFT MARGIN
	FOR INVERT		
1150	RIGHT	.EQ \$FD	RIGHT MARGI
	N FOR INVERT		
1160	TOP	.EQ \$FE	TOP MARGIN
	FOR INVERT		
1170	BOTTOM	.EQ \$FF	BOTTOM MARG
	IN		
1180	BASL	.EQ \$28	POINTER TO
	SCREEN BAS ADDRESS		
1190			
1200		.OR \$E00	
1210		.TF ULTIMAKER.OBJ	
1220			
1230			
1240	READ.CHARACTERS		
1250	LDA #3		R/W CHARS
1260	STA NXT.TRK		INTO \$800
1270	LDY #8		THROUGH
1280	STY BUFF+1		\$DFF
1290	DEY		
1300	STY SECTOR		SECTOR 7
1310			
1320	LDA #0		ZERO ERRORS

1330	STA ERR.FLAG		
1340	STA BUFF		
1350	STA VOL		ANY VOLUME
1360			
1370	LDA BASIC.CMD		READ OR
1380	STA COMMAND		WRITE?
1390			
1400	DO1	JSR \$3E3	GET IOB ADD
	R		
1410	JSR RWTS		DO A SECTOR
1420	BCC NO.ERR		
1430	INC ERR.FLAG		ERROR!
1440			
1450	NO.ERR	INC BUFF+1	NXT PAGE
1460		INC SECTOR	NXT SECTR
1470	LDA BUFF+1		DONE?
1480	CMP #50E		
1490	BCC DO1		NOPE, BRANC
	H		
1500	RTS		THAT'S ALL
1510			
1520	* -----		
1530	* PRINT OUT STATS OF A		
1540	* CHARACTER		
1550	* -----		
1560			
1570	NUM.PRT	LDA (CHAR),Y	GET BYTE
1580		JSR PRINTA	PRINT ACC
1590		INC CV	MOVE DOWN
1600		LDA CV	
1610		JSR BASCALC	
1620		DEC CH	AND BACK
1630		DEC CH	TWICE
1640		INY	NEXT BYTE
1650		DEX	DONE?
1660		BNE NUM.PRT	NO, DO NEXT
1670		RTS	
1680			
1690	NEW.X.Y	STX CH	DO HTAB
1700		STA CV	
1710		JMP BASCALC	AND A VTAB
1720			
1730	Y.N.PRNT	LDX #4	FOUR BITS
1740	P2	LSR	YES OR NO?
1750		PHA	SAVE FOR NE
			XT SHIFT
1760		LDA #\$D9	SLOW, BUT
1770		BCS Y.OUT	MEMORY
1780		LDA #\$CE	EFFICIENT
1790	Y.OUT	JSR COUT1	
1800		DEC CH	BACKUP
1810		INC CV	
1820		LDA CV	
1830		JSR BASCALC	
1840		PLA	
1850		DEX	
1860		BNE P2	
1870		RTS	
1880			
1890	PRINT.A.CHARACTER		
1900			
1910		LDX #20	JMP 20,2
1920		LDA #2	
1930		JSR NEW.X.Y	
1940		LDY #14	CARD BYTE
1950		LDA (CHAR),Y	GET IT
1960		JSR Y.N.PRNT	PRINT CARDS
1970		PHA	

Continued on page 29

SERPENTINE (BS):see Choplifter
 S.E.V.I.S. (SSI): *
 t0-t22 mode-2
 SEX RATED (UNK):normal *
 SHATTERED ALLIANCE:(SSI) normal *
 SHELIA (UNK):normal
 write-protect before booting !!
 SHERWOOD FOREST (PH):normal *
 SHIFTY SAM (UNK):normal *
 SHIVARY (UNK): mode-2 *
 SKIING 3D (CTS):normal *
 SNEAKERS (SRS):see Beer-Run
 SOFT PORN ADVENTURE:(SOL) see Jawbreaker
 SONGWRITER:see Lock-It-Up *
 SORCERER (IC):normal *
 or try: *
 t0-t22 mode-2
 or try: *
 t0-t22 parm 28 = 21 mode-2
 SORCERER OF SIVA (UNK):normal
 SPACE (EW):normal *
 SPACE EGGS (SRS):normal
 SPACE RESCUE (UNK):normal *
 SPACE VIKINGS (SL):normal *
 SPANISH/ENGLISH HANGMAN (GE):normal *
 SPECTRE (DM):normal *
 SPEED READER II (AC):mode-2 *
 Data disks:normal *
 SPELLICOPTER (UNK):mode-2 *
 SPELLIKAZAM (UNK):normal *
 SPELLING BEE (EW):normal *
 SPIDER EATER (UNK): *
 t0-t16 mode-2
 recopy tracks 3 and 4 until boot
 SPITFIRE SIMULATOR (MS):normal *
 SPY'S DEMISE (PEN):normal (t0-t12)
 SPY STRIKES BACK (PEN):*
 t0-t11
 tE.5
 recopy t0 until boot
 STANDING STONES (EA): *
 side-1:see Axis Assassin
 side-2:see Axis Assassin
 or try:
 t0
 t1.25-t22.25 mode-2
 STAR BLAZER (BS): *
 t0 - tB mode-2
 tC.25-t1E.25
 t20
 or see Choplifter
 STARCROSS (IC):normal
 STARGATE (UNK):normal *
 STAR THIEF (CC):*
 t0-t13
 t22 mode-3 or -4
 STAR WARRIOR (EP):mode-2 *
 STAR WARS ADVENTURE (UNK):normal *
 STELLAR DEFENSE (UNK):normal *
 STELLAR SEVEN (SEC): see Lock-It-Up
 STEP BY STEP (UNK): *
 t0-t22 mode-3
 t5,t6,tA mode-2
 STOCK PORTFOLIO SYSTEM (SMI):normal *
 STORY MACHINE (UNK):mode-2 *
 STRIP POKER (ARW):mode-2 *
 SUNDG (UNK):mode-3 *

SUPER BUNNY (UNK):mode-2 *
 SUPER COPY III (SEN):normal *
 SUPER DISK COPY 3.8 (SEN):normal (t0-t8) *
 SUPER SPEED READING (MGN):normal *
 SUPER TEXT PROFESSIONAL (MU):normal *
 SUSPENDED (IC):normal
 SWASHBUCKLER (DM):parm 28 = 10
 or try:
 t0-t22 parm 5 = 12
 TAWALA'S LAST REDOUT (BS):mode-2 *
 TACTICAL ARMOR COMMAND (AVH):normal *
 TAX ADVANTAGE 1983 (CTS):normal *
 TAXMAN (HAL):normal
 TAX MANAGER (ML):normal *
 TEMPLE OF APHSAI (EP):normal
 TENNIS ANYONE:normal *
 TERRAPIN LOGO ver 1.0 (TER):normal *
 or try: *
 t0-t5 mode-5 or 6
 t6-t22 mode-2
 write-protect before booting!
 TERRORIST (UNK):normal
 TERRORISTE (UNK): *
 t0 - t1F
 t20.75-t22.75
 THIEF (DM):
 t0-t22
 t4-t5 mode-2
 THREE MILE ISLAND (MU):normal
 THRESHOLD (SOL):
 t0-t22
 t1 mode-3 or -4
 THUNDER BOMBS (PEN):normal (t0-t11) *
 TIC TAC SHOW (UNK):
 t0
 t1.5-t4.5
 t6 - t22
 Series Disks:normal
 TIGERS IN THE SNOW (SSI):normal *
 TIME ZONE side A (SOL):see Miner 2049er
 sides B-L:normal
 TITAN EMPIRE (UNK):normal *
 TORPEDO FIRE (SSI):normal
 TRACK ATTACK (BS):see Choplifter
 TRANSEND (TRN):normal
 TRANSEND II (TRN):normal *
 TRANSYLVANIA (PEN):normal *
 TUBEWAY (DM):normal
 TUESDAY MORNING QUARTERBACK (UNK):normal *
 TURTLE TRACTS (UNK):normal *
 TYPE ATTACK (SRS):see Flip Out *
 TYPE MASTER (UNK):normal *
 TYPING TUTOR (MIS):normal
 TYPING TUTOR II (MIS):normal *
 U-BOAT COMMAND (SY):normal *
 ULTIMA (CP):normal
 ULTIMA II (SOL): see Miner 2049er
 ULTIMA III (OR):see Miner 2049er
 ULYSSES AND THE GOLDEN FLEECE (SOL):normal
 UNI-SOLVE (UNK):normal
 VERB VIPER (UNK):normal *
 VIEWMAX-80 (UNK):normal
 write-protect before booting!!!
 VISIBLE COMPUTER (SWM):6502:normal *
 recopy track '0' until it boots
 VISICALC 80 COLUMN PREBOOT:(VX) normal
 VISICALC II (VCP):normal
 VISICALC IIe (VCP):normal
 (old version)
 VISICALC ADVANCED (VCP):normal

or try:
 t0-t2
 t3-t22 parm 28 = 40 59 = 85
 5E = 7F 5F = 7F
 VISICALC III:(VCP) mode-2 *
 VISICALC TUTORIAL (UNK):normal *
 VISIDEX (VCP):normal
 or try: *
 t0-t22 parm 28 = 3 mode-2
 VISIFILE II (VCP):normal *
 VISIPILOT II (VCP):normal
 VISISCHEDULE II (VCP):normal *
 VISITERM II (VCP):normal *
 VISITREND/PLOT 1.1 (VCP):normal *
 VOCABULARY BUILDERS (UNK):normal *
 t0-t22 parm 0 = 1
 or try:

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Continued from page 20

590	-	\$114D	650	-	\$7408
600	-	\$4323	660	-	\$6F0D
610	-	\$9D38	670	-	\$2023
620	-	\$37AC	680	-	\$74E4
630	-	\$3C46	690	-	\$02D1
640	-	\$671D	700	-	\$C28E

Ultimapper.Small Checksums

10	-	\$BADD	350	-	\$0526
20	-	\$9B13	360	-	\$EFA6
30	-	\$4D3B	370	-	\$D72A
40	-	\$AD92	380	-	\$7940
50	-	\$C899	390	-	\$208A
60	-	\$FF65	400	-	\$7D72
70	-	\$A3BF	410	-	\$78C8
80	-	\$A900	420	-	\$2D58
90	-	\$53F3	430	-	\$58FA
100	-	\$29C2	440	-	\$31C0
110	-	\$36AC	450	-	\$F84C
120	-	\$D26A	460	-	\$AA6E
130	-	\$CD70	470	-	\$593E
140	-	\$28A0	480	-	\$C42B
150	-	\$6403	490	-	\$6E12
160	-	\$CA65	500	-	\$B524
170	-	\$16AE	510	-	\$6B40
180	-	\$25E7	520	-	\$878C
190	-	\$7A69	530	-	\$5F5B
200	-	\$50E7	540	-	\$A937
210	-	\$ED19	550	-	\$8F66
220	-	\$FDF9	560	-	\$F1DC
230	-	\$4F05	570	-	\$A9FA
240	-	\$E1C4	580	-	\$E51C
250	-	\$7486	590	-	\$CB29
260	-	\$EFDD	600	-	\$1F43
270	-	\$592A	610	-	\$88CB
280	-	\$9664	620	-	\$9C2B
290	-	\$F384	630	-	\$08B6
300	-	\$4A76	640	-	\$C59B
310	-	\$CBEA	650	-	\$C84E
320	-	\$A738	660	-	\$D1CD
330	-	\$3800	670	-	\$EF0D
340	-	\$7BF5	680	-	\$67DD



Most Wanted List

If you have been trying to backup a program, and have only ended up pulling your hair out as a result of the ordeal, let us know about it.

We have received softkeys for a number of programs previously in our list and these will be published as soon as each has been evaluated and edited by our staff.

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

If you know how to de-protect, unlock or modify any of the programs below, we encourage you to help other Hardcore COMPUTIST readers and earn some extra money at the same time. Send the information to us in article form on a DOS 3.3 diskette.

1. **Apple Business Graphics**
Apple Computer
2. **Flight Simulator II**
Sub Logic
3. **Type Attack**
Sirius Software
4. **DB Master 4.0**
Stoneware, Inc.
5. **Time Is Money**
Turning Point
6. **Crossword MAGIC**
L & S Computerware
7. **Visiblend**
Micro Lab
8. **BPI General Ledger**
Apple Computer
9. **Dollars And Sense**
Monogram
10. **Word Juggler**
Quark, Inc.
11. **Catalyst**
Quark, Inc.
12. **Rocky's Boots**
The Learning Company
13. **PFS Graph**
Software Publishing Corp.
14. **HAMSOFT**
Kaltronics
15. **The Statistics Series**
Human Systems Dynamics
16. **Millionaire**
Blue Chip Software
17. **Facemaker**
Spinnaker
18. **Story Machine**
Spinnaker
19. **MASTER TYPE**
Scarborough Systems
20. **Sargon III**
Hayden
21. **Dow Jones Market Analyzer**
Dow Jones Software
22. **Zardax**
Computer Solutions
23. **Stickybear Series**
Xerox Education Publications
24. **Bookends**
Sensible Software

Sensible Speller IV: UPDATE

By Doni G. Grande

**Sensible Speller IV
Sensible Software
6619 Perham Drive West
Bloomfield, MI 48033
(313) 399-8877
\$125.00**

Requirements:

Apple II or II+
16K Ram Card
Blank Disk
Any DOS track copy program

The softkey that was published in Hardcore Computist No. 9 for Sensible Speller IV was based upon revision 4.0d and, unfortunately, would only work correctly on that revision. Apparently there have been many minor revisions (over a dozen) to Sensible Speller and most of these revisions have changed the program to the extent that it no longer has the same startup point nor does it occupy the same memory range. If the softkey from No. 9 is attempted on these revised versions, the results are usually disappointing: the copy will either hang up after loading the Sensible Speller logo or will give a "CHECKSUM ERROR" message when the main menu appears. Don't despair, though, because with some modifications to one of the programs presented in the original article (SPELLER.LOADER) the softkey can be performed successfully on any revision of Sensible Speller IV (at least up to revision 4.2b anyway).

What It Does

Let us first delve a little deeper into what the original softkey does. This demonstrates an excellent use for a RAM card. A little realized fact about RAM cards is that they completely ignore the RESET key. When power is first applied to the Apple, the RAM card's own reset circuitry is set to certain power-up defaults. After that, whenever it is enabled by use of the softswitches (see the manual that came with the card if you do not know about softswitches), it keeps control until it is specifically turned off. That is why it was possible to reset into the monitor in the original softkey by just using the RAM card. This technique is normally possible only with an INTEGER card or modified F8 ROM! Those of you out there cursing your lack of an INTEGER card should note the use of the RAM card here.

Readers who wish to make a backup of Sensible Speller IV but don't have a removable RAM card should read the article "More on Sensible Speller IV" on page 6 of Hardcore COMPUTIST No. 10.

The procedure described by Mr. Cranston doesn't require a RAM card but does require that the entry point to the Sensible Speller menu be known for the particular revision being backed up. Entry points for revisions 4.0c and 4.1c were given in the article and we have since learned the menu entry points for several other revisions. The table below gives the menu points for several different revisions currently in circulation. The correct entry point should be used in line 1070 of the source code or at address \$B791-\$B792 of the object code. If you don't have one of the versions listed try using an entry point of \$0800.

Revision	Entry Point
4.0c	\$33B8
4.0d	\$33D9
4.0h	\$351A
4.0i	\$3538
4.0j	\$3522
4.1b	\$3514
4.1c	\$3517
4.2a	\$3584
4.2b	\$3586

To determine why the original softkey works (at least on 4.0d), get out your copy of Hardcore COMPUTIST No. 9 and follow along. First, the RAM card is moved to slot one, which is a non-standard slot. As mentioned in the article, most software only looks in slot zero for a RAM card, so it is effectively hidden by moving it to slot one. Also, as mentioned above, once the RAM card has control of the Apple, not even RESET will make it let go! So an active RAM card in slot one is not likely to be disabled by software and has the full power of a "normal" (slot zero) RAM card.

Next, a disk with a somewhat modified DOS is made. This modification consists of a "patch" in the \$B6 page of DOS (A page of memory is 256 locations, which works out in hexadecimal to mean that the first two digits of the address do not change. Hence, page \$03 refers to the memory range \$0300-\$03FF). Page \$B6 (\$B600-\$B6FF) resides on the disk on track 0, sector 0 and is the first sector to be read into memory when a disk is booted. It is read into memory page \$08 where, upon execution, it normally reads Track \$0, sectors \$0 through \$9 into memory at \$B600 through \$BFFF. This the portion of DOS containing the RWTS (Read/Write Track & Sector) which is the main portion of DOS responsible for all the gory details of disk operation. The reason

that Track \$0, sector \$0 is re-read into page \$B6 is so that RWTS has something to put on the disk so that it can boot. The patch made to the \$B600 area in the original softkey enables a RAM card in slot zero, copies the motherboard language into it, sets up a location on page \$02, and then jumps to another patch at \$B700.

The patch at \$B700 is installed in step 7 of the softkey. This is the real core of the procedure since this patch loads Sensible Speller into memory from the disk when it is booted. The SPELLER.SAVER routine stores the menu and utilities on the disk in a certain way. See the following Table 1 for a track/sector map of the first seven tracks and their corresponding memory locations.

The hi-res Sensible Speller logo is stored on tracks six and seven. The first thing that the patch at \$B700 does is to display hi-res page two (\$4000-\$5FFF) and load this logo from the disk. Then, \$0800 to \$3A00 is loaded from tracks 0 through 5 (in reverse order), skipping over tracks two and three which are not used by the copy routine. Page three is loaded from track \$0, sector \$0C and then \$7700 and \$7100 are loaded from track 0, sectors \$0B and \$0A respectively. I assume that \$7700 must be used in some way by Sensible Speller 4.0d; later versions do not use it. Page \$71 was used by the RESET trap routine to store zero page. All the important parts of memory are restored to their original contents when the disk is booted. The last task of the patch at \$B700 is to restore zero page and jump to the Speller program. This patch is stored to the disk on track 0, sector 1 in steps 8 through 10. Then, \$0800 to \$3A00 is loaded from tracks \$0, \$1, \$4 and \$5 with the use of the normal DOS RWTS.

Getting back to the original procedure, next the unprotected tracks (\$2-\$3 and \$6-\$22) on the original disk are copied with a bit copier or by SUPER IOB. Then, the SPELLER.SAVER routine is patched into the RAM card, the original disk is booted, and RESET is pressed. The patch entered in step 17 saves page zero at \$7100 when RESET is pressed, allowing the SPELLER.SAVER routine to save a complete snapshot of memory to disk. When the SPELLER.SAVER program is run (D000G in step 22), it writes the important areas of memory to disk at the tracks and sectors shown in Table 1. When the disk is booted, Sensible Speller is loaded back into memory and started.

Table 1

Sct.	Track							
	0	1	2	3	4	5	6	7
00	B6	0B	x	x	1B	2B	40	50
01	B7	0C	x	x	1C	2C	41	51
02	B8	0D	x	x	1D	2D	42	52
03	B9	0E	x	x	1E	2E	43	53
04	BA	0F	x	x	1F	2F	44	54
05	BB	10	x	x	20	30	45	55
06	BC	11	x	x	21	31	46	56

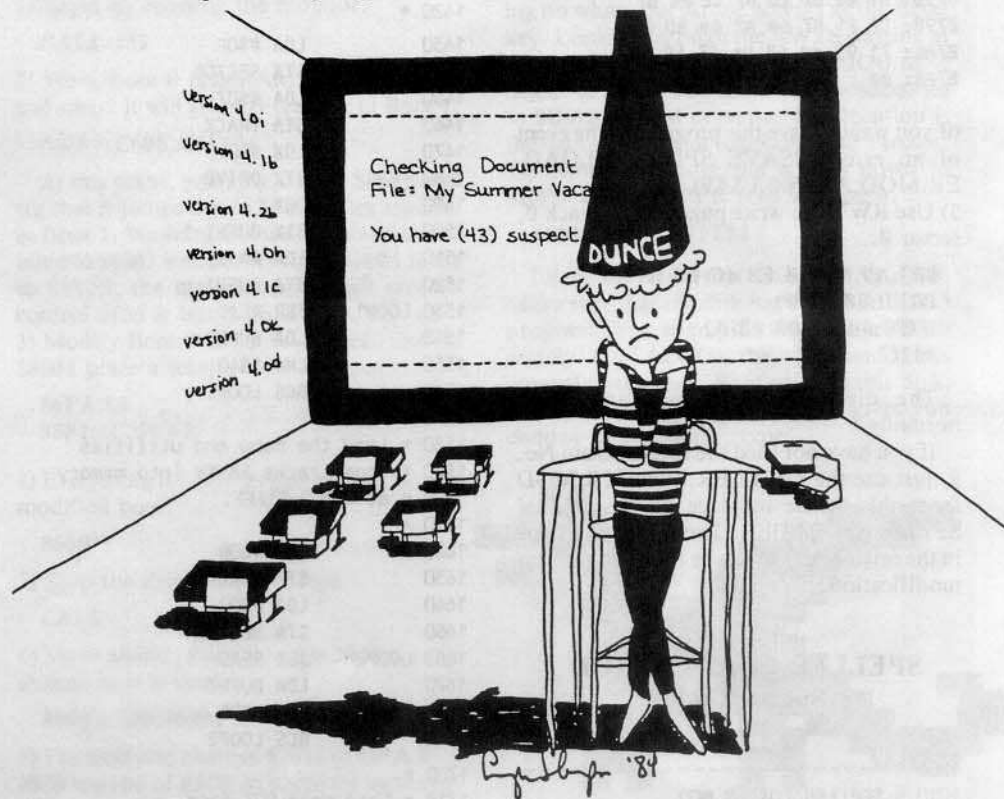
07	BD	12	x	x	22	32	47	57
08	BE	13	x	x	23	33	48	58
09	BF	14	x	x	24	34	49	59
0A	71	15	x	x	25	35	4A	5A
0B	77	16	x	x	26	36	4B	5B
0C	03	17	x	x	27	37	4C	5C
0D	08	18	x	x	28	38	4D	5D
0E	09	19	x	x	29	39	4E	5E
0F	0A	1A	x	x	2A	3A	4F	5F

What Goes Wrong

I found that on later revisions of Sensible Speller the menu and utilities take up two or three more pages of memory than the original softkey saves to disk. If the entire menu is not present in memory, the copy of Sensible Speller will print a "CHECKSUM ERROR" message when the menu appears. The SPELLER.SAVER program saves the menu and utilities to the unprotected disk on tracks 0, 1, 4 and 5 but I found out that the same code also exists on tracks \$8 through \$B which are copied during step 11 of the

key saves page \$03 on track \$0, sector \$0C, the values in the RESET vector can be viewed with a sector editor. The values in \$3F2-\$3F3 turn out to be F8 03, which points at \$03F8. At \$3F8 the assembly language instruction reads JMP (\$004E) which is an indirect JMP to the values at \$4E-\$4F. Therefore, for all versions of Sensible Speller to work correctly, the last thing the SPELLER.LOADER program should do is to perform a JMP (\$004E).

The modifications I have made to the SPELLER.LOADER program load the menu and utilities from tracks \$8-\$B into memory at \$0800-\$3FFF. Some of these sectors on track \$B may or may not be needed but the program loads them in regardless so that the procedure will work with all of the different revisions. Another modification I made was to have the SPELLER.LOADER program lay track \$2, sector \$0F over page \$09 in memory where the setup is contained. This ensures that the latest setup is used each time the disk is booted.



softkey.

Another problem with the original softkey is that the entry point of \$33D9 is correct only for 4.0d. Each of the revisions seems to have a different entry point and if the entry point is not correct, the copy will usually just load in the Sensible Speller hi-res logo, switch to the text screen and then hang up.

One thing to notice about an original copy of Sensible Speller is that the program will always return to the main menu if the RESET key is hit (at least with an autostart F8 ROM). This is a clue that the RESET vector at \$3F2 somehow points to the correct menu entry point. Because the original soft-

Finally, my modified SPELLER.LOADER program performs the aforementioned JMP (\$004E) to enter the menu.

Step-By-Step Copying Of Sensible Speller IV

This assumes that you have already tried to make a copy using the softkey from Hardcore COMPUTIST No. 9. To make this copy work, do the following:

- 1) Boot the DOS 3.3 master disk
- 2) Insert the copy disk made using the original procedure
- 3) Enter the monitor

4) Key in the modified SPELLER.LOADER program listed below.

```
B700: 2C 50 C0 2C 57 C0 2C 52
B708: C0 2C 55 C0 A9 0F 8D ED
B710: B7 A9 07 8D EC B7 A2 01
B718: 8E EA B7 CA 8E F0 B7 A9
B720: 5F 8D F1 B7 20 7F B7 AD
B728: F1 B7 C9 40 B0 F6 A9 0B
B730: 8D EC B7 A9 07 8D ED B7
B738: 20 7F B7 AD F1 B7 C9 08
B740: B0 F6 A9 03 8D F1 B7 A9
B748: 00 8D EC B7 A9 0C 8D ED
B750: B7 20 7F B7 A9 77 8D F1
B758: B7 20 7F B7 A9 71 8D F1
B760: B7 20 7F B7 A9 02 8D EC
B768: B7 A9 0F 8D ED B7 A9 09
B770: 8D F1 B7 20 7F B7 AD 51
B778: C0 AD 54 C0 4C 9C B7 A9
B780: 01 8D F4 B7 A9 B7 A0 E8
B788: 20 B5 B7 CE ED B7 10 08
B790: A9 0F 8D ED B7 CE EC B7
B798: CE F1 B7 60 A2 00 BD 00
B7A0: 71 95 00 E8 D0 F8 6C 4E
B7A8: 00
```

(if you want to save this program in the event of an error: BSAVE SPELLER.LOADER.MOD, A\$B700, L\$A9)

5) Use RWTS to write page \$B7 to track 0, sector 0.

```
803:A9 B7 A0 E8 4C B5 B7
B7EB:00 00 01
B7F0:00 B7 00 00 02
803G
```

The disk will now boot and work normally.

If you have not tried the softkey from No. 9, just use the SPELLER.LOADER.MOD from this article in place of the original SPELLER.LOADER. The rest of the steps in the original article can be followed without modification.

SPELLER.LOADER.MOD Source Code

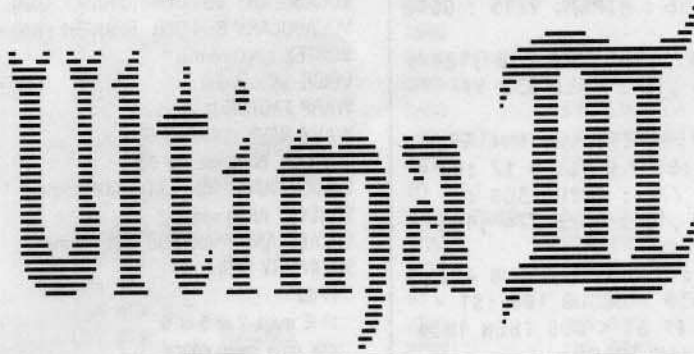
```
1000 * -----
1010 * SPELLER.LOADER.MOD
1020 * This loads what used to be
1030 * part of Sensible Speller
1040 * while it is booting.
1050 *
1060 *
1070 * Modification to SPELLER.LOADER
1080 * from Hardcore COMPUTIST no. 9
1090 * which works on versions
1100 * of Sensible Speller IV up to
1110 * revision 4.2b.
1120 *
1130 * Note that some code was
1140 * rearranged to make room for the
1150 * new code. The free space for
1160 * patches is $B700-$B7B4. RWTS
1170 * entry at $B7B5 must not be
```

```
1180 * disturbed!
1190 * -----
1200 *
1210 .OR $B700
1220 .TF SPELLER.LOADER.MOD
1230 *
1240 * DOS 3.3 RWTS Parmlist
1250 *
1260 DRIVE .EQ $B7EA
1270 TRACK .EQ $B7EC
1280 SECTOR .EQ $B7ED
1290 BUFHI .EQ $B7F1
1300 COMMAND .EQ $B7F4
1310 RWTS .EQ $B7B5
1320 *
1330 * Display Hi-res page 2
1340 *
1350 BIT $C050
1360 BIT $C057
1370 BIT $C052
1380 BIT $C055
1390 *
1400 * Load the SS logo from
1410 * tracks 6 & 7.
1420 *
1430 LDA #$0F
1440 STA SECTOR
1450 LDA #$07
1460 STA TRACK
1470 LDX #$01
1480 STX DRIVE
1490 DEX
1500 STX BUFHI-1
1510 LDA #$5F
1520 STA BUFHI
1530 LOOP1 JSR READ
1540 LDA BUFHI
1550 CMP #$40
1560 BCS LOOP1
1570 *
1580 * Load the menu and utilities
1590 * from tracks $8-$B into memory
1600 * at $0800-$3FFF.
1610 *
1620 LDA #$0B
1630 STA TRACK
1640 LDA #$07
1650 STA SECTOR
1660 LOOP2 JSR READ
1670 LDA BUFHI
1680 CMP #$08
1690 BCS LOOP2
1700 *
1710 * Load page $03 from
1720 * track $0, sector $0C.
1730 *
1740 LDA #$03
1750 STA BUFHI
1760 LDA #$00
1770 STA TRACK
1780 LDA #$0C
1790 STA SECTOR
1800 JSR READ
1810 *
1820 * Get $7700 from track $0,
1830 * sector $B. This may not be
1840 * needed for your revision.
1850 *
1860 LDA #$77
1870 STA BUFHI
```

```
1880 JSR READ
1890 *
1900 * Get $7100 (SS page $0) from
1910 * track $0, sector $A.
1920 *
1930 LDA #$71
1940 STA BUFHI
1950 JSR READ
1960 *
1970 * This routine overlays the setup
1980 * code over page $09 from
1990 * track $2, sector $F.
2000 *
2010 LDA #$02
2020 STA TRACK
2030 LDA #$0F
2040 STA SECTOR
2050 LDA #$09
2060 STA BUFHI
2070 JSR READ
2080 *
2090 * Set the screen to text page 1
2100 * and exit.
2110 *
2120 LDA $C051
2130 LDA $C054
2140 JMP EXIT
2150 *
2160 * READ has been modified to
2170 * decrement BUFHI after each read
2180 * to save some space in the code.
2190 *
2200 READ LDA #$01
2210 STA COMMAND
2220 LDA #$B7
2230 LDY #$E8
2240 JSR RWTS
2250 DEC SECTOR
2260 BPL RTS1
2270 LDA #$0F
2280 STA SECTOR
2290 DEC TRACK
2300 RTS1 DEC BUFHI
2310 RTS
2320 *
2330 * Restore page $0 from $7100 and
2340 * then jump to SS IV entry point
2350 *
2360 EXIT LDX #$00
2370 LOOP3 LDA $7100,X
2380 STA $0,X
2390 INX
2400 BNE LOOP3
2410 *
2420 * JMP indirectly to Speller Menu
2430 *
2440 JMP ($004E)
```



Softkey For EXODUS:



By Tim Schaap

Requirements:

Apple with 48K
One disk drive with DOS 3.3
Exodus
SUPER IOB from issue #9
One blank disk

Exodus: Ultima III, by Origin Systems, is a superior role-playing game. The author, Lord British, has added many enhancements to this, the third, Ultima scenario. Unfortunately, the program side of this third Ultima still doesn't allow the user to back it up. On the brighter side, there exists a method of unprotecting Exodus. Some boot code tracing is required to capture its RWTS, but once this has been done, SUPER IOB, with the proper controller installed, can be used to make a backup of Exodus.

Several things prevent making a duplicate of Exodus with a bit copier. The address and data marks on the disk are changed extensively throughout the disk. The only tracks that are used on the disk are \$0-\$10, the rest of the tracks being unformatted. The disk is similar to normal DOS 3.3 in that it uses normal DOS 3.3 RWTS calls and an Input/Output Block (IOB). Even though the RWTS and IOB are at different locations than in normal DOS 3.3, Exodus is a prime target for deprotecting with Super IOB.

But How Do I Do It?

That's enough of the usual hubbub. To make a backup of your original Exodus disk, first we have to capture the entire Exodus RWTS so that it can later be put into memory for utilization by SUPER IOB. In order to do this a little boot code tracing is required. Boot code tracing is not a process used for manufacturing footwear, but is a technique for gradually loading pieces of code into memory from disk and halting the code before it can begin to execute. This

method is based upon the fact that, even on highly protected Apple disks, track \$0, sector \$0, must be readable by the disk controller hardware.

1) Begin by entering the monitor.

CALL-151

2) Move Boot 0 into RAM so we can control where it will go after reading in Boot 1.

8600 < C600.C6FFM

At this point, you may look at \$86F8 and see that it jumps out to \$0801 after reading in Boot 1. We want to modify this so it will jump to \$8801 instead. We make \$8601 jump to \$FF59, the monitor, so it will give us control after it has read in Boot 1.

3) Modify Boot 0 to jump to \$8801 and at \$8801 place a jump to the monitor.

**86FA:88
8801:4C 59 FF**

4) Everything is ready so we can start up our modified boot.

8600G

5) Stop the drive after it beeps.

C0E8

6) Move \$0800 (Boot 1) to \$8800 so we can change how it works.

8800 < 800.900M

7) The next step changes \$8811 to ORA with #80 instead of #C0 so it will set up the indirect jump to go to \$865C (our modified read routine, down in RAM), and not \$C65C (the ROM read routine). There is a branch out to \$8846 that jumps out only after it has read in the necessary information. This step also makes \$8846, the location where it branches out, jump to the monitor in order to give us control after it has read in the RWTS.

**8812:80
8846:4C 59 FF**

8) Start it up again and stop it after the beep.

**8600G
C0E8**

9) It has just loaded in its RWTS, but we will

not be able to use it at this point because it has not set itself up. Let's make it so it will set itself up and let us have control afterwards. Look at \$0846-, the original Boot 1 location. It sets up the Reset vector and the slot number where the disk drive resides (\$0854 up to \$0860). We will have to skip this portion of the code and start our next boot process at \$0860. But first, we have to set up the Reset vector at \$03F2 to jump to the monitor when we hit Reset key after the demo has begun.

3F2:59 FF 5A

10) Remember, we don't want the code to set up its own values for the Reset vector and other items. Therefore, we will begin the next boot at \$0860. *Note: the drive may recalibrate, but it will read the rest of the program in afterwards.*

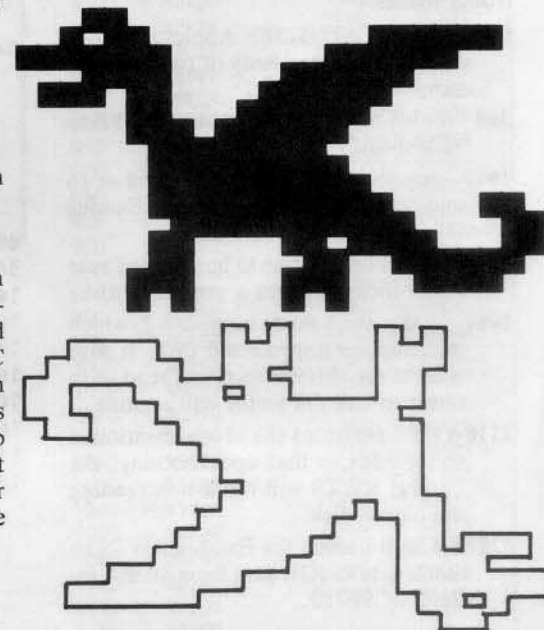
860G

11) As soon as the red light on the disk drive goes off, hit RESET or ^{CTRL}RESET depending on what your Apple accepts as the Reset key. Looking through the RWTS starting at \$B500, one would find that the IOB table begins at \$B750 and that some locations go to \$B610 to read or write. This location is the main RWTS call to go and read a sector.

12) Now let's move the RWTS down to \$2400 where SUPER IOB will use it.

2400 < B400.BFFFM

Insert the disk that has SUPER IOB. Make sure that the disk has a short HELLO program. For example, a program which merely CATALOGs the disk and gives control to the user. Boot up with this disk, and after the HELLO program gives you control of the Apple, type:



**BSAVE RWTS.EXODUS,
AS2400,LSC00**

13) Type in the controller at the end of this

article and save it by whatever means you usually use.

14) When RUNNING Super IOB with the Ultima III controller installed, you must copy with disk drives that are in slot 6. Press "Y" when the program asks if it should INITIALIZE the blank disk. Give the disk a volume number of 2.

What Happened?

After it is finished, Super IOB makes some sector edits by changing all the bytes referred to on the small chart below from B1's to B2's. This tells Exodus that a non-protected disk is being used.

Trk	Sct	Change these bytes
0	0	E7
0	D	4 10 1C 28 34 40 4C 58 64 70 7C 88

In order for Exodus to have a protected boot side and a normal DOS player side, the RWTS has to differentiate between the two. The protection scheme relies upon the disk volume number to tell whether the disk is protected or not. A volume number of 1 tells the RWTS that the disk is protected and tells it to get the address and data marks from the table which begins at \$B765. A volume number of 2 tells the RWTS that the disk is the player disk and that it should use normal address and data marks. All other volume numbers are rejected. The sector edit performed on track \$0, sectors \$0 and \$D ensures that a normal RWTS is always accessing the disk.

Here is an explanation of some of the modifications to Super IOB that the controller makes.

60 - makes \$1A00-\$23FF Applesoft variable space, giving plenty of room for the program to work in.

360 - moves memory from \$2400-\$2FFF to \$B400-\$BFFF.

1010 - sets the last track to be copied at 16 and sets up page 3 to call the Exodus RWTS at \$B610.

1020 - makes the volume to be accessed next a 1, which indicates a protected disk.

1060 - makes the volume number a 2, which indicates an unprotected disk. It also tests to see if track zero was read in in order to call the sector edit routine.

1110-1120 - performs the above mentioned sector edits so that upon booting, the Exodus RWTS will think it is reading the player disk.

62000-62010 - alters the Exodus RWTS so that it gets its IOB data from \$030A instead of \$B750.

That's all. Exodus with normal address and data marks is now ready to be backed-up and played. This same procedure, with a few

changes, can be used to make Caverns of Callisto COPYable.

Ultima III Controller

```

60 LOMEM: 6656 : HIMEM: 9215 : GOTO
10010
360 POKE 253 ,36 : POKE 255 ,180 :
POKE 224 ,12 : CALL 832 :
RETURN
1000 REM ULTIMA III CONTROLLER
1010 TK = 0 :ST = 0 :LT = 17 :CD =
WR :IO = 772 : GOSUB 360 :
POKE 773 ,16 : POKE 774 ,182 :
GOSUB 62000
1020 VL = 1 :T1 = TK : GOSUB 490
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 VL = 2 : GOSUB 490 :TK = T1
:ST = 0 : IF TK = 0 THEN GOSUB
1110
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" : GOSUB 360 : END
1110 READ LOC : POKE LOC ,178 : IF
LOC < > 13448 THEN 1110
1120 RETURN
10010 PRINT CHR$( 4 ) "BLOAD^
RWTS.EXODUS,A$2400"
62000 READ LOC : READ NUM : POKE
LOC ,NUM : IF NUM < > 10 THEN
62000
62010 RETURN
62020 DATA 46610 ,13 ,46611 ,3
,46621 ,14 ,46622 ,3 ,46625
,14 ,46626 ,3 ,46708 ,3 ,46710
,10
62030 DATA 10215 ,13316 ,13328
,13340 ,13352 ,13364 ,13376
,13388 ,13400 ,13412 ,13424
,13436 ,13448

```

Controller Checksums

60	- \$AA93	1080	- \$6C1E
360	- \$321E	1090	- \$D12A
1000	- \$E3B8	1100	- \$3FE1
1010	- \$DD88	1110	- \$69D0
1020	- \$3132	1120	- \$E3C1
1030	- \$2733	10010	- \$7158
1040	- \$B700	62000	- \$DB27
1050	- \$AB69	62010	- \$A73A
1060	- \$9CC0	62020	- \$AF61
1070	- \$94C5	62030	- \$AF7C



Continued from page 23

VOCABULARY BUILDER- FRENCH (UNK): normal *
VOCABULARY BUILDER- GERMAN (UNK): normal *
VOCABULARY BUILDER- SPANISH (UNK):normal *
VORTEX (UNK):normal *
VOICE (MU):normal *
WARP FACTOR:(SSI) normal *
WAVY NAVY (SRS):see Flip Out *
WAYOUT (SRS):see Flip Out *
WHOLE NUMBERS-PLATO (CDP):mode-2 *
WINDOW (UNK):normal *
WIZARD AND PRINCESS (SOL):normal
WIZARDRY (SIR):
t0-t22
tA-tE mode-2 or 5 or 6
note: drive speed critical
write-protect boot side!!!
WORD ATTACK (UNK):normal *
Data disks:normal *
WORD HANDLER (SVS):
note: 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 4=10 mode-3 or -4
tB.25-t10.25 mode-2
t11-t22
WORD INVASION (DEL):normal *
WORD JUGGLER III (QRK):mode-2 *
WORD MASTER (UNK):normal *
WORDRACE (DAS):mode -2 *
WORD RADAR (UNK):normal *
WORDSPINNER (UNK): *
t0 - t9
t1.75-t2.75
WORLDS GREATEST BLACK-JACK (AC):normal
XPS DIAGNOSTIC II^s or IIe (XPS):
t0-tA mode-2
t3 parm 12=5 16=8, 10, or 14 mode-2
ZANDER-THE WIZARD level 1 and 2 (UNK): *
t0-t23 mode-2
ZAXXON (DS): *
note:very hard to copy
drive speed critical
t0-t16 normal
or try: *
t0-t16 mode-5 or 6
or try: *
t0-t22 parm 07=1 mode-2
ZENITH (GB):see Choplifter
ZOOM GRAFIX (PH):normal
ZORK I (IC):normal
ZORK II (IC):normal *
ZORK III (IC):normal *

* = Parameters for this program were supplied by an EDD user.



Continued from page 22

```

1980 LDX #30 JMP 30,2
1990 LDA #2
2000 JSR NEW.X.Y
2010 PLA
2020 JSR Y.N.PRNT
2030 LDX #0 JMP 0,7
2040 LDA #7
2050 JSR NEW.X.Y
2060 LDY #18 STRENGTH
2070 LDX #4 DEX, WIS, I
NT
2080 JSR NUM.PRT
2090 LDX #14 JMP 14,7
2100 LDA #7
2110 JSR NEW.X.Y
2120 LDY #15 TORCHES
2130 LDX #1
2140 JSR NUM.PRT
2150 LDY #37 GEMS, KEYS
2160 LDX #3 POWDER
2170 JSR NUM.PRT
2180 LDY #25 MAGIC PTS
2190 LDX #1
2200 JSR NUM.PRT
2210 LDX #0 JMP 0,15
2220 LDA #15
2230 JSR NEW.X.Y
2240 LDX #7 SEVEN ARMOU
RS
2250 LDY #41 ARMOUR BYTE
2260 JSR NUM.PRT
2270 LDX #17 JMP 17,14
2280 LDA #14
2290 JSR NEW.X.Y
2300 LDY #49 WEAPONS BYT
E
2310 LDX #10 FIRST 10
2320 JSR NUM.PRT
2330 LDX #30 JMP 30,14
2340 LDA #14
2350 JSR NEW.X.Y
2360 LDX #5 OTHER 5
2370 JSR NUM.PRT
2380 LDX #24 SEED X VALU
E
2390 STX CH
2400 LDY #26 HITS MSB
2410 JSR TWO.DIGIT
2420 LDY #27 LSB
2430 JSR TWO.DIGIT
2440 LDA #26 CURSOR AT 2
6
2450 STA CH
2460 LDY #35 GOLD
2470 LDA (CHAR),Y
2480 JSR PRINTA
2490 INY
2500 LDA (CHAR),Y
2510 JMP PRINTA DONE!
2520
2530 TWO.DIGIT INC CH
2540 INC CH TO
2550 LDA #7 VTAB8
2560 STA CV
2570 JSR BASCALC
2580 LDA #54 FOUR OF THE
M
2590 STA 0
2600 .1 LDX #1 ONLY 1

```

```

2610 JSR NUM.PRT
2620 INY
2630 DEC 0
2640 BNE .1
2650 RTS
2660
2670 INVERT LDA TOP INV=NORM, N
ORM=INV
2680 STA CV
2690 LINER2 JSR BASCALC
2700 LDY RIGHT FROM RIGHT
TO LEFT
2710 LINER LDA (BASL),Y
2720 EOR #$C0 FLIPAROONI
2730 CMP #$E0 MORE PROCES
S?
2740 BCS SBC YES!
2750 CMP #$C0
2760 BCS STORE.IT
2770 CMP #$20
2780 BCC STORE.IT
2790 SBC SBC #$40
2800 STORE.IT STA (BASL),Y
2810 DEY
2820 CPY LEFT DONE LINE?
2830 BNE LINER
2840 INC CV
2850 LDA CV
2860 CMP BOTTOM
2870 BNE LINER2
2880 DEC CV
2890 RTS

```

```

390 - $3DAC 1120 - $43B5
400 - $8875 1130 - $578F
410 - $3A62 1140 - $3FB4
420 - $1AD4 1150 - $DCB5
430 - $94A9 1160 - $9215
440 - $C076 1170 - $1FFE
450 - $8372 1180 - $FF4F
460 - $0117 1190 - $83DD
470 - $AB34 1200 - $131A
480 - $4641 1210 - $CA01
490 - $2532 1220 - $956E
500 - $ACCB 1230 - $5E9C
510 - $805E 1240 - $FAAB
520 - $CFF0 1250 - $9640
530 - $BAB7 1260 - $F83D
540 - $81C3 1270 - $3F3D
550 - $5327 1280 - $DF56
560 - $34C9 1290 - $2B74
570 - $C5BA 1300 - $6743
580 - $9637 1310 - $53EA
590 - $04C0 1320 - $C053
600 - $9A1D 1330 - $2070
610 - $57DA 1340 - $E86C
620 - $471C 1350 - $9591
630 - $56E5 1360 - $43C3
640 - $FB19 1370 - $B620
650 - $E092 1380 - $9A03
660 - $2D67 1390 - $EFEE
670 - $1015 1400 - $D88C
680 - $D2DC 1410 - $CE39
690 - $53B1 1420 - $2E3B
700 - $DD86 1430 - $8DC0
710 - $6A6E 1440 - $92F5
720 - $8F19 1450 - $61B3
730 - $DA83 1460 - $5775
740 - $1930 1470 - $5B1E
750 - $630C 1480 - $34AA
760 - $CE4D 1490 - $5622
770 - $8226 1500 - $C071
780 - $4E82 1510 - $9741
790 - $E7EF 1520 - $CEBD
800 - $4115 1530 - $6BD9
810 - $9A81 1540 - $7F20
820 - $3058 1550 - $4CD5
830 - $2645 1560 - $3C35
840 - $E7DA 1570 - $08D7
850 - $2AD8 1580 - $B9A9
860 - $2EFF 1590 - $642E
870 - $4CD9 1600 - $FD4F
880 - $8689 1610 - $DDA8
890 - $5E0A 1620 - $72ED
900 - $F4BB 1630 - $0C2C
910 - $0795 1640 - $E96A
920 - $2C97 1650 - $06E7
930 - $F395 1660 - $58F6
940 - $5045 1670 - $637A
950 - $8C77 1680 - $8FA4
960 - $3631 1690 - $995D
970 - $F8B4 1700 - $60D8
980 - $DFCF 1710 - $ED85
990 - $CFE2 1720 - $CA9A
1000 - $E942 1730 - $1E98
1010 - $3799 1740 - $43C7
1020 - $C010 1750 - $2785
1030 - $4D29 1760 - $F428
1040 - $1DDE 1770 - $AD25
1050 - $28BE 1780 - $1F53
1060 - $1CEA 1790 - $0556
1070 - $A22E 1800 - $307A
1080 - $B743 1810 - $0172
1090 - $D5A8 1820 - $COAE
1100 - $CD5A 1830 - $669E
1110 - $398C

```

We at Hardcore COMPUTIST just received word that there are two versions of Exodus, Ultima III out there. One version stores its characters on disk in locations that are mentioned in the Ultimaker article.

The other, however, stores them one sector less than the places mentioned in the article. If the Ultimaker program doesn't work with your Ultima III scenario disk, then you probably own this other version.

Here is the modification to the Ultimaker program that will make it perform correctly on this different version:

Modification:
190 POKE 3595 ,206 : POKE 47085
,7 :FS = 01 : CALL 3584 : IF
PEEK (255) THEN 330

Ultimaker III Checksums

```

10 - $BADD 200 - $496B
20 - $9B13 210 - $75AF
30 - $4D3B 220 - $70DB
40 - $AD92 230 - $AAEC
50 - $C899 240 - $BA29
60 - $FF65 250 - $789A
70 - $A3BF 260 - $927E
80 - $A900 270 - $07DB
90 - $0268 280 - $8DB2
100 - $1CC6 290 - $4AAA
110 - $34D2 300 - $C9D5
120 - $C82F 310 - $C17D
130 - $D8CA 320 - $3147
140 - $AAC2 330 - $0A9F
150 - $09C3 340 - $A214
160 - $8B28 350 - $F07C
170 - $A74B 360 - $72F9
180 - $78F9 370 - $F6CC
190 - $6B80 380 - $0CA8

```


Defendisk Defeated??

Hardcore COMPUTIST No. 10 ran a short article about a \$10,000 reward being offered by Defendisk Inc. to the first person who could produce an exact duplicate of an IBM PC disk protected by the Defendisk system. Shortly thereafter, we received a press release from a company called Copyrighter which claimed that two of its engineers, Peter Hipson and Thomas Westheimer had successfully defeated Defendisk and submitted a working copy on June 20, 1984.

Hipson and Westheimer are the inventors of the hardware-based COPYRIGHTER protection system which can be incorporated into a microprocessor when it is manufactured, and will probably first appear in the 8088 and 8086 microprocessors used by IBM and others. There are also plans to embody the system within Western Design's 16-bit, 6502 compatible CPU's.

In making the copy of the Defendisk competition disk, Hipson and Westheimer utilized a BATCH file, the PC-DOS equivalent of an Apple EXECable file. This file, when executed, made a copy of Defendisk which ignored the results produced by the disk verification routines. A working copy of Defendisk resulted. Unfortunately for Hipson and Westheimer, Rule 1 of the Defendisk competition rules read:

1. An exact duplicate of this competition diskette must be produced by the use of software only.

Because the code which checked the disk's "signature" had been altered, in Defendisk's opinion, an exact duplicate was not produced. The submitted copy worked well, but Defendisk adamantly refused to pay the reward.

Defendisk's president, Robert Veener, says his company is still evaluating other copies of the competition disk which were submitted and is considering payment (and a job offer?) to at least one individual. Meanwhile, if you enter any contests, be sure to read the rules very carefully.

Caveat Emptor

Several complaints have recently been directed towards one of our former advertisers, Connecticut Information Services of Bridgeport, CT. Their ad for bit copiers, copy cards and other hardware items appeared in Hardcore COMPUTIST No. 's 6,7 and 8 and can also be found in recent issues of Nibble.

Complaints against CIS include non-delivery of goods ordered and non-payment of their advertising bills. Recently, there has also been no answer at the telephone number listed in their ads. Readers contemplating purchase of any of the products advertised by Connecticut Information Services should consider shopping elsewhere.

Apple II, II+, IIe, Franklin users:

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Why all the excitement about the CIA (confidential information advisors)? Probably because it is the ONLY set of utilities (5 in all) which enable even a beginner to investigate, edit, locate, list, trace, rescue, translate, patch, repair, verify, examine, protect, unprotect, analyse, encrypt, and decrypt programs on normal AND protected disks. You also get the "CIA Files", a 65000+ word book which contains detailed instructions for using the C.I.A. plus easy-to-follow, hand-holding tutorials about patching, repair, formatting, encoding, protection, and numerous other disk topics. You'll find plenty of material here which has never before appeared in print. PROGRAMS NOT COPY PROTECTED

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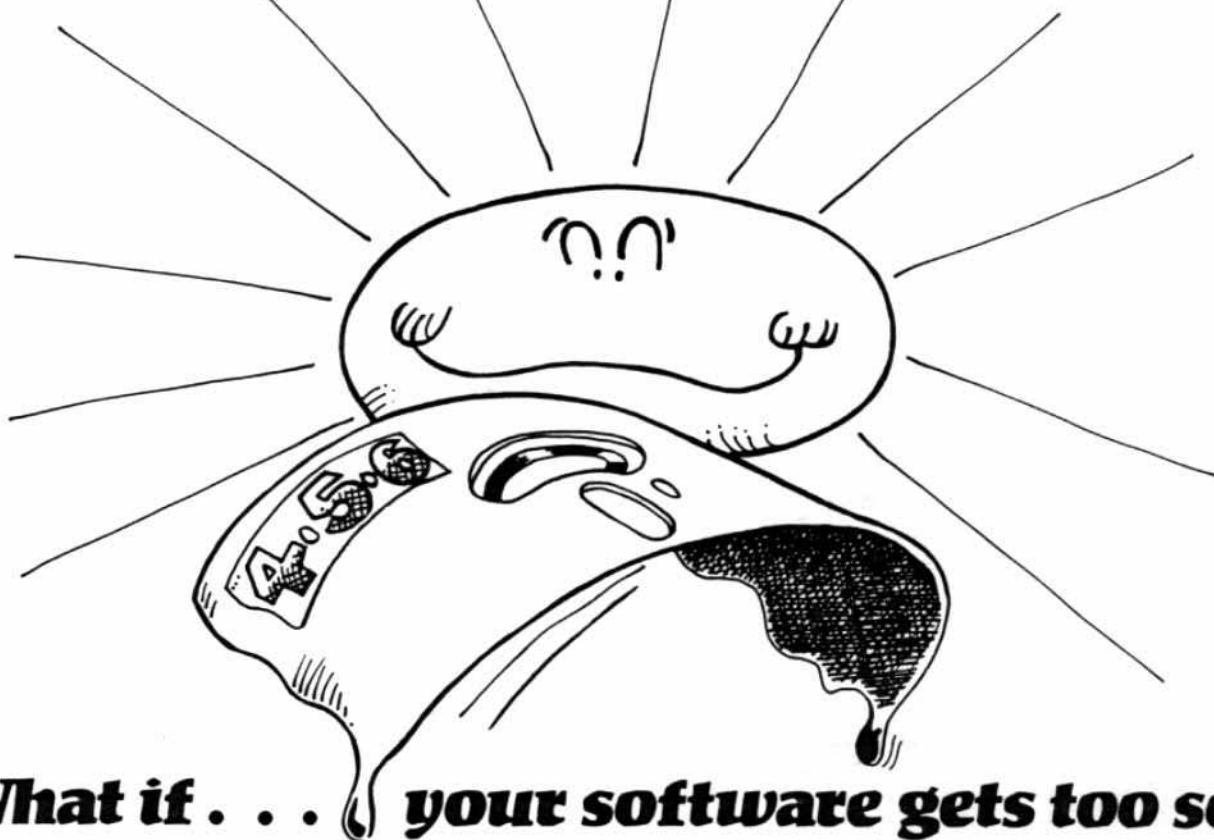
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