DISK WIZARD

USER'S MANUAL

FOR THE ATARI 400/800 COMPUTER

DISK WIZARD

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PROGRAM
WRITTEN BY:

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MANUAL
WRITTEN BY:
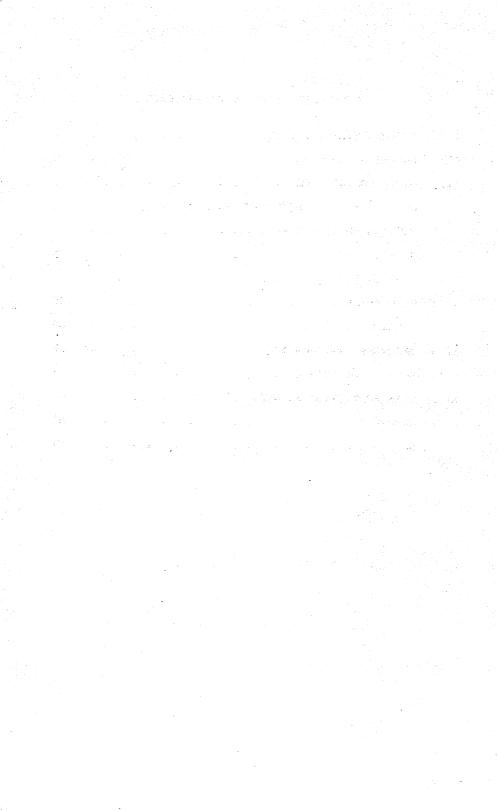
A. L. ARBITAL
AND
R. W. PAKAN

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I. INTRODUCTION

Congratulations on your purchase of C.A.P. Software's DISK WIZARD. We believe that you will be more than satisfied with the quality and versatility of the programs contained on this disk.

As you will see when you run DISK WIZARD, a lot of time has gone into preparing these programs for you. It has features that are suitable for the beginner, but also contains more advanced programs for the experienced computer enthusiast. Most importantly though, is that all of the programs on DISK WIZARD are laid out in a fashion that is understandable and easy to use.

TRADEMARK ACKNOWLEDGEMENTS

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a Warner Communications Co.

II. BACKUP OF ORIGINAL

    We strongly suggest that before proceeding any
further, you make a backup copy of your DISK WIZARD disk.
Please refer to Appendix A for the DISK WIZARD Backup
Procedure.

III. KEYBOARD PROTOCOL

The keyboard entries follow the format shown below:

    - When a prompt is followed by two values separated by
a slash, the entry can be either of the two values
(e.g.,FORMAT BACKUP DISK(Y/N)). The entry may be either a
Y or an N. Press [RETURN] after the value has been
selected.

    - When a prompt is followed by two values separated by
a dash, the entry can be any value between the first and
second value, inclusive(e.g.,ENTER START SECTOR(1-720)).
The entry may be any integer between 1 and 720 including 1
and 720. Press[RETURN] after a value has been selected.

    - If at any time an incorrect keyboard entry is made,
the computer will "Beep" and wait for the correct entry.
If you're pressing the correct keys and are still getting
a "Beep" check to make sure the keyboard isn't set for
inverse video or lower case.

    - If you type the wrong character, hit DELETE BACK S
to correct.

IV. GETTING STARTED WITH DISK WIZARD

We assume that you are already familiar with the basic operations of your ATARI 800 computer and Disk Drive. DISK WIZARD requires a minimum of 32K of RAM, a Basic cartridge and a disk drive. DISK WIZARD can accomodate 1 or 2 drives. If you have just purchased your ATARI computer system, please read the literature supplied with the computer and disk drive before running DISK WIZARD.

The DISK WIZARD disk contains four separate programs. The function of each program is explained below:

1.DISK BACKUP: Makes a sector by sector copy of any disk.

2.DISK EDIT: Enables the user to review and/or modify data on any sector of a disk. Also allows user to scan disk sectors for a series of bytes or a string.

3.DISASSEMBLER: Allows disassembly of machine language directly from disk by file name or sector number.

4.DISK SPEED: Provides display of exact disk drive speed. Also allows for creation of bad sectors on any disk.

A detailed description of each of the programs is presented in sections VI, VII, VIII, and IX of this manual.

V. BOOTING UP DISK WIZARD

     The following procedure should be used to load the DISK WIZARD disk into your ATARI 800 computer:

    1. Turn on your TV or Monitor.

    2. Insert the Basic cartridge into your computer.

    3. Turn on the disk drive and wait for the busy light to go out. Now carefully insert the DISK WIZARD disk into disk drive 1 and turn on your computer. DISK WIZARD is now being loaded. When the program load is complete you will see the DISK WIZARD MAIN MENU on the screen as shown below:

C. A. P. SOFTWARE
PRESENTS
DISK WIZARD

DISK BACKUP
DISK EDIT
DISK SPEED
DISASSEMBLER

SELECT AND START

REL. 1.1   (C) 1982

    At this point you are ready to select one of the four DISK WIZARD programs. Press the SELECT button until the desired program title is highlighted. Press the START button to load the selected program into the computer.

VI. DISK BACKUP

When the DISK BACKUP program is loaded you will see
the following display:

```
        DISK  BACKUP
┌──────────────────────────────────────┐
│          ▐ OPTIONS ▌                  │
│  DRIVE(S) - 1        DENSITY - SINGLE  │
│  FORMAT - YES        PRINT - NO        │
│  EMP SECT CHK - YES  FAST WRITE - NO   │
│  START SECTOR - 1    END SECTOR - 720  │
└──────────────────────────────────────┘

         ▐ DISK BACKUP MENU ▌

    1 BACKUP DISK

    2 CHANGE OPTIONS

    3 RETURN TO MAIN MENU

    ENTER NUMBER (1-3)█
```

This program is used to make a sector by sector copy
of any disk. An option table is located at the top of the
display.   These options may be changed to meet your
specific requirements.   The function of each option is
described on the following pages.   Before continuing
let's define the following two terms:

SOURCE DISK: The disk which contains the program you
wish to copy.
BACKUP DISK: A blank disk that will contain a copy of
the source disk program after running DISK BACKUP.

NOTE
Please refer to the KEYBOARD PROTOCOL section of this
manual if any problems are encountered during keyboard
entries.
                ****

1. BACKUP DISK

If the options in the option table do not need to be
changed and you wish to begin the DISK BACKUP procedure
type 1 [RETURN] and skip ahead to page 8 to continue the
DISK BACKUP Procedure.

2. CHANGE OPTIONS

If any or all of the options need to be changed type 2
[RETURN]. A prompt for each option will then be displayed
one at a time. Each prompt must be answered before
continuing on.

3. RETURN TO MAIN MENU

This selection is used to exit from the DISK BACKUP
program and return to the DISK WIZARD MAIN MENU. After
typing 3 [RETURN] you will see the message:INSERT DISK
WIZARD IN DRIVE 1 PRESS RETURN. Following the
instructions on the screen will bring you back to the DISK
WIZARD MAIN MENU.

OPTIONS

ENTER NUMBER OF DRIVES?(1/2) — Enter the number of
disk drives connected to your computer, then press
[RETURN]. Pressing just [RETURN] will cause the program
to default to the value presently shown in the option
table.

ENTER DENSITY?(S/D) — Type S [RETURN] if your disk
drive(s) is a single density drive. Press D [RETURN] if
you have a double density drive(s) with a double density
disk installed. Pressing just [RETURN] will cause the
program to default to the value presently shown on the
option table.

FORMAT BACKUP DISK?(Y/N) — TYPE Y [RETURN] if you
wish to format the backup disk. A blank disk must be
formatted before any data is written onto it.
(CAUTION—Formatting a disk destroys any data previously
saved on that disk.) Type N [RETURN] if you do not wish to
format the backup disk. You will not want to format the
disk if you are doing a partial copy and just wish to
transfer selected sectors to a disk that contains other
data. Pressing just [RETURN] will cause the program to
default to the value shown on the option table.

PRINT BAD SECTOR NUMBERS?(Y/N) — Please make sure
your printer is turned on if you plan to answer Y(Yes) to
this option question. If Y [RETURN] is pressed the
numbers of all bad sectors will be printed during the DISK
BACKUP procedure. A bad sector is any sector on a disk
that cannot be read by the disk drive. If there are no bad
sectors the message "NONE" will be printed when the
source disk reading operation is complete. If N [RETURN]
is pressed the bad sectors will not be printed, however
they will be displayed on the screen as they are found

during the reading of the source disk. Pressing just
[RETURN] will cause the program to default to the value
presently shown on the option table.

     EMPTY SECTOR CHECK?(Y/N) - If Y [RETURN] is pressed
the empty sector check is performed on each sector. An
empty sector is a sector that contains all zero data.
This option saves time if there are many empty sectors on
the source disk. The rationale behind the empty sector
check is as follows: When a disk is formatted all 720
sectors will be written with all zero data.   Thus, if as
we read a source disk we encounter a sector with all zero
data, there is no need to write this sector on the backup
disk. Do not use this feature if the backup disk is not
being formatted because there is no guarantee that a
given sector will contain all zero data. If the disk used
as a backup once had data on it, the sectors will not be
all zeroes. Empty sector numbers are identified on the
screen as they are read from the source disk.
     If N [RETURN] is pressed all sectors (except bad
sectors) will be copied onto the backup disk.
     Pressing just [RETURN] will cause the program to
default to the value presently shown on the option table.

              IMPORTANT NOTE
If you are using a PERCOM Disk Drive do not use the empty
sector check option, press N [RETURN]. This is due to the
fact that the PERCOM drive does not format the disk with
all zeros.
                    ****

     FAST WRITE?(Y/N) - Normally data is written onto the
disk then read back by the drive to verify proper data
transfer.
     If Y [RETURN] is pressed data written onto the disk
is not read back for verification.   Selecting this option
increases the copying speed at the expense of not
verifying the data written on the disk.
     Pressing N [RETURN] allows the normal read after
write verification of data transferred onto the disk.
     Pressing [RETURN] will cause the program to default
to the value presently shown on the option table.

     PARTIAL COPY?(Y/N) - If N [RETURN] is pressed in
response to the PARTIAL COPY prompt the entire disk will
be copied (START SECTOR=1 and END SECTOR=720). The program
will then display the original DISK BACKUP MENU.
     If just [RETURN] is pressed the program will default
to the START and END sector numbers shown in the option
table. The program will then display the original DISK
BACKUP MENU.
     Pressing Y [RETURN] allows you to make a partial copy

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of a disk. A disk contains 720 sectors, starting with
sector number 1 and ending with sector number 720. If it
is known that the program on the source disk you wish to
copy has less than 720 sectors of data or for some other
reason you wish to transfer a certain group of sectors
then the partial copy option can be employed. This will
speed up the copy process. After you type Y [RETURN] the
following prompt will appear on the display:

                ENTER START SECTOR NUMBER(1-720)

Enter the number of the first sector you wish to copy then
press [RETURN]. The following prompt will then be
displayed:
                ENTER END SECTOR NUMBER(X-720)

<<Where X is the starting sector number you entered>>

Enter the number of the last sector you wish to copy then
press [RETURN]. For example, if you know a program
occupies sectors 1 through 200 on a particular disk,
setting the START SECTOR NUMBER=1 and the END SECTOR
NUMBER=200, the program can be copied without taking the
time to copy sectors 201-720.

        After changing the desired options you are now back
to the original DISK BACKUP MENU. You may now do one of
three things:

        1. TYPE 1 [RETURN] - This will start the Backup
procedure, described in detail on the following pages.

        2. TYPE 2 [RETURN] - This allows you to again, change
the options in the option table.

        3. TYPE 3 [RETURN] - This will return you to the DISK
WIZARD MAIN MENU where you may re-select the program you
wish to run.

DISK BACKUP PROCEDURE

        You are now ready to start the copying process so
type 1 [RETURN].

NOTE
If at any time during the copying process you wish to
stop, press the ESCAPE KEY [ESC]. The computer will halt
the copying process and return you to the DISK BACKUP MENU.
                ****

        If you are using two disk drives please skip to the
section - COPYING USING TWO DISK DRIVES.

COPYING USING ONE DISK DRIVE

The prompt INSERT SOURCE DISK, PRESS RETURN will be displayed as shown below:

DISK BACKUP

```
┌──────────────────────────────────────────┐
│              OPTIONS                       │
│  DRIVE(S) - 1          DENSITY - SINGLE    │
│  FORMAT - YES          PRINT - NO          │
│  EMP SECT CHK - YES    FAST WRITE - NO     │
│  START SECTOR - 1      END SECTOR - 720    │
└──────────────────────────────────────────┘
```

INSERT SOURCE DISK, PRESS RETURN█

At this point, remove the DISK WIZARD disk from the disk drive and insert the disk with the program you wish to copy (SOURCE DISK).

NOTE

It is a good idea to make sure the source disk has the write protect tab installed to prevent any inadvertent damage.

****

Press [RETURN] and the source disk will be read sector by sector. As each sector is read from the disk it will be displayed on the screen:

DISK BACKUP

```
┌──────────────────────────────────────────┐
│              OPTIONS                       │
│  DRIVE(S) - 1          DENSITY - SINGLE    │
│  FORMAT - YES          PRINT - NO          │
│  EMP SECT CHK - YES    FAST WRITE - NO     │
│  START SECTOR - 1      END SECTOR - 720    │
└──────────────────────────────────────────┘
```

```
READING SECTOR 129
READING SECTOR 130
READING SECTOR 131
READING SECTOR 132
READING SECTOR 133
READING SECTOR 134
READING SECTOR 135
READING SECTOR 136
READING SECTOR 137
READING SECTOR 138
READING SECTOR 139
READING SECTOR 140
```

If, during the reading of the source disk, a bad or
empty sector is found, the message BAD SECTOR or EMPTY
SECTOR will be displayed to the right of the respective
sector:

DISK BACKUP

```
┌─────────────────────────────────────────────┐
│                 ▐OPTIONS▌                      │
│  DRIVE(S) - 1           DENSITY - SINGLE      │
│  FORMAT - YES           PRINT - NO            │
│  EMP SECT CHK - YES     FAST WRITE - NO       │
│  START SECTOR - 1       END SECTOR - 720      │
└─────────────────────────────────────────────┘
```

```
READING SECTOR 407 - EMPTY SECTOR
READING SECTOR 408 - BAD SECTOR
READING SECTOR 409
READING SECTOR 410 - EMPTY SECTOR
READING SECTOR 411 - BAD SECTOR
READING SECTOR 412
READING SECTOR 413 - EMPTY SECTOR
READING SECTOR 414 - BAD SECTOR
READING SECTOR 415
READING SECTOR 416 - EMPTY SECTOR
READING SECTOR 417 - BAD SECTOR
READING SECTOR 418
```

Sector data will continue to be read and stored into
computer memory until memory is full(approximately 196
sectors for 48K). When memory is full the prompt INSERT
BACKUP DISK, PRESS RETURN will be displayed. When the
busy light goes out on the disk drive unit, remove the
source disk and insert a blank disk (BACKUP DISK) and
press [RETURN]. If the FORMAT BACKUP DISK option is
enabled the backup disk will now be formatted. After the
format operation is complete the backup procedure will
continue. Sector data will now be written on the backup
disk. As each sector is written on the disk it will be
displayed on the screen in the same way as it had during
the reading portion except that it informs you that it is
writing those sectors.

This will continue until all sectors previously read
into memory are written onto the backup disk. If the
backup process is not complete (there are more sectors to
be copied) the prompt INSERT SOURCE DISK, PRESS RETURN
will again be displayed. Continue swapping source and
backup disks as indicated by the display prompts until
copying is complete. Copying is complete when you see the
FINAL SECTOR COUNTS display as shown on the following page:

DISK BACKUP

```
┌─────────────────────────────────────────┐
│              ▐OPTIONS▌                    │
│  DRIVE(S) - 1          DENSITY - SINGLE   │
│  FORMAT - YES          PRINT - NO         │
│  EMP SECT CHK - YES    FAST WRITE - NO    │
│  START SECTOR - 1      END SECTOR - 720   │
└─────────────────────────────────────────┘
```

```
    FINAL SECTOR COUNTS:

       NUMBER OF DATA SECTORS   - 720

       NUMBER OF EMPTY SECTORS  - 0

       NUMBER OF BAD SECTORS    - 0

       LAST DATA SECTOR         - 720

    PRESS RETURN TO CONTINUE█
```

The FINAL SECTOR COUNTS display will include the following information about the disk just copied.

    The number of data sectors
    The number of empty sectors
    The number of bad sectors
    The sector number of the last sector containing non-zero data

    The following prompt is also included on the FINAL SECTOR COUNTS display. PRESS RETURN TO CONTINUE. Pressing [RETURN] brings you back to the DISK BACKUP MAIN MENU. If you run the program again, remember that the program will use the options currently shown in the option table.
    If the backup copy of the program does not run please refer to section XII of the manual, DISK PROTECTION METHODS.

COPYING USING TWO DISK DRIVES

    If the two drive option was selected, the OPTION table and the prompt INSERT SOURCE DISK IN DRIVE 1 AND INSERT BACKUP DISK IN DRIVE 2, PRESS RETURN will be displayed.
    At this point remove the DISK WIZARD disk from drive 1 and insert the source disk.

NOTE
It is a good idea to make sure the source disk has the write protect tab installed to prevent any inadvertent damage.
****

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Insert a backup disk into drive 2 and press [RETURN].
Sector data will now be read from the source disk sector
by sector. As each sector is read from the disk, that
sector number will be displayed on the screen:

DISK BACKUP

```
┌──────────────── OPTIONS ────────────────┐
│ DRIVE(S) - 2          DENSITY - SINGLE   │
│ FORMAT - YES          PRINT - NO         │
│ EMP SECT CHK - YES    FAST WRITE - NO    │
│ START SECTOR - 1      END SECTOR - 720   │
└──────────────────────────────────────────┘
```

```
READING SECTOR 130
READING SECTOR 131
READING SECTOR 132
READING SECTOR 133
READING SECTOR 134
READING SECTOR 135
READING SECTOR 136
READING SECTOR 137
READING SECTOR 138
READING SECTOR 139
READING SECTOR 140
READING SECTOR 141
```


If during the reading of the source disk, a bad or
empty sector is encountered the message BAD SECTOR or
EMPTY SECTOR will be displayed to the right of the
respective sector:

DISK BACKUP

```
┌──────────────── OPTIONS ────────────────┐
│ DRIVE(S) - 2          DENSITY - SINGLE   │
│ FORMAT - YES          PRINT - NO         │
│ EMP SECT CHK - YES    FAST WRITE - NO    │
│ START SECTOR - 1      END SECTOR - 720   │
└──────────────────────────────────────────┘
```

```
READING SECTOR 410 - EMPTY SECTOR
READING SECTOR 411 - BAD SECTOR
READING SECTOR 412
READING SECTOR 413 - EMPTY SECTOR
READING SECTOR 414 - BAD SECTOR
READING SECTOR 415
READING SECTOR 416 - EMPTY SECTOR
READING SECTOR 417 - BAD SECTOR
READING SECTOR 418
READING SECTOR 419 - EMPTY SECTOR
READING SECTOR 420 - BAD SECTOR
READING SECTOR 421
```

Sector data will continue to be read and stored in memory until memory is full. If the FORMAT BACKUP DISK option is enabled, the backup disk will now be formatted. After the format operation is complete the backup procedure will continue. Sector data will now be written on the backup disk in drive 2. As each sector is written on the disk the sector number will be displayed on the screen.

This will continue until all the sectors previously read into memory are written onto the backup disk. The program will now continue alternately reading and writing sector data until the copying process is complete, as indicated by the FINAL SECTOR COUNTS display shown below:

DISK BACKUP

```
┌─────────────────────────────────────────────┐
│              ▐OPTIONS▌                        │
│   DRIVE(S) - 2          DENSITY - SINGLE      │
│   FORMAT - YES          PRINT - NO            │
│   EMP SECT CHK - YES    FAST WRITE - NO       │
│   START SECTOR - 1      END SECTOR - 720      │
│                                               │
└─────────────────────────────────────────────┘
```

FINAL SECTOR COUNTS:

   NUMBER OF DATA SECTORS   - 720

   NUMBER OF EMPTY SECTORS - 0

   NUMBER OF BAD SECTORS   - 0

   LAST DATA SECTOR   - 720

PRESS RETURN TO CONTINUE▮

The FINAL SECTOR COUNTS display includes the following information about the source disk just copied:
   The number of data sectors
   The number of empty sectors
   The number of bad sectors
   The sector number of the last sector containing non-zero data.

The following prompt is also included on the FINAL SECTOR COUNTS display: PRESS RETURN TO CONTINUE. Pressing [RETURN] brings you back to the DISK BACKUP MAIN MENU. If you run the program again, remember that the program will use the options currently shown in the option table.
   If the backup copy of the program does not run please refer to section XII of the manual, DISK PROTECTION METHODS.

VII. DISK EDIT

When the DISK EDIT program is loaded you will see the following display:

DISK EDIT

```
┌─────────────────────────────────────────┐
│              OPTIONS                      │
│  DRIVE - 1              DENSITY - SINGLE  │
└─────────────────────────────────────────┘
```

DISK EDIT MENU

1 READ/CHANGE SECTOR

2 SCAN SECTOR

3 READ DIRECTORY

4 DECIMAL/HEX CONVERSIONS

5 CHANGE OPTIONS

6 RETURN TO MAIN MENU

ENTER NUMBER (1-6)█

As you notice there are two (2) system options that can be changed to tailor the edit program to your particular use. Changing these options is discussed in the CHANGE OPTIONS portion of this section.

Below the "OPTIONS" you will see six (6) "MENU" selections. To select any one of these just type the number of the selection and [RETURN].

We will now discuss each of these selections in detail.

1. READ/CHANGE SECTOR

NOTE
The following section is written for single density disk drives. If you are using a double density disk drive with a double density disk you should read this section first and then refer to the Double Density section at the end of this section. It contains an explanation of the differences for double density operation.
****

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If you selected item 1 you will see the prompt:

ENTER SECTOR NUMBER (1-720)

You must enter the number of the sector that you wish
to look at or change. When you enter this number and
[RETURN] the screen will display the contents of the
selected sector in hex format.

If you do not wish to look at any sector or if you
want to return to the DISK EDIT MENU just press [RETURN].

Below is a sample of the sector display:

```
            SECTOR   100

      0  1  2  3  4  5  6  7   ASCII
  0  5A 00 00 00 00 00 00 00   Z........
  8  5B 00 00 00 00 00 00 00   [........
 10  5C 00 00 00 00 00 00 64   \.......d
 18  00 0D 0D 0A 0E 41 80 00   .....A..
 20  00 00 00 16 C8 00 34 1C   ......4.
 28  28 80 15 0F 0F 52 45 41   (....REA
 30  44 49 4E 47 20 53 45 43   DING SEC
 38  54 4F 52 20 15 81 15 14   TOR ....
 40  22 36 82 2D 83 14 2C 07   "6.-..,.
 48  84 2A 81 20 85 25 86 1B   .*. .%..
 50  34 36 82 2D 87 27 88 16   46.-.'..
 58  D2 00 1F 1C 36 89 2D 3F   ....6.-?
 60  3A 8A 3C 86 3C 0E 40 82   :.<.<.@.
 68  00 00 00 00 3C 8B 3C 82   ....<.<.
 70  3C 81 2C 14 1F 24 16 2C   <.,..$.,
 78  01 31 19 28 0F 0C 65 7D   .1.(..e.

FN = 3   NEXT SECT = 101   BYTES = 125

CHANGE SECTOR? (Y/N)█
```

As you notice the display is divided into two parts.
The left half is an 8x16 matrix of the actual hex bytes
that are stored on the disk. The right half displays the
ASCII equivalent of these hex bytes. If a dot is
displayed in this ASCII table it means that the
corresponding data byte does not have an upper or lower
case letter equivalent.

The inverse video bands across the top and down the
left side of the display are used as an address matrix to
help you locate bytes within the sector. To determine the
address of any data byte in the matrix take the
corresponding left column address and add to it the
corresponding top row address. This number will be the
hex address of the desired byte. Remember that the
letters A-F are used for the numbers 10-15, respectively.

The address of each byte in the matrix addressing
scheme is shown on the next page:

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```
     0   1   2   3   4   5   6   7    ASCII
 0  00  01  02  03  04  05  06  07  ........
 8  08  09  0A  0B  0C  0D  0E  0F  ........
10  10  11  12  13  14  15  16  17  ........
18  18  19  1A  1B  1C  1D  1E  1F  ........
20  20  21  22  23  24  25  26  27   !"#$%&'
28  28  29  2A  2B  2C  2D  2E  2F  ()*+,-./
30  30  31  32  33  34  35  36  37  01234567
38  38  39  3A  3B  3C  3D  3E  3F  89:;<=>?
40  40  41  42  43  44  45  46  47  @ABCDEFG
48  48  49  4A  4B  4C  4D  4E  4F  HIJKLMNO
50  50  51  52  53  54  55  56  57  PQRSTUVW
58  58  59  5A  5B  5C  5D  5E  5F  XYZ[\]^_
60  60  61  62  63  64  65  66  67  .abcdefg
68  68  69  6A  6B  6C  6D  6E  6F  hijklmno
70  70  71  72  73  74  75  76  77  pqrstuvw
78  78  79  7A  7B  7C  7D  7E  7F  xyz#|...
```

FN = 31   NEXT SECT = 382   BYTES = 127

CHANGE SECTOR? (Y/N)█

     The following example should help you to understand
this procedure a little more easily.

                        EXAMPLES

                                    #1   #2

    If the left column value is: 20   38
    And the top row value is: + 5   + 6
                                    --   --
    The hex address of the data is: 25   3(14)
                                                or 3E

     If you still have problems understanding how to work
with hex numbers consult almost any computer reference
manual for a more complete explanation.

     Below the Sector Matrix, you will see a line which
contains the symbols FN, NEXT SECT, and BYTES. This
information can be very valuable to you if you are trying
to "step" through a program sector by sector. The
following brief description should help you understand
what these symbols mean and how they can be used.

     Each sector of a DOS file contains 125 Data Bytes (0
-7C). The last three (3) bytes of each sector are called
the control bytes. These are used to let DOS know how
many bytes of information are contained in the sector,
where the next data sector for that file is, and the file
number. The following is a brief explanation of the terms
associated with the aforementioned symbols:

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FN(File Number) - This is the value associated with the file's position in the Disk Directory. The file number may range from 0 to 63. It is used to commonly identify all the sectors that make up a file.

NEXT SECT(Next Sector) - This is the number of the next consecutive data sector of the selected file. NEXT SECT=0 signifies that the displayed sector is the last sector in that file.

BYTES(Number of Bytes) - This is the number of data bytes contained in the displayed sector. This value should be 125 for all sectors except the last sector of the file.

NOTE
If the sector being displayed on the screen is from a non-DOS file then the values for the above symbols will be meaningless.
****

For a more detailed description of the sector layout see the TECHNICAL INFORMATION section of this manual.

Below the symbols (FN, etc.) you will see the prompt:

CHANGE SECTOR? (Y/N)

If you do not wish to change any data in the displayed sector type N [RETURN]. This will allow you to select another sector.

If you wish to change any data in the displayed sector type Y [RETURN]. You will now see the prompt:

ENTER HEX ADDRESS (0-7F)

Type in the address of the byte that you wish to change and [RETURN]. You will notice that this byte is highlighted and see the prompt:

ENTER NEW HEX DATA (0-FF)

NOTE
If the highlighted byte is not the one that you thought you had selected then press [RETURN] and recalculate the address of the desired byte. Refer to the address location paragraph and example on the previous page.
****

Type in the new data (in hex format) for this address and [RETURN]. The new data will be displayed in the selected address and the next sequential address will be highlighted. This is done for ease of entry of strings of data. If you do not wish to enter data at the newly highlighted address then press [RETURN]. You will now see

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the prompt:

                    ENTER HEX ADDRESS (0-7F)

     If you wish to change another address just enter it
as you did before.

     If you do not wish to enter any more data in this
sector then press [RETURN]. If any data had been changed
during this time then the following question will appear
on the screen:

                 WRITE NEW DATA ON DISK? (Y/N)

     If you answer YES (type Y [RETURN]) to this question
then the newly revised sector will be written on the disk
to replace the original sector.   If you do not wish to
write this new data on the disk then type N [RETURN].
     If you wrote the new data on the disk then the newly
revised sector will again be displayed on the screen.   If
this data is correct as displayed then type N [RETURN] to
the CHANGE SECTOR? question. The original prompt:

                 ENTER SECTOR NUMBER (1-720)

will be displayed.

     If you wish to look at or change any other sector(s)
then repeat the above procedure for the new sector(s).

            USING DOUBLE DENSITY

     The following paragraphs are written to document the
differences in using the READ/CHANGE SECTOR section for a
Double Density disk.   If you haven't already done so, we
suggest that you read the READ/CHANGE SECTOR section in
its entirety before continuing any further.

     The sector display for double density is broken up
into two (2) separate 128 Byte matrix displays.   When a
sector number is selected the screen will display the
first 128 bytes (0-7F) of the sector and will ask the
question:

              CHANGE FIRST HALF OF SECTOR? (Y/N)

     If you answer YES (type Y [RETURN]) to this question
you will be able to change the sector in the same way as
described in the SINGLE DENSITY section.

                         NOTE
If any data in the first half of the sector is changed
then it must be written on the disk before you look at the
second half of the sector.
                      ****

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If you answer NO (type N [RETURN]) to the above
question you will then see the question:

DISPLAY SECOND HALF OF SECTOR? (Y/N)

If you type N [RETURN] to this question you will go
back to the ENTER SECTOR NUMBER (1-720) prompt.

If you type Y [RETURN] then the screen will display
the second 128 bytes (80-FF) of the sector. You may
change any byte in the same way as you have done before.

INFORMATION NOTE
In double density mode the addresses of control bytes are
FD-FF.
****

There is one more important thing to realize about
disks that are written in Double Density.

SECTORS 1,2, AND 3 OF ALL DISKS ARE WRITTEN IN SINGLE
DENSITY NO MATTER WHAT MODE YOUR DISK DRIVE IS IN.   IF YOU
ARE IN DOUBLE DENSITY MODE THE PROGRAM WILL AUTOMATICALLY
SWITCH TO SINGLE DENSITY MODE FOR THESE SECTORS.

Combining these differences with what we have read in
the READ/CHANGE section for single density disks   you
should have no problem using this option with any disk.

2. SCAN SECTOR

If you have selected Item 2 from your DISK EDIT MENU
you will see the following display:

DISK EDIT

```
 OPTIONS
DRIVE - 1            DENSITY - SINGLE
```

SCAN SECTOR

1 BYTE SCAN

2 STRING SCAN

ENTER NUMBER (1-2)█

This section allows you to scan through the disk, sector
by sector, searching for a group of bytes that comprise a

certain instruction or piece of data. This search can be done in either of two ways.

The first way is a BYTE SCAN. (This is selected by typing 1 [RETURN].) When BYTE SCAN is selected the screen display will look as follows:

DISK EDIT

```
┌─────────────────────────────────────────┐
│               OPTIONS                     │
│  DRIVE - 1              DENSITY - SINGLE  │
└─────────────────────────────────────────┘

            BYTE SCAN

      __ __ __ __ __ __ __ __

      __ __ __ __ __ __ __ __

      __ __ __ __ __ __ __ __

      __ __ __ __ __ __ __ __
```

ENTER BYTE (0-FF)█

As you see there are 32 blanks on the screen. You may enter up to 32 bytes for any series.
To enter data just type in each byte followed by a [RETURN]. Any single digit byte entered will have a 0 put before it. (eg. 4 will become 04) You will notice that the previously entered byte appears in the top display. Repeat this procedure until all desired bytes are entered. At this time just press [RETURN].
The screen will now display the series of bytes that were entered and the prompt:

ENTER START SECTOR (1-720)

You must tell the computer at which sector you want to start the search.

NOTE
If at any time you wish to get out of any part of this program just press [RETURN].
                    ****

After entering the START SECTOR you will be asked to enter the END SECTOR for the search.
When the start and end sector are both entered the following question will appear:

ENTER NUMBER OF BYTES (125/128)

DOS files contain 125 data bytes (253 Data Bytes for

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Double Density). The last three bytes are control bytes. This bytes per sector question is necessary for the simple fact that if any string that you are searching for spans across two sectors you must ignore the control bytes and continue the data byte scan in the next sector. For all DOS files you must input 125 [RETURN] for this question. If, however, you are doing a byte scan in a program that is not DOS formatted the sector contains 128 data bytes (256 for double density) and all must be checked in the search. For this case you must type 128 [RETURN].

Upon entering the number of data bytes per sector the computer will begin to scan the selected sectors for the desired series of bytes.

If a match is found then the screen will display the sector in which the match was found and the first byte of the match will be highlighted. Keep in mind that if the series of bytes is not all contained in one sector then the computer will only display the sector which contains the first byte of the series.

After displaying the first match the computer will ask you if you wish to CONTINUE SCAN? (Y/N). If you do, type Y [RETURN]. The computer will continue to search until it either finds another match or comes to the last designated sector.

If you answered NO to the CONTINUE SCAN question you will be returned to the initial SCAN SECTOR display. If you no longer want to scan sectors just press [RETURN] and you will see the DISK EDIT MENU displayed.

The second way to scan a sector is by using a STRING SCAN. This method searches through selected sectors to find a desired string of numbers or letters. If STRING SCAN is selected the screen will look as follows:

DISK EDIT

```
┌─────────────────────────────────────────┐
│              OPTIONS                      │
│  DRIVE - 1              DENSITY - SINGLE  │
└─────────────────────────────────────────┘
```

STRING SCAN

ENTER STRING:

■────────────────────────────────

Type in the string that you want to locate and then press [RETURN].

As in BYTE SCAN you will be asked for START SECTOR, END SECTOR and NUMBER OF BYTES/SECTOR. After answering all of these questions, which are described in detail in

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section 2 , the computer will begin to search for the
desired string.
    If an exact match of the string is found the screen
will display the sector in which the first letter of the
matching string was found. If you wish to continue the
scan just type Y [RETURN]. When the scan is complete a
message containing the number of matches that were found
will be displayed. At this point press [RETURN] and you
will be returned to the SECTOR SCAN MENU. If you press
[RETURN] again you will see the DISK EDIT MENU displayed.

3. READ DIRECTORY

    If item 3 is selected from the DISK EDIT MENU the
following prompt will appear on the screen:

    ENTER DIRECTORY SECTOR NUMBER (361-368)?

    Sectors 361 through 368 are called directory sectors.
These sectors are used to store the names, starting
sectors and lengths of all DOS programs found on the disk.
When any program is called from the disk, DOS checks the
Directory sectors to see if the program is on the disk and
where on the disk it is located. As you use this portion
of DISK EDIT you will become more familiar with what the
directory sectors are actually used for.
    You must first select one of the eight directory
sectors, say 361 for instance by typing the number and
[RETURN].
    You will see a display that looks as follows (the
disk that you are using will not contain the same
filenames as the example):

DISK EDIT

```
┌─────────────────────────────────────────┐
│              OPTIONS                       │
│  DRIVE - 2            DENSITY - SINGLE     │
└─────────────────────────────────────────┘
```

         DIRECTORY SECTOR 361

      FILENAME   START SECTOR   LENGTH

  * DOS   SYS   4   39
  * DUP   SYS   43   42
    FILE1   85   22
    FILE2   107   22
    FILE3   (D)   129   22
    FILE4   151   22
    FILE5   173   22
    FILE6   195   22

    READ NEXT DIRECTORY SECTOR (Y/N)█

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The left hand column shows the names of the file. An asterisk to the left of the name means that the file is locked. If a (D) appears to the right of the file name it means that the file has been deleted.

The center column contains the starting sector of each listed file. The program or file always begins at byte 00 of the starting sector. The right hand column contains the length of each file in sectors.

The directory is useful for the simple reason that you can see where any file is located on the disk quickly and easily.

At the bottom of the display is the question:

READ NEXT DIRECTORY SECTOR? (Y/N)

If you want to look at the next consecutive directory sector press Y [RETURN]. The next directory sector will be displayed.

If you don't want to look at the next sector but you do want to see another directory sector press N [RETURN] and the original prompt:

ENTER DIRECTORY SECTOR NUMBER (361-368)

will appear. You can repeat the above procedure until you have collected all your required information. If you are finished looking at the directory sectors press [RETURN]. This will bring you back to the DISK EDIT MENU.

4. DECIMAL/HEX CONVERSION

This portion of the program is used to convert from hex to decimal and decimal to hex.

When you select item 4 from the DISK EDIT MENU the screen will display the following:

1-DECIMAL TO HEX
2-HEX TO DECIMAL

ENTER NUMBER (1-2)

If you wish to convert from decimal to hex just type 1 [RETURN]. You will see the following:

ENTER DECIMAL NUMBER (0-65535)

You simply type in the number you want converted and [RETURN]. The computer will do the converting for you and display the hex equivalent.

If you want to convert from hex to decimal then type 2 [RETURN]. The prompt:

ENTER HEX NUMBER (0-FFFF)

will appear on the screen. Just type in the number you

wish to convert and [RETURN]. The decimal equivalent will
then be displayed.
    If no more numbers are to be converted then press
[RETURN]. This will bring you back to the DISK EDIT MENU.

5. CHANGE OPTIONS

    This section should only be used by persons who have
more than one disk drive or a double density drive.
    When this section is selected you will be asked the
following two questions:

    ENTER DRIVE NUMBER(1-2) — Enter the number of the
disk drive which contains the disk you wish to edit. If
you do not wish to change this option simply press
[RETURN]. In most cases disk drive 1 will contain DISK
WIZARD and disk drive 2 will contain the disk for edit.
The other question that will appear on the screen is:

    ENTER DENSITY (S/D) — If you are using a single
density disk drive just type S [RETURN]. If you are using
a double density disk then enter D [RETURN]. You will now
find yourself back to the DISK EDIT MENU with the options
changed to the number or density you wanted.

6. RETURN TO MAIN MENU

    This selection is used to exit from the DISK EDIT
program and return to the DISK WIZARD MAIN MENU.
    After typing 6 [RETURN] you will see the message:

                    INSERT DISK WIZARD
                        IN DRIVE 1
                    PRESS RETURN.

    Following the instructions on the screen will bring
you back to the DISK WIZARD MAIN MENU.

VIII. DISK SPEED

When the DISK SPEED program is loaded you will see
the following display:

DISK SPEED

```
┌─────────────────────────────────────────────┐
│             ▌OPTIONS▐                         │
│  DRIVE - 1                                    │
└─────────────────────────────────────────────┘
```

▌DISK SPEED MENU▐

1 DISPLAY DISK SPEED

2 WRITE SECTOR(S)

3 CHANGE OPTIONS

4 RETURN TO MAIN MENU

ENTER NUMBER (1-4)█

This program is used to verify your disk drive speed
or to selectively write bad sectors onto a disk. Each
selection in the DISK SPEED MENU is explained below.

1. DISPLAY DISK SPEED

Typing 1 [RETURN] selects the DISPLAY DISK SPEED
display as shown below:

DISK SPEED

```
┌─────────────────────────────────────────────┐
│             ▌OPTIONS▐                         │
│  DRIVE - 1                                    │
└─────────────────────────────────────────────┘
```

▌DISPLAY DISK SPEED▐

INSERT A NON BLANK DISK IN DRIVE 1

PRESS RETURN TO CONTINUE█

NOTE
If you attempt to display the disk speed without a
disk installed or a blank disk installed, the program
cannot detect this error and will continue trying to read
the speed of the disk drive. Press the [ESC] button if
this error is made.
****

Insert any non-blank disk into the appropriate disk
drive as indicated by the display prompt. Press [RETURN].
The following display will now appear:

DISK SPEED

```
╔════════════════════════════════════════╗
║              ▐ OPTIONS ▌                 ║
║  DRIVE - 1                               ║
╚════════════════════════════════════════╝
```

▐ DISPLAY DISK SPEED ▌

WAITING FOR DRIVE SPEED TO STABILIZE

After a few seconds, the screen will display the disk
drive RPM as shown below:

DISK SPEED

```
╔════════════════════════════════════════╗
║              ▐ OPTIONS ▌                 ║
║  DRIVE - 1                               ║
╚════════════════════════════════════════╝
```

▐ DISPLAY DISK SPEED ▌

```
┌──────────────┐
│  RPM = 288   │
└──────────────┘
```

PRESS ESCAPE TO TERMINATE
SPEED READOUT

The program will update the display about every 13
seconds with the latest value of disk RPM. This is
indicated by the RPM value flashing off then back on with
the new RPM value. If the RPM of the disk is less than
100 RPM or greater than 400 RPM, the RPM value will be
displayed as ***. Refer to the next section of this

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manual (WRITE SECTORS) for information on how to adjust
the ATARI 810 disk drive speed.
    Pressing the [ESC] button terminates the speed
readout display and returns you to the DISK SPEED MENU.

2. WRITE SECTORS

    Let's explain the bad sectoring process before
proceeding any further.
    This section of the DISK SPEED program is used to
create bad sectors on a disk. To create a bad sector(s)
you must first slow down the speed of the ATARI 810 disk
drive. We recommend you do this only with the ATARI 810
disk drive.
    Bad sectors can be written on a disk by following the
step by step instructions given below:

———WARNING———
    Before you attempt to adjust your drive, we must
caution that the operation described here may void any
warranty you have for your ATARI drive. Even if the drive
is out of warranty, ATARI does not recommend that users
attempt to adjust the speed of their drives.
    Neither the authors, nor C.A.P. Software can assume
any responsibility for damage caused to your drive while
attempting to make a speed adjustment. We do know that
hundreds of ATARI owners are already adjusting the speed
of their drives with no negative results. ATARI does
provide an 810 Service Manual for $30 to anyone who
insists on doing their own repairs. Write to ATARI
Personal Computers, 1395 Borregas Avenue, Sunnydale, CA

——*—*—*—*—

    i. Boot-up DISK WIZARD (refer to section V of the
manual) and select the DISK SPEED program. Press START.
    ii. When the DISK SPEED MENU is displayed, type 1
[RETURN] to DISPLAY DISK SPEED. Remove the DISK WIZARD
disk from the disk drive.
    iii. Be sure you have a clean working environment so
that dust, hair, etc. will not get into the disk drive.
    iv. You will need a pen knife, a small to medium size
phillips head screwdriver and a small slot screwdriver.
    v. Using the pen knife or similar instrument, lift
off the four plastic stick-on screw hole covers on the top
of the drive.
    vi. Using the phillips screwdriver, remove the four
screws that secure the drive cover to the base of the
drive.
    vii. Carefully lift the cover off the drive and set
it aside.
    viii. With the drive facing you, locate the drive
speed potentiometer. We have found two different sizes

and locations of the speed potentiometer. One type is a
white or blue nylon wheel potentiometer with a slot in it.
It is located in the back of the drive to the left side.
The other type is a small green rectangular potentiometer
with a very small slotted screw located about 2" from the
back of the unit and just left of the center.

ix. Turn on the disk drive and insert any non-blank
disk, as indicated by the display prompt. Press [RETURN].

x. The disk drive will now spin up and in a few
moments the display will show the disk speed (should be
about 285-290 RPM).

xi. If you have the large nylon wheel type
potentiometer turn it clockwise to slow the drive down.
Just turn it a small amount and wait for the RPM display
to update, to insure you are indeed slowing it down. If
you have the small rectangular type potentiometer turn it
counterclockwise to slow the drive down. It will take
several turns to make a difference. In either case watch
the RPM readout to verify you're slowing it down.

xii. Continue turning the potentiometer in the
appropriate direction to slow the drive further until you
hear the familiar "SNARK" sound. DO NOT watch the RPM
readout, it will probably not be accurate at such low
speeds.

xiii. Now increase the speed (turn potentiometer in
the other direction) just enough to stop the "SNARK"
sound. This will take a little experimentation, but once
you've got it, it's easy.

xiv. You are now ready to write bad sectors. Press
[ESC] to terminate the DISK SPEED DISPLAY. Remove the
non-blank disk used to measure speed from the disk drive.

xv. Type 2 [RETURN] to display the WRITE SECTOR
DISPLAY as shown below:

DISK SPEED

```
┌──────────────────────────────────────────┐
│               OPTIONS                      │
│   DRIVE - 1                                │
└──────────────────────────────────────────┘
```

WRITE SECTOR(S)

```
    056 066 ___  ___  ___  ___  ___  ___

    ___  ___  ___  ___  ___  ___  ___  ___

    ___  ___  ___  ___  ___  ___  ___  ___

    ___  ___  ___  ___  ___  ___  ___  ___
```

ENTER SECTOR NUMBER (1-720)█

xvi. You may now enter up to 32 sector numbers to be
written on the disk as bad sectors. As you may remember,

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the DISK BACKUP program lists or prints the numbers of the
bad sectors found on the original program disk. These are
the bad sectors which must be recopied onto the backup
disk to make it an exact copy of the original.
    After you have entered the last sector number press
[RETURN]. The following display now appears:

DISK SPEED

```
┌──────────────────────────────────────────┐
│              ▐ OPTIONS ▌                   │
│  DRIVE - 1                                 │
└──────────────────────────────────────────┘
```

                        ▐ WRITE SECTOR(S) ▌
                          SECTOR(S)
                          056 066

                INSERT DISK TO BE WRITTEN
                IN DRIVE 1, PRESS RETURN▐

        xvii. As indicated by the display prompt, insert
the disk into the drive you wish to write the bad sectors
onto. Press [RETURN]. The bad sectors will now be
written on the disk.
        xviii. After the bad sectors are written, return to
the DISK SPEED DISPLAY and display the speed of the drive.
Re-adjust the speed of the potentiometer to obtain the
normal drive speed of 285-290 RPM.

        You have now created a backup disk with bad sectors
that should run on your computer. If you have any
problems running the backup copy then refer to section XII
(DISK PROTECTION METHODS) of this manual.

3. CHANGE OPTIONS

        Typing 3 [RETURN] allows you to change the options in
the OPTION DISPLAY. Enter the number of the disk drive
that you wish to verify the speed of, or to be used to
write the bad sectors onto the backup disk.

4. RETURN TO MAIN MENU

TYPING 4 [RETURN] returns you to the DISK WIZARD MAIN MENU
where you may re-select the program you wish to run.

IX. DISASSEMBLER

When the DISASSEMBLER program is loaded you will see the following display:

DISASSEMBLER

```
          OPTIONS
DRIVE - 1           DENSITY - SINGLE
PRINT - NO          ORIGIN  - 3000
```

DISASSEMBLER MENU

1 DISASSEMBLE BY SECTOR NUMBER(S)

2 DISASSEMBLE BY FILE NAME

3 CHANGE OPTIONS

4 RETURN TO MAIN MENU

ENTER NUMBER (1-4)█

This program is used to disassemble machine language from disk by file name or sector number(s). This section of the manual explains how to use the DISASSEMBLER program on your DISK WIZARD disk. It does not explain 6502 Assembly Language programming. If not already so, please become familiar with assembly language programming before using the disassembler program.

Each selection in the menu will be described below including the options seen on the option table at the top of the DISASSEMBLER MENU.

NOTE
Typing [ESC] any time during this program will return you to the DISASSEMBLER MENU. If any problems are encountered during keyboard entries please refer to the KEYBOARD PROTOCOL section of this manual.
****

1. DISASSEMBLE BY SECTOR NUMBER

Typing 1 [RETURN] allows you to disassemble a disk by sector number. You may disassemble as many sectors as you wish, from 1 to 720. At this point the following prompt will be displayed:

DISASSEMBLER

```
┌──────────────────────────────────────────┐
│             OPTIONS                        │
│  DRIVE - 1          DENSITY - SINGLE       │
│  PRINT - NO         ORIGIN  - 3000         │
└──────────────────────────────────────────┘
```

DISASSEMBLE BY SECTOR NUMBER(S)

ENTER START SECTOR (1-720)█

ENTER START SECTOR NUMBER - This is the sector number
you wish to start the disassembler listing from. Enter
the number of the first desired sector and press [RETURN].
If just [RETURN] is pressed the program will return
to the DISASSEMBLER MENU.
You will now see the prompt:

ENTER END SECTOR NUMBER(X-720) [where X is the start
sector number you just entered] - This is the last sector
number to be disassembled. Enter the number of the last
desired sector and press [RETURN].
If just [RETURN] is pressed the program will return
to the DISASSEMBLER MENU.
For example, if you wanted to disassemble only one
sector, say sector 1, set START SECTOR NUMBER =1 and END
SECTOR NUMBER =1.
At this point the following prompt will be displayed:

DISASSEMBLER

```
┌──────────────────────────────────────────┐
│             OPTIONS                        │
│  DRIVE - 1          DENSITY - SINGLE       │
│  PRINT - NO         ORIGIN  - 3000         │
└──────────────────────────────────────────┘
```

DISASSEMBLE BY SECTOR NUMBER(S)

START SECTOR - 1   END SECTOR - 1

ENTER NUMBER OF
BYTES/SECTOR (125/128)█

Enter the number of bytes per sector you wish to
disassemble. Normally you would enter 125 for DOS

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created files. Press [RETURN]. The program will now
start disassembling the sector data on the disk. Please
refer to the TECHNICAL INFORMATION section of this manual
for more detailed information on the number of bytes
contained in a sector.

     The disassembled listing of the sector data will
appear on the display as shown below:

DISASSEMBLER

```
3056  60           RTS
3057  18           CLC
3058  A5 43        LDA    $43
305A  6D 11 07     ADC    $0711
305D  8D 04 03     STA    $0304
3060  85 43        STA    $43
3062  A5 44        LDA    $44
3064  69 00        ADC    #$00
3066  8D 05 03     STA    $0305
3069  85 44        STA    $44
306B  60           RTS
306C  8D 0B 03     STA    $030B
306F  8C 0A 03     STY    $030A
3072  A9 52        LDA    #$52
3074  A0 40        LDY    #$40
3076  90 04        BCC    $307C
3078  A9 57        LDA    #$57
307A  A0 80        LDY    #$80
307C  8D 02 03     STA    $0302
307F  8C           ???
```


#NOTE#
     If the disassembled listing is being printed out it
will not be displayed on the screen.
****

     The program address is shown in the left column. Note
that the program addresses are not always sequential. This
is because of the variable length instructions which may
be from one to three bytes long. Each byte requires one
memory location.
     The beginning of a sector disassembly may contain
question marks even though there is valid data. This is
due to phase error caused by the variable length of the
instructions. The first byte of the first instruction may
be on the previous sector thus causing the disassembler to
misinterpret the code. This phase error will correct
itself as soon as the disassembler syncs itself with the
sector data.

The next column contains the actual code (object program). The last two columns on the right contain the disassembled machine language (source program).

The DISASSEMBLER program will continue to disassemble the sector data until the last required sector is disassembled (END SECTOR NUMBER). The following display will now appear:

DISASSEMBLER

```
305D  8D 04 03    STA    $0304
3060  85 43       STA    $43
3062  A5 44       LDA    $44
3064  69 00       ADC    #$00
3066  8D 05 03    STA    $0305
3069  85 44       STA    $44
306B  60          RTS
306C  8D 0B 03    STA    $030B
306F  8C 0A 03    STY    $030A
3072  A9 52       LDA    #$52
3074  A0 40       LDY    #$40
3076  90 04       BCC    $307C
3078  A9 57       LDA    #$57
307A  A0 80       LDY    #$80
307C  8D 02 03    STA    $0302
307F  8C          ???
```

DISASSEMBLY COMPLETE
PRESS RETURN TO CONTINUE■

Press [RETURN] to go back to the DISASSEMBLER MENU.

2. DISASSEMBLE BY FILE NAME

Typing 2 [RETURN] allows you to disassemble a disk by file name. The following prompt will now be displayed:

DISASSEMBLER

```
┌─────────────────────────────────────────────┐
│                 OPTIONS                       │
│  DRIVE - 1              DENSITY - SINGLE      │
│  PRINT - NO             ORIGIN  - 3000        │
└─────────────────────────────────────────────┘
```

DISASSEMBLE BY FILE NAME

ENTER FILE NAME: ■_____

Type in the file name of the file you wish to disassemble. The file name may be any group of

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alphanumeric characters up to 12 characters in length, the
first character being a letter. The file name must be an
exact match including extension, if any, of the file you
wish to disassemble (e.g.,TEST.BAS). Press [RETURN]. Do
not input D1: or D2: in front of the file name. No wild
cards allowed (e.g.,TEST.*).
     If the file name is not found on the disk, the
computer will "Beep" and the following display will appear:

DISASSEMBLER

```
+---------------------------------------------+
|              OPTIONS                         |
|  DRIVE - 1              DENSITY - SINGLE     |
|  PRINT - YES           ORIGIN  - 3000        |
+---------------------------------------------+
```

DISASSEMBLE BY FILE NAME

FILENAME: TEST.ABC

FILE NOT FOUND

PRESS RETURN TO CONTINUE█

     Pressing [RETURN] allows you to go back and enter
another file name.
     If the listing is to be printed (PRINT DISASSEMBLY
option is YES) the following prompt will also be displayed
as shown below:

DISASSEMBLER

```
+---------------------------------------------+
|              OPTIONS                         |
|  DRIVE - 1              DENSITY - SINGLE     |
|  PRINT - YES           ORIGIN  - 3000        |
+---------------------------------------------+
```

DISASSEMBLE BY FILE NAME

FILENAME: AUTORUN.SYS

ENTER TITLE FOR PRINTOUT:
█_____

     Type in the title you want to be printed at the top
of the disassembler printout. The title may be any group

of alphanumeric characters up to 32 characters in length.
Press [RETURN].
     When the correct file name has been found, the
program will read the file data from disk and begin to
display or print the disassembled program.

<center>*NOTE*</center>

     If at any time you want to stop the display listing
of the disassembled program, press and hold [CTRL] then
type 1. Type [CTRL] then 1 again to continue the display
listing.
<center>**********</center>

     The display format of the DISASSEMBLER program is the
same as that shown on page 32.
     The DISASSEMBLER program will continue until all the
data in the file is disassembled. The following display
will now appear:

<center># DISASSEMBLER</center>

```
305D   8D 04 03   STA   $0304
3060   85 43      STA   $43
3062   A5 44      LDA   $44
3064   69 00      ADC   #$00
3066   8D 05 03   STA   $0305
3069   85 44      STA   $44
306B   60         RTS
306C   8D 0B 03   STA   $030B
306F   8C 0A 03   STY   $030A
3072   A9 52      LDA   #$52
3074   A0 40      LDY   #$40
3076   90 04      BCC   $307C
3078   A9 57      LDA   #$57
307A   A0 80      LDY   #$80
307C   8D 02 03   STA   $0302
307F   8C         ???
```

<center>DISASSEMBLY COMPLETE
PRESS RETURN TO CONTINUE█</center>

     Press [RETURN] to go back to the DISASSEMBLER MENU.

3. CHANGE OPTIONS

     Typing 3 [RETURN] allows you to change the options
shown in the option table of the DISASSEMBLER program. A
prompt for each option will be displayed one at a time.
Each prompt must be answered before continuing on. Each
option is explained below.

     ENTER DRIVE NUMBER(1-2) - Enter the number of the disk
drive that will be used to read in the program to be
disassembled. Press [RETURN].

If just [RETURN] is pressed the program will default
to the value presently shown in the option table.

ENTER DENSITY(S/D) - Type S if you are disassembling
from a single density disk, D if you are doing the same
from a double density disk. Press [RETURN].
If just [RETURN] is pressed the program will default
to the value presently shown on the option table.

PRINT DISASSEMBLY(Y/N)-Type Y [RETURN] to print the
disassembled listing on your printer. If your printer is
not on, an error message will be displayed. If N [RETURN]
is typed the listing will not be printed; however, it will
be displayed on the screen.
If just [RETURN] is pressed the program will default
to the value presently shown on the option table.

ENTER ORIGIN - This is the assumed start address of
the code that is being disassembled. The default value
(value used if just [RETURN] is pressed) upon loading the
disassembler is hexadecimal 3000. If you are disassembling
relocateable code this origin will not cause any problems.
For example, suppose we are disassembling code that
has an origin of 700 hex.

```
0700   A900   CMP   #$0
0702          BNE   $0706
0704   A901   LDA   #$1
0706          LDY   #$2
```

The disassembled version with an origin of 3000 would
be:

```
3000   00     CMP   #$0
3002          BNE   $3006
3004          LDA   #$1
3006          LDY   #$2
```

Notice that the branch instruction (BNE) points to the
same instruction in both cases. This is because the branch
instruction is relative (ie. branch to x number of
locations from current address).
If we disassemble non relocateable code the following
problem arises:

ORIGINAL

```
0700 A900   LDA   #$0
0702 205007 JSR   $0750
0705 A901   LDA   #$1
```

DISASSEMBLED

```
3000 A900   LDA   #$0
3002 205007 JSR   $0750
3005 A901   LDA   #$1
```

In the above example the JSR instruction is absolute
(ie. points to an unchanging address). To produce a
useable listing of absolute code it is necessary to change
the origin so that the address works out correctly. How is
the origin determined? If it is a DOS file the first 6
bytes of the file usually contain this information in the
following format:

    FFFF-BINARY FILE IDENT
    0007-START ADDRESS-0700 (lo,hi)
    8507-END ADDRESS-0785 (lo,hi)

This header tells us that the origin for the
disassembly should be 0700. However, the six byte header
must be discarded because it isn't part of the actual
code. To do this, just subtract 6 from the start address
(in hex). This will give you an origin of 6FA(700-6).
Consult the DOS and ASSEMBLER/EDITOR manual for further
information on binary load files.

If you're disassembling a non DOS format disk, you
are pretty much on your own. You'll have to disassemble
the boot code on sector 1 on up and figure out where the
program is loaded. The boot code on sector 1 is in the
following format:

flags	byte 1
# of sectors	byte 2
memory address to start load	byte 3 byte 4
init address	byte 5 byte 6

Byte 1- should equal zero
Byte 2- contains the number of 128 byte disk sectors
to be read as part of the boot process.
Bytes 3&4- contain the address (lo,hi) at which to
start loading the first byte of the file.
Bytes 5&6- contain the address (lo,hi) to which the
booter will transfer control after the boot process is
complete.

4. RETURN TO MAIN MENU

Typing 4 [RETURN] returns you to the DISK WIZARD MAIN
MENU where you may re-select the program you wish to run.

X. TECHNICAL INFORMATION

In this section we will discuss how a disk is laid out, what formatting does to a disk, and how a program is located on a disk. We hope this information will help you understand the disk and its associated operations better.

DISK LAYOUT

The 5 1/4 inch floppy disk is a round, flexible disk, that is covered with an oxide coating. This disk is enclosed in a protective envelope with several openings in it for access to the disk. The information is stored on the disk very much like a tape recorder stores information on recording tape. The data section of an ATARI formatted disk consists of 40 concentric rings, called tracks. Each track is divided into 18 sections, called sectors. A quick multiplication tells us that there are 40 X 18 = 720 sectors on a disk. Each sector can contain up to 128 bytes of information. DOS formatted sectors contain 125 data bytes and three control bytes. These will be discussed in the next few paragraphs. On a DOS formatted disk there are three types of sectors. They are: the Volume Table of Contents, the Directory Sectors and the Data Sectors.

1. VOLUME TABLE OF CONTENTS (SECTOR 360) — A sector that contains the status of all sectors. It lets the Disk Operating System (DOS) know which sectors are available for use in data files.

2. DIRECTORY SECTORS (SECTORS 361-368) — These sectors are used to store the program names, as well as, their starting locations on the disk, the length of each program and the status of it (whether it is locked or unlocked, or whether it has been deleted,etc.).

3. DATA SECTORS — The remaining sectors are called data sectors. These sectors contain programs, data, files and any other information being stored on the disk.

FORMATTING

Before a blank disk can be used to store any information, it must be formatted. When a disk is formatted the following operations occur:

1.A special Boot File is written on sectors 1,2 and 3.

2.The Volume Table of Contents (sector 360) is written.

3.Zeroes are written on all other sectors.

When the formatting is complete the disk is ready for use.

PROGRAM LOCATION

Before a file is stored on a disk, DOS checks the Directory to verify whether a file of the same name exists. If one does exist it will then check to see if that particular file is locked. The method for locking and unlocking files is described in any DOS book. If the file is not locked then the new file will be written in the sectors that contained the old one of the same name. If the name of the new file being stored does not exactly match any other file name in the directory then DOS will write the new file name and its starting sector in the directory. It will then write the file on the disk. When this is complete it will store the length of the file in the Directory Sector containing that file name.

Each Directory Sector can contain up to 8 file names. There are eight directory sectors, therefore there can be up to 64 separate files on a disk.

If a file is being called from the disk, DOS scans the directory sectors for the desired file name. When the file name is located DOS then checks the starting sector for the file and begins reading that sector. The next step in this process is for DOS to find the next sector of the program. This is done by reading the control bytes (last 3 bytes of the sector). The control bytes contain three valuable pieces of information. First is the file number. This number defines a particular file's location in the directory. Since there can only be 64 files on any one disk the file number can be 0-63. All sectors of one file should have a common file number. The next thing of interest contained in the control bytes is the number of the next sector. This is used to link the sectors together. After DOS reads a sector it checks to see where the next sector in that file is located and then reads that one, and so on. The last thing contained in the control bytes is the number of data bytes in that particular sector. The only time that you will find a partially filled data sector is if it is the last sector of the file. Another way of determining whether a sector is the last one in a file is if the NEXT SECTOR = 0 (see DISK EDIT section).

Another thing to add here is that in files that are not DOS formatted all 128 bytes are data bytes, there are no control bytes.

Hopefully the above information will help you in understanding some of the functions and operations of the various disk storage routines. Keep in mind that this is just an overview of the data disk layout and its associated functions to help you use DISK WIZARD to its fullest capabilities.

XI. BACKUP PHILOSOPHY

It is with the following philosophy in mind that the program DISK BACKUP was created:

The DISK BACKUP program on DISK WIZARD is solely for the purpose of making a backup copy of your original disk for your own use. This backup copy is necessary because the original disk may eventually wear out or can be accidentally lost or destroyed.

In all fairness to the software manufacturers and dealers we urge you not to use this program for anything but the purpose stated above.

XII. DISK PROTECTION METHODS

You will notice that with some of the program disks you make a backup copy of, the program will load but will not run. This is due to the fact that the programmer of the original disk installed a protection device so that any duplicate copy of the original will not run.

NOTE
The following section is for information only. Please read BACKUP PHILOSOPHY on page 40 of this manual before continuing with the next section.
****

There are three commonly used protection methods for software, on the market today.

The first method of disk protection is called "bad sectoring". This is accomplished by "removing" sectors from the disk using a specially modified disk drive. When a normal disk drive attempts to read these sectors, it cannot because these sectors do not exist. When a backup copy of this disk is made these "bad" sectors are not copied. When the program is run it attempts to read one of these "bad" sectors and expects to get a "bad sector" status back from the disk drive. Since this sector is not "bad" on the backup copy (it is only empty) the program stops. In order for the copy to run, bad sectors corresponding to those on the original, must be written on the disk. If it is desired to write "bad" sectors on a disk refer to section VIII of this manual.

The next two protection methods that are employed require a specially modified disk drive to produce. A workable copy of disks protected by these two methods cannot be made without hardware modifications. We will, however, make a brief mention of these methods.

One of these methods is called the "double sector" method. In this method two consecutive sectors of data are written on the disk but the same sector number is assigned to both. This is usually done on the last two sectors of each track (e.g., Sectors 17-18, 35-36, 53-54, etc.). These "double sectors" can be read on a normal disk drive by doing consecutive reads of the same sector and by writing one of the sectors as the next consecutive sector.

The other method of protection is the "custom format" method. With this method the disk is specially formatted. The sectors are written on this disk in a non-consecutive order. The program uses a special timing sequence to locate the desired sectors. This method is impossible to reproduce on a normal disk drive.

XIII. LIMITED WARRANTY

C.A.P. SOFTWARE warrants to the original consumer/
purchaser that this C.A.P. SOFTWARE program diskette shall
be free from defects in material or workmanship for a
period of 90 days from the date of purchase. If a defect
is found during this warranty period, C.A.P. SOFTWARE will
replace the diskette, provided the diskette and proof of
purchase is delivered or mailed, postage prepaid, to
C.A.P. SOFTWARE.

This warranty shall not apply if the diskette has been
misused, shows signs of excessive wear, or has been
partially or totally erased or damaged in any other way by
the purchaser. Any applicable implied warranties,
including warranties of merchantability and fitness, are
limited to 90 days from the date of purchase.
Consequential or incidental damages resulting from a
breach of any applicable, express or implied warranties
are hereby excluded.

APPENDIX A

DISK WIZARD BACKUP PROCEDURE

To make a backup copy of DISK WIZARD just follow these step by step instructions:

1. Insert the ATARI Basic Language cartridge in the left Cartridge slot of your computer.

2. Turn Disk Drive 1 power on. When the busy light goes out, open the disk drive door and insert the DISK WIZARD disk. Turn on your computer and TV screen and wait until the DISK WIZARD MAIN MENU appears.

3. Press the console START button and observe the "DISK BACKUP LOADING" message.

4. After loading is complete observe that the DISK BACKUP MENU is displayed.

5. Enter 1 [RETURN].

6. The display will read INSERT SOURCE DISK, PRESS RETURN.

7. Since the source disk is already installed, just press [RETURN].

8. DISK BACKUP will commence reading the disk data into memory and continue reading data until memory is full. The sector number currently being read will be displayed on the screen.

9. After memory is full the prompt INSERT BACKUP DISK, PRESS RETURN will appear.

10. Remove the DISK WIZARD disk and insert a blank disk (with write protect tab removed). Press [RETURN].

11. FORMATTING BACKUP DISK message will appear. After a few moments, writing of the disk data will begin.

12. After the disk write is complete the INSERT SOURCE DISK message is displayed. Remove the backup disk and insert the DISK WIZARD disk then press [RETURN].

13. The program will continue to read in sectors from where it left off. Continue swapping source and backup disks as indicated by the display prompts until the FINAL SECTOR COUNTS display is on the screen.

The backup process is now complete. Remove the backup disk and install a write protect tab on it. You now have a backup copy of DISK WIZARD in case the original is lost or damaged.

C.A.P. SOFTWARE

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