

INSTRUCTION MANUAL

for

NIBBLES AWAY][
(vers C1)

written by
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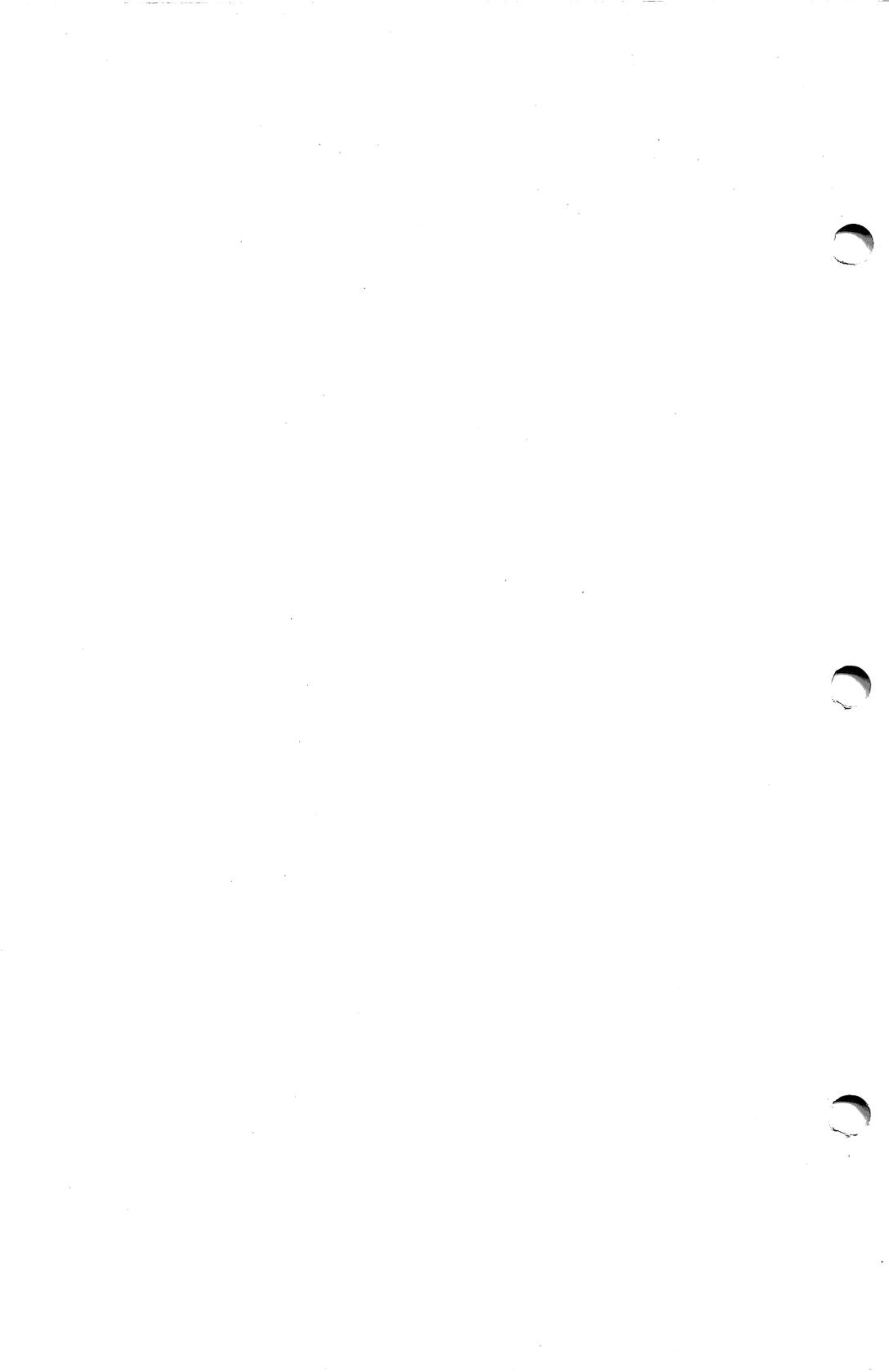
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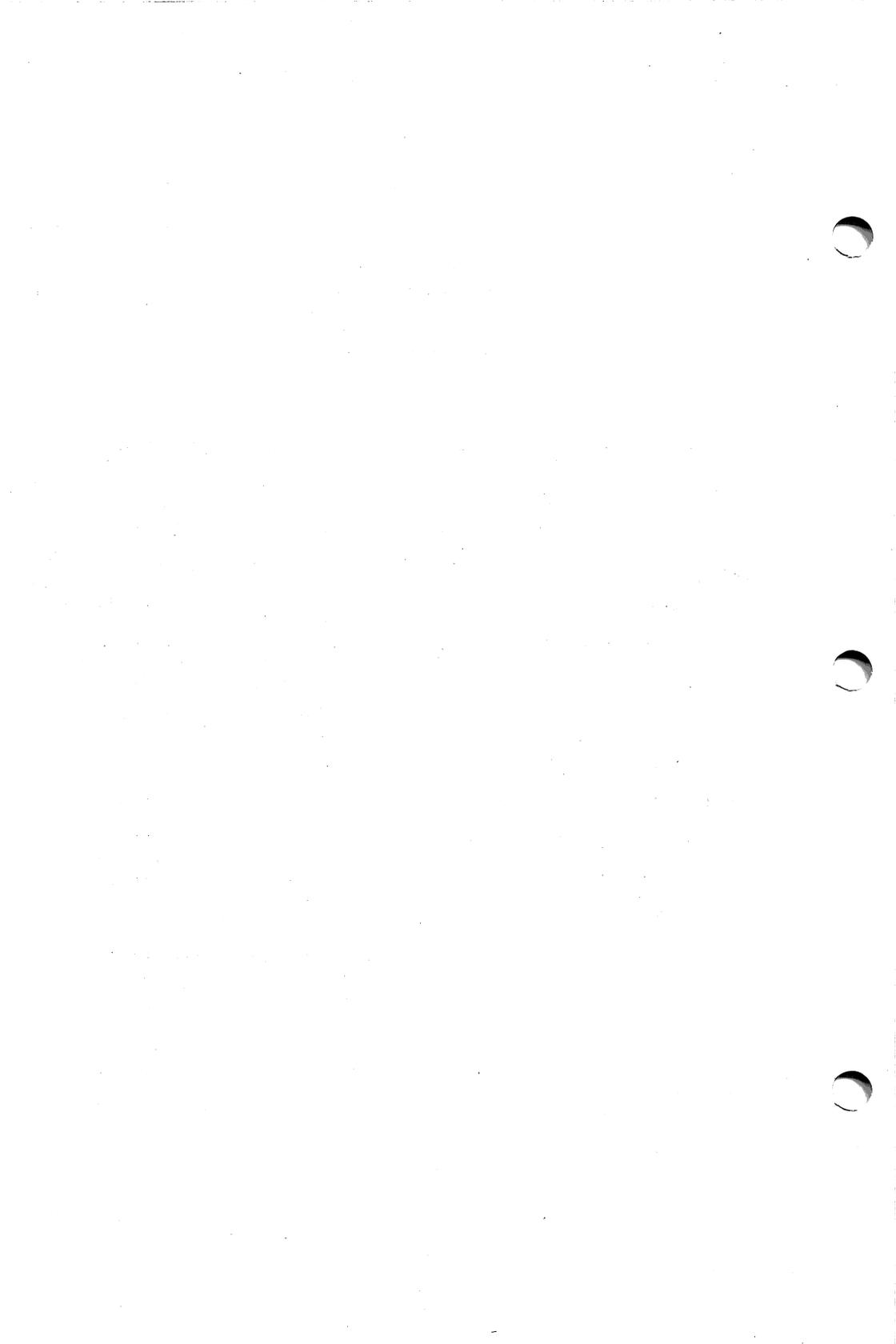
Dedicated to
the Apple][computer
without whom we would all
have a little more of our sanity



NIBBLES AWAY][

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PREFACE

OVERVIEW OF NIBBLES AWAY] [

NIBBLES AWAY] [disk backup system provides a means to protect your software investment by allowing you to make additional copies (back-ups) of many diskettes that are not normally copyable.

NIBBLES AWAY] [provides the user with many new features and techniques not found in other similar programs, with an extremely high degree of accuracy. The routines in NIBBLES AWAY] [have been written to give the maximum amount of accuracy, while still making them easy to use by the average user.

BOOTING NIBBLES AWAY] [

NIBBLES AWAY] [may be booted from any slot in your Apple] [, using either a DOS 3.2 or 3.3 disk controller. To boot NIBBLES AWAY] [with an autostart ROM, simply place the master disk in the disk drive and turn on the power to the computer. If you have an 'old style' monitor ROM type 6 control-P and then press <RETURN>. The NIBBLES AWAY] [logo will appear on the

screen within a few seconds, then the rest of the program is loaded into the computer.

MASTER MENU

- N - NIBBLES AWAY] [
- T - TRACK/BIT EDITOR
- S - SECTOR EDITOR
- D - DISK DIAGNOSTICS
- F - FILE MANAGER
- M - MODIFY PARAMETERS
- X - EXECUTE AUTO-LOAD

When the program has finished loading, you will be prompted to press any key to continue. Doing this will result in a menu (The MASTER MENU) which asks you to select which NIBBLES AWAY] [function you would like to perform. Each function on the menu is covered in detail in a separate section of the manual, starting with NIBBLES AWAY] [itself. On the left is an example of the main menu.

ENTER SELECTION ->

For backup purposes, the 'X' option for 'Execute Auto-Load' is the most used function. To use this option, insert your Auto-Load disk into the disk drive (Your NIBBLES AWAY] [disk has an Auto-Load section on it). Then press the 'X' key. NA] [will prompt you for a directory number. Auto-Load disks have several directories of files on them, normally arranged alphabetically. The directory number will select which set of Auto-Loads that you will look at.

After entering this number, NA] [will read in the selected directory and display it on the screen.

The screen will show a list of the Auto-Loads on the selected directory which you may scan through using the right and left arrow keys on your keyboard. The file displayed in the center line will show in inverse, and is the file that you will select when you press the return key. If you wish to abort this function, you may press the <ESC> key.

When the file which is desired is displayed in the inverse field, press the <RETURN> key. The screen will then prompt you to put your original and destination diskettes into the disk drives, and press any key. When this is done NA][will proceed to back up your diskette without any further intervention being needed.

For some Auto-Loads there may be special instructions which will be included with your Auto-Load diskette.

SCREEN DUMP

NIBBLES AWAY][is compatible with most printer interfaces which operate under the Apple Pascal 1.0 or 1.1 operating systems. The printer is used from within the Track/Bit Editor, and also in the Track/Sector Editor.

At any time when NA][is waiting for the user to type a key, usually denoted by a white cursor, control-P (the control and P keys held simultaneously) may be pressed to print the contents of the current screen to the printer. This allows any information that can be viewed to be saved for future reference.

If a valid printer interface is not present, two bells will sound and printing will not occur.

CHAPTER 1

NIBBLES AWAY] [

To use NIBBLES AWAY] [, you should select the first item on the master menu by pressing the 'N' key. A list of options is then displayed and the cursor is placed at the question asking if you wish to alter the default values for the options. Below is a list of the options and their respective values. The values shown to the right of the options are those that will be used if you do not specify otherwise. Pressing <RETURN> for an option will select the default value for that option.

EXAMPLE OF THE INITIAL PAGE

CHANGE DEFAULT VALUES -> N	<-- 'Initial prompt'
DISK DRIVE SLOT -> 06	
SOURCE DRIVE -> 01	<-- These stay until
DESTINATION DRIVE -> 02	specifically changed
STARTING TRACK -> 00	<-- These default back
ENDING TRACK -> 22	to these values
TRACK INCREMENT -> 01	
DATA MOVER ONLY -> N	
SYNCHRONIZED COPY -> N	<-- These always
ERASE DEST TRACKS -> N	default to 'N'
AUTO HALF TRACKS -> N	
REDUCED ERROR CHK -> N	

NOTE: At each item, the backspace key can be used to move the cursor to the previous item.

NOTE: All numbers MUST be entered in HEXADECIMAL. (For a Decimal to Hexadecimal conversion table see Appendix D)

NOTE: A WRITE PROTECT TAB SHOULD BE PLACED ON ALL ORIGINAL SOFTWARE BEFORE BACK-UP IS STARTED TO AVOID A PROBLEM IF THE DISK DRIVE ORDER IS INADVERTANTLY REVERSED.

The following pages describe each of the options displayed in the order in which they are displayed.

DISK DRIVE SLOT

This is the slot number of the disk controller which is to be used for the back-up. If two drives are used, they must both be connected to the same controller. This option will keep any value assigned to it until specifically reassigned. (e.g. If you select slot 4, slot 4 will be used until you select another slot)

SOURCE DRIVE

This is the disk number that will contain the original disk to be duplicated. This value also retains any value entered until another is assigned to it.

DESTINATION DRIVE

Enter the disk drive number that will contain the blank disk that you wish to backup onto.

NOTE: On a one drive system, drive one should be selected as both the source drive and the destination drive. You will then be prompted to switch disks during the back-up procedure.

STARTING TRACK

Enter the track number that you wish to begin with or press return to use the default value of track 00. Legal track numbers are in the range of 00-23, and half tracks may be specified using a '.5' after the track number.

ENDING TRACK

Enter the track number that you wish to end with, or press return to use the default value of track 22. Legal track numbers are the same as for STARTING TRACK.

NOTE: Most diskettes have only 22 tracks. On some rare occasions you may need to select track 23 as the ending track, However this is not normal.

TRACK INCREMENT

This is the increment which will be used to step from the starting track specified above, to the ending track, also specified above. The default value here is 01, However, some disks place their data at non-standard intervals. This option allows the user to compensate for this.

DATA MOVER

When selected, this option tells NIBBLES AWAY][not to analyze the information that it reads but to write it out on the destination disk in whatever form it happens to be in. This option is rarely used, but is provided for any instance when a track is known to contain some type of data which cannot be read by the normal option selections. Due to the data movers operation, a given track may have to be copied several times. If this option is selected, no other questions are asked since they pertain to forms of analyzing which the data mover does not do.

SYNCHRONIZATION

When selected, this option causes all tracks on the destination disk to be written with the same rotational orientation to track 0 as on the original. This is needed when a disk being backed-up requires not only that the proper data be present, but that the tracks be positioned in certain patterns. This can correct problems on disk which appear to boot but then fail to operate properly at the last moment, even though no errors were reported during the back-up procedure.

NOTE: While backing-up track 00, NIBBLES AWAY][does not synchronize. On track 00 it finds a reference that will be used to position all other tracks to. Therefore, track 00 must ALWAYS be backed-up in order for any other tracks to synchronize properly.

ERASE DESTINATION TRACKS

This will cause the range of tracks which will be written to on the duplicate disk to be erased. This is recommended if the next option, auto half tracks, has been selected. and the destination disk previously contained other data.

NOTE: See the section on ERASE BUFFER MODIFIER for additional information on the erase function.

AUTO HALF TRACKS

This option, when selected, tells NIBBLES AWAY][that it should step forward by .5 track increments if a given track is found not to contain data, as opposed to the full track step normally used. Use of this option can uncover hidden data on a disk which gives a large quantity of read errors with the standard options selected.

REDUCED ERROR CHECK

This option reduces the amount of error checking which is done by NIBBLES AWAY] during the analyze and verify stages. This is useful if a high number of intermittent read errors are encountered. (e.g. Many tracks back-up only after 3 or 4 read errors).

STATUS FIELD DISPLAY

During the backup procedure the status of the program is shown on the screen. The function being performed is shown at the top. Any errors which occur are displayed to the right of the function line. The current track being operated on is shown to the left of the function display.

The lower portion of the screen shows which tracks have been successfully copied with an inverse 'Y' next to the track number (Half-tracks are shown to the right under the heading 'HLF'). An 'N' indicates that the track was not successfully copied (This does not necessarily indicate a problem, since an unused track may not have any valid data to back-up).

The two digits to the right of the Y or N show the number of read and write errors, respectively, which were encountered on that particular track.

EXAMPLE STATUS FIELD DISPLAY

READING

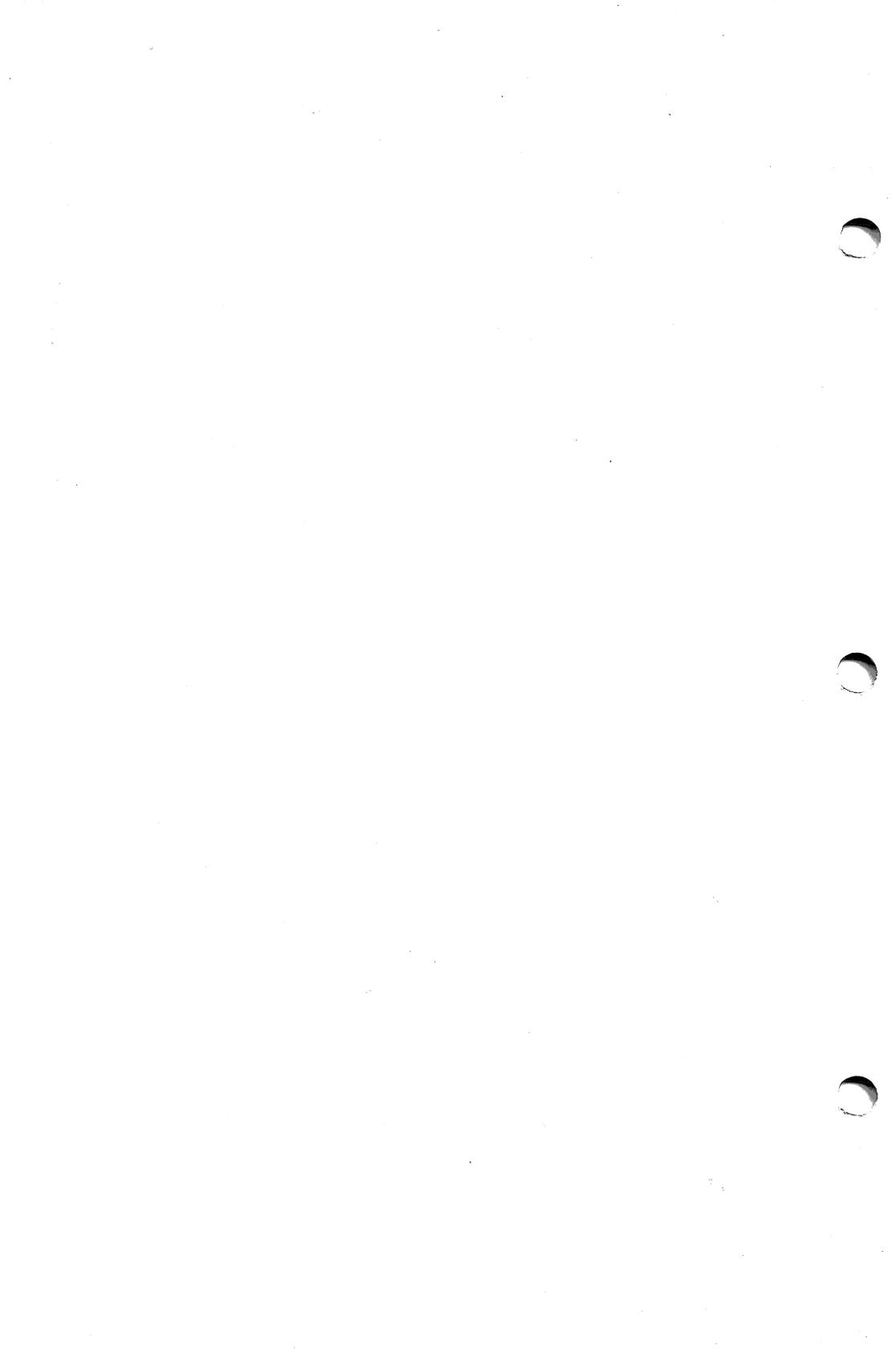
TRACK=21.5

TRACK	HLF	TRACK	HLF	TRACK	HLF	
----	----	----	----	----	----	
00-Y00		0C-Y00		18-Y00		Display shows whether or not a track copies with a 'Y' or an 'N'
01-Y00		0D-Y00		19-N50	Y00	
02-Y00		0E-Y00		1A-	Y00	
03-Y00		0F-Y00		1B-	N50	The first number which follows signifies the number of read errors encountered on that particular track.
04-Y00		10-Y00		1C-N50	Y00	
05-N50		11-Y00		1D-	N50	
06-	Y50	12-Y00		1E-N50	Y00	
07-	N50	13-Y00		1F-	Y00	
08-Y00		14-Y00		20-	Y00	The second one shows the number of write errors encountered.
09-Y00		15-Y00		21-		
0A-Y00		16-Y00		22-		
0B-Y00		17-Y00				

EXECUTION TIME COMMANDS

While the program is operating certain keys can be pressed to perform additional functions. They are as follows:

- <ESC> Aborts the function in progress and waits for you to press any key to restart the program.
- <G> Turns on GRAPHIC DISPLAY. This shows you the raw data as it is read off the disk in Hi-Res graphics. By noting the patterns viewed, and which ones cause read errors, it can be determined visually which tracks contain some form of data and which are just random information.
- <T> Text mode. Cancels Graphics mode.
- <SPACE> Causes NIBBLES AWAY][to skip the track currently being copied. With the normal options selected, the track counter is incremented by the currently set increment value. If auto-half tracks are selected, then .5 is added to the track counter.



CHAPTER 2

THE MODIFIERS

To enter the modifiers, press 'M' from the master menu. You will then be prompted with another menu. The options on the menu reflect the different types of modification which can be done to NIBBLES AWAY][. The options are as shown on the right. A description of each of the menu functions follows below, along with samples of what will be seen on the screen for each option. The modifiers menu is shown on the right.

PARAMETER SET MODIFICATION

B - BACKUP
C - CONTROL
F - FILTER
E - ERASE
S - SYNC ADD
G - GLOBAL

ENTER SET TO MODIFY ->

Pressing 'B' will allow you to change the BACKUP parameters. You will be prompted with the question 'USE ADDRESS MARK ->'. This is asking whether or not you would like to enter the specific address mark (See the section for Advanced Users for details). If you answer 'Y', the cursor will move down and prompt you to enter the address mark. This is done by entering pairs of hexadecimal digits separated by spaces (i.e. D5 AA 96) and then pressing RETURN. Upon your next entry into the BACKUP modifier, this address mark will be displayed and can be turned off by specifying 'N' at the 'USE ADDRESS MARK' question.

After either selecting an address mark or answering 'N' at the previous question, you will be asked if you would like to specify an insert mark (See the Advanced Users section for details on the function of this option). In the same fashion as for the previous question, pressing 'Y' causes NIBBLES AWAY][to ask for the specific insert mark, while pressing 'N' will cause the cursor to move to the next question.

EXAMPLE OF BACKUP OPTIONS

BACKUP PARAMETERS

USE ADDRESS MARK ->N

USE INSERT MARK ->N

OVERIDE NIBBLE FILTER ->N

OVERIDE GLITCH DETECT ->N

USE NIBBLE COUNTER ->N

OVERIDE SYNC CONVERT ->N

OVERIDE STANDARDIZER ->N

At any time, the backspace key may be used to move back to previous items to correct an error. After all of the questions have been answered you will be returned to the modifier menu.

The next five questions ask for yes or no answers as to whether or not their specific functions should be enabled during the backup procedure. The functions of these options are discussed in the Advanced Users information.

Pressing 'Q' from the initial prompt on this page will return you to the modifiers menu.

Pressing 'C' from the modifier menu will take you to the control parameter modifier. A list of parameter names and values will appear on the lower portion of the screen, with a set of inverse arrows positioned to either side of the first number. The left and right arrow keys will move the inverse arrow on the screen up and down, and over to the second column. To modify any of these parameters, place the inverse arrows adjacent to the parameter to be modified. Pressing the space bar will result in the question 'ENTER NEW VALUE-->'. Typing in the desired value and pressing RETURN will update the value next to the parameter name. Several parameters may be updated at one time. Pressing 'Q' will exit the control parameter modifier and return you to the modifier menu.

CONTROL PARAMETERS

FIND MAX	->0C<-	DATA MIN	13	The arrows are moved
DEL BYTE	30	DATA MAX	1D	by pressing the left
GAPBYTE1	FE	SYNC SYZ	09	and right arrow keys.
GAPBYTE2	00	FIX AMNT	08	The space-bar will
RDERR MX	05	FIX VALU	7F	cause a prompt above
WRERR MX	07	PAGE LEN	42	asking you for a
SYERR MX	05	LF VALUE	0A	new value for that
GAP SIZE	0C	TRK CHOP	00	parameter. Entering
FALSE LO	0A	SHIFT N+	00	this parameter and
FALSE HI	1B	SHIFT N-	08	pressing <RETURN>
GAP HIGH	48	OFFSET +	00	will enter the value
TOLERANC	00	OFFSET -	00	into the list.
DATA LIM	65	MATCHNUM	03	

Pressing 'F' from the modifier menu will cause the current NIBBLE FILTER to be displayed on the lower portion of the screen. The left and right arrows may be used to move the arrows around through the different values displayed. The keys I,J,K,M will move the arrows up,left,right and down, respectively. Pressing the space bar will cause a value to alternate between inverse and normal text. Any value which is displayed in inverse will be filtered from the data which NIBBLES AWAY][writes to the destination disk, thus enabling the user to eliminate invalid bytes from the data written out.

Pressing the 1,2 and 3 keys will invoke the STANDARD, DOS 3.2 and DOS 3.3 filters, respectively. The values in inverse on each of these options are those which are not considered valid for that system. Option 1 is the default value for NIBBLES AWAY][, and only removes those values which are not valid for any system with the Apple Disk][drives. Care should be used with this option as valid data could be filtered out by an incorrect setting of this filter.

Pressing 'Q' will exit to the modifier menu.

Pressing 'E' from the modifier menu will cause the current ERASE BUFFER to be displayed. The ERASE BUFFER is a set of 128 bytes which are the last bytes to be written out to a disk during an erase function. The arrows may be moved around in the same fashion as that described for the NIBBLE FILTER. Pressing the space bar will result in a request for you to enter the new value for that position in the buffer. Any value which less than \$80 will be displayed in inverse with \$80 added to it and will represent the byte that will be written to the disk, except that those values in inverse will be written as SYNC-BYTES. (See the Advanced Users Guide for more detail). Pressing 'Q' will exit this option.

SYNC ADD PARAMETERS

```
>80< 90  A0  B0  C0  D0  E0  F0
81  91  A1  B1  C1  D1  E1  F1
82  92  A2  B2  C2  D2  E2  F2
83  93  A3  B3  C3  D3  E3  F3
84  94  A4  B4  C4  D4  E4  F4
85  95  A5  B5  C5  D5  E5  F5
86  96  A6  B6  C6  D6  E6  F6
87  97  A7  B7  C7  D7  E7  F7
88  98  A8  B8  C8  D8  E8  F8
89  99  A9  B9  C9  D9  E9  F9
8A  9A  AA  BA  CA  DA  EA  FA
8B  9B  AB  BB  CB  DB  EB  FB
8C  9C  AC  BC  CC  DC  EC  FC
8D  9D  AD  BD  CD  DD  ED  FD
8E  9E  AE  BE  CE  DE  EE  FE
8F  9F  AF  BF  CF  DF  EF  FF
```

Pressing 'S' from the modifier menu will display the current SYNC-ADD buffer. This buffer shows in inverse all of those values which will be converted to SYNC every time they are encountered in the data read and written by NIBBLES AWAY][. The movement of the arrows is controlled in the same way as for the two previous options, and the space bar toggles an entry between inverse and normal, representing whether or not that value will be converted to SYNC. Initially, no values are selected to be converted to SYNC. As with the previous options, 'Q' exits to the modifier menu.

To invoke the GLOBAL modifier, simply press 'G' from the modifier menu. You will then be prompted to enter a byte number. After entering the desired byte number, the current value of that location will be displayed, and you will be asked to enter a new value for that byte. Pressing <RETURN> alone will leave the byte as it is. This function is used to change certain control variables as described in other portions of this manual. The values to enter for a specific parameter are supplied in the section describing that particular parameter's function. To exit the GLOBAL modifier, enter a 'Q' when prompted for an address. This will return you to the modifier menu.

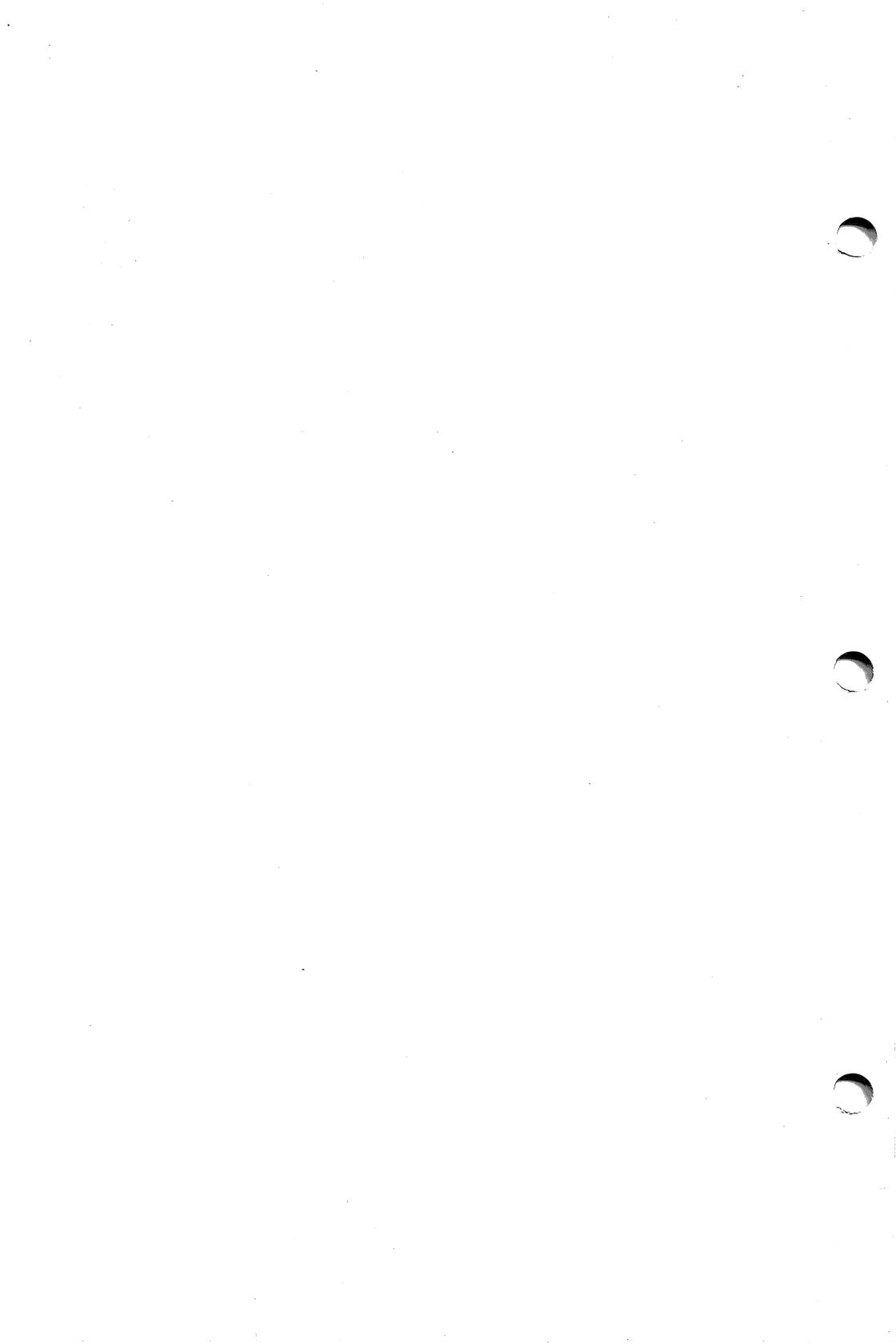
Any changes which are made to the internal parameters are permanent until NIBBLES AWAY][is rebooted, when they return to their normal values. If you wish to save the parameters that you have changed, you can use the SAVE option in the FILER. Then if you wish to use the same parameters at a later time, you only need to LOAD them back in using the FILER.

TABLE 1

BYTE NAME	DEFAULT VALUE	PURPOSE
FIND MAX	\$0C	This byte specifies the minimum number of bytes which must match to verify data validity.
DEL BYTE	\$30	This byte controls the delay used in seeking the disk drives from track to track. The lower the number, the faster the drives will seek.
GAPBYTE1	\$FE	Minimum GAP-BYTE recognized.
GAPBYTE2	\$00	Maximum GAP-BYTE recognized + 1.
RDERR MX	\$05	Maximum number of read errors allowed before skipping to the next track.
WRERR MX	\$07	Maximum number of write errors.
SYERR MX	\$05	Maximum number of sync errors.
GAP SIZE	\$0C	Minimum number of bytes needed to determine a GAP.
FALSE LO	\$0A	Number of bytes forward to look for a 'False GAP'.
FALSE HI	\$1B	Number of bytes forward which determine the end of a false GAP.
GAP HIGH	\$48	High order byte of the highest address to look for a GAP at.
DATA LIM	\$65	High order byte of the effective limit of the READ BUFFER.
DATA MIN	\$13	Minimum number of pages forward at which to search for a GAP.
DATA MAX	\$1D	Maximum number of pages forward at which to search for a GAP.
TOLERANC	\$00	Maximum number of bytes by which the byte counts can differ on a nibble count.
SYNC SIZ	\$09	Sets length of the sync bytes written to the disk in one bit increments. Only the values \$09 and \$0A have any effect here.

TABLE 1

BYTE NAME	DEFAULT VALUE	PURPOSE
FIX AMNT	\$08	Number of GAPBYTE's which are converted to sync in each GAP.
FIX VALU	\$7F	Value of SYNC used to replace GAPBYTE's for sync conversion.
PAGE LEN	\$42	Page length used in the TRACK/BIT editor during a memory dump.
LF VALUE	\$0A	Line feed character used during a memory dump. Change this value to a \$00 if your printer produces double line feeds.
TRK CHOP	\$00	If non-zero, this paramter specifies the absolute number of pages to be written out on every write operation.
MATCH NM	\$03	This is the number of times that a nibble count must match to be considered valid.
SHIFT N+	\$00	Along with the next parameter, defines the 'window shift' for the nibble counting option.
SHIFT N-	\$08	Used with the previous parameter, see the appendix on nibble counting for details.
OFFSET +	\$00	Along with the next parameter, defines the offset from the insert mark to the SYNC BYTE to be added.
OFFSET -	\$00	Used with the previous parameter, defines the reverse shift used to determine the location of the inserted SYNC BYTE.



CHAPTER 3

USING THE TRACK/BIT EDITOR UTILITY

The TRACK/BIT EDITOR (TBE) has been provided so that the user will be able to determine the values for the parameters described in the chapter on the modifiers in order to back up diskettes which are extremely abnormal. It also provides the user with an invaluable utility to read/edit/write the nibbles on a diskette.

To use the TBE simply press 'T' from the master menu. Drive one will immediately turn on and seek to track 0. The screen will show you 256 bytes of memory, with their respective addresses shown on the left. Pressing the forward arrow will shift your memory display 256 bytes forward, while the backward arrow will shift it 256 bytes backwards, allowing you to view all of the memory from \$2200 to \$7FFF. Any byte which has its high-bit (bit 7) cleared ('0') will be displayed with its high bit on in inverse video, to represent a SYNC byte.

Two lines will appear above the data display area. In between these lines is the status information for the Track/Bit editor. At the left hand side of the screen the word PTR is shown, followed by a four digit number. This is the memory address that NIBBLES AWAY][will use as the starting address for a write command (\$8000 is always the ending address). In the center, ADDR is followed by a four digit number representing the current position of the flashing cursor in the read/write buffer. At the right, the current track number is displayed.

Below is a explanation of the commands available in the Track/Bit Editor. They are as follows:

I,J,K,M ..These keys form a 'movement diamond' and cause the inverse cursor to move up,left,right and down, respectively.

<-,>Left and Right arrows. These Keys shift the page of memory displayed on the screen forward or backward from its current position.

RThis causes the current track to be read into the read/write buffer. A message is displayed in the center of the status line while this takes place.

WThis writes the data in the read write buffer, starting at the PTR location and ending at the end of the read write buffer (\$8000). The data will be written to the current track after the user types a 'Y' in response to the VERIFY prompt in the status line.

<SPACE> ..This enters the EDIT subsystem with the following commands:

0-9,A-F ..This enters a hex value into the edit window in the status line. The numbers will scroll to the left as more are entered.

<RETURN> ..This enters the current value in the edit window into the read/write buffer at the current cursor location and exits the edit mode.

<-,>These keys move the cursor forward and backward in the read/write buffer without disturbing the data currently there.

<SPACE> ..This moves the cursor forward, entering any value in the edit window before moving the cursor. This allows multiple changes to be made by entering a new byte, pressing <SPACE>, entering a new byte, and so on.

;This increments the current track number.

-This decrements the current track number.

TAllows the direct entry of a specific track number.

PAllows the entry of a new PTR value.

AEnters the ADD mode. Bytes to be inserted may be typed into the edit window. Then <RETURN> may be pressed to enter the value and exit, or <SPACE> may be pressed to insert the value and move the cursor to the next location for another insertion.

DDeletes the byte at the current location.

GPrompts 'GO TO ->' and waits for the user to enter the address in the read/write buffer that the cursor will be moved to. Valid values range from \$2200-\$7FFF. Entering 'P' will move the cursor to the current PTR. Entering 'B' or 'E' will move the cursor to the beginning or end of the read/write buffer, respectively.

HToggles the high bit of the value at the cursor.

ZCalls the internal analyze routines of NIBBLES AWAY][. The data in the read write buffer will be analyzed, placed at the end of the read/write buffer, and the PTR value will be set to the beginning of the data. ERR will be displayed if an analyze error occurs.

QExits to the MAIN MENU.

ctrl-R ...Same as 'R' option, except that any SYNC bytes on the disk will be shown as inverse on the screen.

- C(Count) This will display the number of bytes to the next occurrence of the bytes at the cursor.
- SThis option prompts the user for a string of bytes to search for starting at the current location. The bytes are entered as pairs of HEX digits separated by spaces. Entering 'S' will use the last entered search string. If the string is not found a bell will sound and the cursor will not move. If the string is found, the cursor will move to the location where it is found.
- OThis calls the OUTPUT option which will print all or a portion of the current buffer on your printer. If a NIBBLES AWAY]] compatible printer is not detected, two bells will sound and you will be returned to the editor.
If a compatible printer is detected, the user is prompted to enter the desired starting and ending addresses for the memory dump, and the title to be printed at the top of each page. The user is then prompted to press any key to start.
After the printing has begun, 'Q' can be pressed at any time to abort the printing operation.

EXAMPLE OF PRINT OPTIONS PAGE

TRACK EDITOR

 PTR=2200 ADDR=2200 TRK=00

The current track number is printed on the printout along with the data.

PRINT FUNCTION

STARTING ADDRESS ->2200

The starting and ending addresses are entered here.

ENDING ADDRESS ->8000

TITLE ->ANY TITLE MAY GO HERE

The title is printed on each page of the printout.

POSITION PRINTER AT TOP OF PAGE
 THEN PRESS ANY KEY TO START

The appendix for Advanced Users contains information about the meaning of the data displayed by the TBE, please consult that section for details.

On the following pages are some examples of what you may see using the TBE to look at different tracks on a diskette.

TRACK EDITOR

 PTR=6734 ADDR:4643 TRK=00

```

4600-D7EDF6BE B5AEBBAC BDDDEBAE BBACB9FE
4610-CDEAAC9E D6E7EDF7 F7BCEFF9 DEADE99E
4620-DFEBDCDA DDECFFD3 B3FDEAD3 FDFAB2BE
4630-FF9AB5B9 D9FFA7F3 FFBE9ABC 9ADFF7F7
4640-DAFAE9DB DEAAEBEB FFFFFFFF FFFFFFFF
4650-FFFFFFFF FFFFFFFF FFFFFFD5 AA96FFFF
4660-AAAAAF AFABDEAA E6DFCFDF E7F9FEFF
4670-FFD5AAAD E6E6F9F2 9BFCF4DA DAEDFFFD
4680-E9F6E7E9 B297EAD3 CDADB2BE CBEDD7BD
4690-9AD9F4BC B6AFBA9D BEFCE6DA B3F3EDEB
46A0-CFF7EEB3 FDE9BEFD ABF9B59B F9BB9FFC
46B0-CD9AD9D9 EFBFA7DF F7DDDD7 F39EFAEF
46C0-FFFFA7F7 EED7FAEB FCE7D6E7 96F2D39F
46D0-BBFCB7FA B2AEE796 EFB5BCF4 ABCFFFFFFA
46E0-F59AF3D9 BDE6B9FD 97FCFDD9 D3FEAFDE
46F0-E5E6B2AE DFBBFDE7 E5B4DECE BEEEF4F3
  
```

This is a standard
 DOS 3.3 diskette.

19 \$FF's used as
 GAPBYTES here

Address marker begins
 with D5 AA 96

Data marker D5 AA AD

Data follows

TRACK EDITOR

 PTR=6846 ADDR=4016 TRK=01.5

```

4000-9F9FAEFB EEF4DDF2 979BEDF3 9E96CE9F
4010-BFBAD7EF F7F7FAD4 D7FEFDBF B7FDD3FB
4020-BBBCAEDE D5EAD6F3 FDEEDDF4 979EEDE5
4030-BECD97D7 AE9BFFED DDF4979E EDFADFFD
4040-9796AF9B FBFFDDF4 979EEDE5 BECD9797
4050-AE9BFAFE DDF4979E EDEEDFCD 97F6AF9E
4060-FEFFB9F6 EBBE9F9D F5F29A97 EDEF9BBE
4070-9F97B5FB FFFBDDEE 9DA6F2F2 96F6A6FF
4080-BEDDCDFE FADDF4F7 9EEDEFB6 DEAAEBF1
4090-D7DFAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA
40A0-AAAAAAAAAA D5AB96FF FEAFAAAE ABFEFFDE
40B0-ADEBFDFA A9ABAAAA AAAAAAD5 AAAEBFFF
40C0-B6EFBDED FFFBF7B7 DBFAFBF7 B5BBBBF5
40D0-BBBEFDFE F7D7ADE2 EFEFBAD DFF7A8CF
40E0-FDCBEFF5 B2F5BEB5 BED697B2 D6D7DBAD
40F0-EBB78FDE FFF9BAD4 DFDDBDDE FAFBFFCF
  
```

This is a diskette
 which uses \$AA's in
 the GAPS as part of
 its protection

\$AA'S USED IN GAP

Address marker changed
 to D5 AB 96

Data marker D5 AA AE

TRACK EDITOR

```

-----
PTR=6987      ADDR=7700      TRK=03
-----
7700-AAAAAAAA AAAAAAAAAA AAAAAAAAAA AFFBFFFF
7710-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
7720-FFFFFFBFC E1BFE7FF FFFFFFFF FFFFFFFF
7730-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
7740-FFFFFFFF FFFFFFFF3 F4E7F6FF FFFFFFFF
7750-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
7760-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
7770-FFFFFFFF FFFFFFFF FFFFFFFF FFE7F9FE
7780-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
7790-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
77A0-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
77B0-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
77C0-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
77D0-FFFFFFFF FFFFFFFF FFFFFFFDD ADDAAFA
77E0-AAFAAFA EAFAEAFA EAFAEAFA EAFAEAFA
77F0-EAFAEAFA AAFAAFA AAFAAFA AAFAAFA

```

This is a protected diskette which does not use a second GAP

Extra large GAP

Glitches present but FALSE LO and FALSE HI are set to ignore these

Section of 'pure' GAP just before the address marker

Address marker DD AD DA

TRACK EDITOR

```

-----
PTR=6763      ADDR=5250      TRK=1F.5
-----
5200-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5210-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5220-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5230-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5240-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5250-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5260-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5270-FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF
5280-FFFFFFFF FFFFFFFF FFFFFFFF FFD5AAB5
5290-FFFEABAB AEAEFAFB DEAAEBFF FFFFFFFF
52A0-FFFFFFFF FFFFFFFF FFD5AAAD ABABABAE
52B0-BDDEEAAF AFBDBBBE B7BAAEAD BDFBF5BA
52C0-EBBDAFE FEFEFFDB F5EEBDD BAEF7DDB
52D0-EFBEABBE EEEDDBB7 ABABABAB ABABABAF
52E0-EADDBED7 DAD6BEDB ABB6FEDF B5ADB6DA
52F0-BBEAAEBA BEB5BBBD BDBBB5FA EEEAEEAD

```

This is from a DOS 3.2 diskette

Large preceding GAP

Address marker D5 AA B5

Second GAP

Data marker D5 AA AD

TRACK EDITOR

```

-----
PTR=2000      ADDR=2B53      TRK=04
-----
2B00-EEBDDAAE AEEAEADA ADD7D7D7 AEFEFBB6
2B10-BAABEAED BADADADA ADADADAF AED7D7AD
2B20-ABABABD6 AFAFEADD BBB6AFAD BBDEAAEE
2B30-ABD5ABD5 ABD5ABD5 ABD5ABD5 ABD5ABD5
2B40-ABD5ABD5 ABD5ABD5 ABD5ABD5 ABD5ABD5
2B50-ABD5ABD5 ABD4AAB7 FFFFAAAE AAABFFFA
2B60-DEAAEEFE FFADAAAB D5ABD5AB D5ABD5AB
2B70-D5AAADAF ADBBABDA B5AFB6AE DDEFDAEF
2B80-F5AEABB7 EFBAFBBD BEFFEF AF AEB5D6BA
2B90-BAAFABEB BFBDBDAF DBB6B6BE BFB5BFBF
2BA0-F5FABFDA BFBABEDF DFB7DDFB F5ABDDAB
2BB0-D6F5BBF5 ABDEEDB5 B5B7AEED DEB5B6AE
2BC0-BFD7B5AE AEADEAEE EDDFB6BB BABBBAB7
2BD0-BDBEBEBD BFBADAE B6EBABDD B7B7ABAB
2BE0-BBD6B5BB ABDBAFAB ABBBAFBF ABABFDFD
2BF0-BBBBB5BB B5DDEBEB EBD7B6BE DDDBEDBB

```

This is a disk which uses several bytes in the GAPS.

The GAPS are made up of D5 AB's.

To locate the data the address mark of D4 AA B7 must be specified, since the GAPBYTES cover too wide a range of values.

TRACK EDITOR

```

-----
PTR=2000      ADDR=2465      TRK=11
-----
2400-A28D95B5 A2B190A7 A7F0A3C2 80B8B8B8
2410-B8ACAAAA C5C5E983 A7A8AAAF C0EEEEEC4
2420-828B8280 808080C3 C3C5C5C5 D98CCACA
2430-CACAF0B8 AE8287B0 B0A0A0CC B8C0C0C0
2440-C0CC88A0 D4A6C486 8E9882AA 80A7A794
2450-88888888 A0D9808E A0A0DADA BDA0A3A3
2460-A3C0A0B4 B4C0A0A0 AB80A0A0 A0A0B8A0
2470-A1B0A18A 80808090 909C9C9C A1929088
2480-8888A480 C198A0C0 D8A09194 B8B8B8A1
2490-CAA19EA0 A0CC889A B2A9A9CA C0A280A0
24A0-E8A8A880 80AAA0C0 A29999B8 92A8A0F1
24B0-8880A0A0 A0A0A0A0 CACACFAA A7E5A283
24C0-A0A0C0AF AFCCCA0 C0A0B4D4 A3A280C0
24D0-B4B4A0A0 A0C0BAA0 A0B8A0B5 8696A2AD
24E0-ADA0CCAD ADB7C8B6 B1949494 EAB280A1
24F0-D0D8A0D8 A0A0A0A0 ADA888A2 80B488A0

```

This is from a track which was not used.

The large quantity of bytes ending in 0 is an easy way to identify this type of track.

The degauss option will create a disk like this.

CHAPTER 4

USING THE TRACK/SECTOR EDITOR

The Track/Sector Editor (TSE) is invoked by typing 'S' from the main menu. This option allows the user to read, edit and write to any sector on a DOS 3.2 or DOS 3.3 diskette. The data in the sectors may be displayed in HEX or ASCII code, or a disassembly listing may be selected. The checksum used by the internal read/write routines may also be disabled, to allow reading or writing to disks with non-standard checksums.

The screen format for the TSE is similar to that found in the TBE (Track/Bit Editor). The current track and sector numbers are displayed between the two dashed lines in the upper portion of the screen (The status field). The valid commands for the TSE, along with their respective functions, are listed below.

I,J,K,M ..These move the cursor up, down, right and left.

<-,>These move the cursor left and right.

AThis switches the screen display from HEX to ASCII and back again. (The cursor is an inverse block in HEX mode and switches to a pair of '[']' surrounding the character in the ASCII mode.

RThis reads the currently selected sector into whichever buffer is currently selected. If an error occurs, a message will be displayed in the status line.

WThis writes the current buffer to the currently selected sector on the disk. If an error occurs, a message is displayed in the status line.

TThis allows the direct entry of a particular track number.

SAllows the direct entry of a specific sector number.

OThis selects the OPTIONS page whose commands are as follows:

S ...Increments the current slot number.

D ...Toggles the current drive number.

F ...Toggles the current disk format
(13 sector / 16 sector)

C ...Toggles the checksum flag in the internal read/write routines on or off. This allows them to access a sector whose Closing Marks (See the Advanced Users Guide) have been modified. Care should be taken when writing with this option, as the sector written will use the standard closing marks.

<RETURN> ...Exits the OPTIONS page.

LInvokes the Disassemble function. This will list, in 6502 assembly language, the data starting at the current cursor location. The left and right arrow keys may be used to move forward and backwards throughout the listing, and a bell will sound if you try to move beyond the limits of the current sector. The addresses and offsets shown are all referenced to \$0000 starting at the beginning of the current sector. The <RETURN> key cancels this function.

ctrl-L ...This will print the disassembly of the entire current sector to the printer. If no printer is available, two bells will sound.

BThis allows the user to select from 8 different data buffers within NIBBLES AWAY []. These buffers are numbered from 0-7 and the desired number should be entered at the displayed question. If data is read into one buffer, the other 7 are left undisturbed. This function is useful for moving several sectors from one location to another.

<SPACE> ..This enters the EDIT mode. The following commands are used in the EDIT mode:

 0-9,A-F ..These enter a HEX value into the edit window. The values scroll to the left in this window and only the last two are used.

 <SPACE> ..This enters any values typed in at the current cursor location, and moves the cursor to the next location.

 <-,>These move the cursor left and right.

 <RETURN> .This exits the edit mode.

+Increments the current track and sector number.

-Decrements the current track and sector number.

DDisk Skan function. This will prompt for a starting and ending track/sector location on the disk, which select the range of the scan. The scan direction will then be prompted for, a '+' will select scanning sectors from 0 through the current sector setting, while a '-' will select scanning from the sector setting to 0, with track numbers always increasing. The next prompt is for the type of search string. This can be Hex, Ascii (bit 7 set), or Low ascii (bit 7 clear). The search string is prompted for next, and can be up to 24 characters in length. During parameter entry the left arrow key may be used to move back through the selections, and the <RETURN> key will accept the default value. If an improper value is entered, then a bell will sound.

Once all of the parameters have been entered the search will begin, with each track/sector/byte offset location which contains the search string being shown on the screen. If there are more occurrences than will fit on the screen, NA]| will stop and wait for a key before continuing (This also allows you to use the control-P function to obtain a hardcopy).

The scan function views the disk as having track 0 after track \$22, so a search may begin on track \$20, and end on track \$4, which would include tracks \$20,\$21,\$22,\$0,\$1,\$2,\$3,\$4.

The scan will use the current disk format setting to select the disk format as well as the number of sectors per track.

QExits to the main menu.

The following pages contain examples of the various screens which the TSE can display.

SECTOR EDITOR

```

-----
TRK=00                               SEC=01
-----
00- 8EE9B78E F7B7A901 8DF8B78D EAB7ADE0
10- B78DE1B7 A9028DEC B7A9048D EDB7ACE7
20- B7888CF1 B7A9018D F4B78A4A 4A4A4AAA
30- A9009DF8 049D7804 2093B7A2 FF9A8EEB
40- B74CC8BF 2089FE4C 849DADE7 B738EDF1
50- B78DE1B7 ADE7B78D F1B7CEF1 B7A9028D
60- ECB7A904 8DEDB7A9 028DF4B7 2093B7AD
70- E7B78DFE B6186909 8DF1B7A9 0A8DE1B7
80- 38E9018D FFB68DED B72093B7 60000000
90- 000000AD E5B7ACE4 B720B5B7 ACEDB788
A0- 1007A00F EAEACEEC B78CEDB7 CEF1B7CE
B0- E1B7D0DF 60087820 00BDB003 28186028
C0- 3860ADBC B58DF1B7 A9008DF0 B7ADF9B5
D0- 49FF8DEB B760A900 A89142C8 D0FB6000
E0- 1B020A1B E8B700B6 016002FE 0001FBB7
F0- 00B70000 0202FE60 02000000 01EFD800

```

This is the third stage boot sector from a DOS 3.3 slave diskette.

The cursor is shown as an inverse block which can be moved throughout the data area.

The values may be edited and then written to the disk.

SECTOR EDITOR

```
-----
TRK=00          DISASSEMBLE          SEC=01
-----
0000-   8E E9 B7   STX   $B7E9
0003-   8E F7 B7   STX   $B7F7
0006-   A9 01     LDA   #$01
0008-   8D F8 B7   STA   $B7F8
000B-   8D EA B7   STA   $B7EA
000E-   AD E0 B7   LDA   $B7E0
0011-   8D E1 B7   STA   $B7E1
0014-   A9 02     LDA   #$02
0016-   8D EC B7   STA   $B7EC
0019-   A9 04     LDA   #$04
001B-   8D ED B7   STA   $B7ED
001E-   AC E7 B7   LDY   $B7E7
0021-   88         DEY
0022-   8C F1 B7   STY   $B7F1
0025-   A9 01     LDA   #$01
0027-   8D F4 B7   STA   $B7F4
```

This is what would be shown if the sector above were disassembles using the 'L' option.

This is the 6502 assembly language equivalent of the first \$28 bytes of the previous dump.

The arrow keys may be used to page through the listing.

SECTOR EDITOR

```
-----
TRK=01          SEC=08
-----
00-[U]N V E R I F Y @ ! 0 0 ! 0
10- 0 0 0 0 0 @ " F 4 "
20- F " D # 8 " 0 0 0 @ 0 @ @ @ @ H
30- @ H @ D @ @ 0 @ @ 1 9 1 1
40- 0 V D S L R B A C I O @ P H D
50- B A @ P @ @ ~ @ A @ B @ A @ G
60- @ A @ ~ ? @ @ ~ ? @ @ ~ ? @ @ ~
70- ~ M G M L A N G U A G E N O T
80- A V A I L A B L E R A N G E
90- E R R O R W R I T E P R O T E
A0- C T E D E N D O F D A T A F
B0- I L E N O T F O U N D V O L
C0- U M E M I S M A T C H I / O
D0- E R R O R D I S K F U L L F I
E0- L E L O C K E D S Y N T A X
F0- E R R O R N O B U F F E R S
```

This is a sector from a DOS 3.3 disk shown in the ASCII mode.

The brackets on the first line indicate the cursor position.

Control characters are shown in inverse video on the screen.

Data entry is still done in HEX.



To adjust the speed of your disk drive, the cover must be removed to access the adjustment. MAKE SURE THE POWER IS OFF! After removing the cover, locate the motor control board. This board is in the back of the drive, between the disk mechanism and the rear section of the baseplate. On the right hand side of this board, a small adjustable resistor will be seen. This is the speed adjustment. Making sure that nothing interferes with the open drive, and checking to see that all cables are securely in place, power on the Apple and boot NIBBLES AWAY][. Start the drive speed test and adjust the control on the drive so that the pointer spends most of its time between -5 and +5. POWER OFF THE APPLE! Then reassemble the disk drive and the process is complete.

WARNING: THIS PROCESS MAY VOID YOUR WARRANTY. If in doubt, or if you do not feel comfortable taking your computer apart, then consult your local Apple dealer.

Selecting 'D' from the diagnostics menu will select the DEGAUSS disk option. You will be prompted for the drive, starting and ending track numbers for the operation. A warning will then be displayed showing that any data on the disk will be ERASED. Pressing space will start the operation and the main menu will be displayed upon its termination.

Pressing 'M' from the diagnostics menu will invoke the MEDIA VERIFY system. You will be asked for the drive number to test, and then a warning similar to that described above will be displayed. Pressing space will start the process, and <ESC> may be used to stop the operation. A message will be displayed on completion of the test as to whether or not the disk has any bad sections. If the test reports an error, the disk should not be used for data storage.

Pressing 'Q' will return you to the main menu.

CHAPTER 6

USING THE FILER

To access the NIBBLES AWAY][Filer, select item 'F' from the main menu. This will result in a secondary menu containing the options in the filing system.

The function of the Filer is management of the Auto-Load parameters. These are files contained on your NIBBLES AWAY][disk which are composed of all of the key sequences necessary to back-up certain software packages. For example, if a particular program requires that five parameters be changed, and has data on tracks 00-04 and 5.5-9.5, the Auto-Load file for that program would change those parameters and perform the backup on the required tracks. The way that the Filer accomplishes this is to automatically type in all of those keys which the user would normally have to enter. When an Auto-Load parameter is in operation, the characters being typed can be viewed on the screen as if the user were typing them directly (This is similar to the EXEC command in Apple DOS).

In order to save any Auto-Loads, a data disk must first be formatted. This is done by pressing 'I' at the Filer menu. You will then be asked if you are sure if you wish to go on. Typing 'Y' here will result in a second warning, and an explanation that any data on the disk in the drive will be erased. (Make sure you have a blank diskette in the drive). NIBBLES AWAY][will then wait until a key is pressed, and then format the disk for parameter storage. At any time during this process, as in any other section of NIBBLES AWAY][, The <ESC> key may be pressed to exit to the master menu.

When loading or deleting an Auto-Load file, the screen display will be the same as that for the 'X' (Execute Auto-Load) function from the main menu (described in the preface).

The options on the File Maintenance menu are described below:

- C.....This option will clear the Auto-load file buffer and place the user in edit mode. The user must answer 'Y' to the confirmation question to make sure that he wants to clear the buffer.
- E.....This places the user in edit mode. All characters which are typed in at this point are inserted into the current Auto-Load buffer at the cursor position. This means that NIBBLES AWAY][will perform as if these keys were being typed in from the keyboard when the file is executed. There are several special keys while in the Auto-Load editor:

The left and right arrows can be used to move the cursor forward and backwards in the buffer.
>,<..The less than and greater than signs will show in the buffer in inverse, and will act as the forward and backward arrows when the Auto-Load file is executed.
]....(Shift-M) This will show up in inverse on the screen and will act as the ESC key when the file is executed. The ESC key should not be pressed while in the Auto-Load editor since it will cause NIBBLES AWAY][to return to the MAIN menu.
Control-D will delete the character to the right of the cursor and move all following characters over one.
Control-E will exit the Auto-Load editor and return the user to the FILE MAINTENANCE menu.

The 'S' option allows the current Auto-load in memory to be saved to disk. Pressing this key will cause a prompt to appear on the screen for the name to save the Auto-Load under. After pressing <RETURN>, a prompt will appear for the directory to save the file under. Then the file will be saved to the selected directory. If a file exists with the same name as the one being saved, then the new file will replace the old one on the diskette.

The 'L' option allows an Auto-Load to be read in like the 'X' command from the main menu, but it does not execute the file. This allows Auto-Loads to be read in for examination and editing.

The 'D' option allows the user to remove Auto-Load files from the disk and operates in a manner similar to that of the Auto-Load file loading system outlined above, except that the selected file will be removed from the diskette instead of being loaded into memory.

The 'R' option allows the user to execute the current Auto-Load buffer. NIBBLES AWAY][will do this just as if the 'X' option had been selected from the MASTER menu. This option, combined with the editor, allow the user to test and modify Auto-Load files before they are saved to disk.

NOTE: The Auto-Load system uses the drives which have been selected under the 'N' option from the main menu. This defaults to slot six, with drive one as the source and drive two as the destination. If you would like to change these, select 'N' from the main menu, enter 'Y' when asked if you would like to change the defaults, then enter the new values for slot and drive. (You can press <ESC> to go back to the main menu without having to answer the rest of the questions).

The <ESC> key may be pressed at any time during an Auto-Load sequence. This will halt the Auto-Load wherever it happens to be, and return keyboard control to the user.

APPENDIX A

BEGINNERS GUIDE

Step by Step guide to backing-up disks with NIBBLES AWAY]]

There are three basic steps to backup a diskette:

1. Locate the tracks which contain data.
2. Find the address marker for the sectors there.
3. Figure out any additional protection.

(Hint: #3 is the hard one!)

For most of the procedures below, a basic working knowledge of the Track/Bit Editor (TBE) is required. For those who are not familiar with the TBE, an overall description and some examples are given below. The examples are easier to understand if they are performed as you read this, so you may want to boot up NIBBLES AWAY]] and try them out to get a better understanding of what is going on.

Enter the TBE by selecting option 'T' from the main menu. A large section of numbers will appear on the screen, with two dashed lines at the top. The information in between these lines is the status information and informs you of such things as cursor position, track number, and is also the location where various prompts appear for certain functions. The numbers at the bottom are separated into two sections. On the left are the starting memory address's for each line to the right. Move the cursor around using I,J,K or M, and watch the ADDR indicator in the status line. It will tell you exactly what memory address the value under the cursor represents. The arrow keys change the area of memory which you can see. They shift your view 256 bytes forward or backward at a time. The only really important thing to know for this discussion is how to use the arrow keys to move the viewing 'window' around in memory.

The ';' (unshifted '+') and the '-' keys increment and decrement the track number in the status line. Pressing 'R' will cause drive one to read the data from the track indicated in the status line into memory. The bytes on the screen will change, since different data has been read in. Pressing the 'R' key multiple times will result in different data being displayed. This is because NIBBLES AWAY]] starts reading at whatever point happens to be under the head when the drive is turned on, which is random, hence the change in the displayed data (the data is not actually different, it is just not loaded at the same memory location as it was previously).

STEP 1:

To do this we must locate all of the tracks on the disk which contain data. To do this we should have the track pointer set to track 00. Pressing 'R' will read in the track and show it on the screen. The arrow keys should be used to move the viewing 'window' to start at \$2000. Now we will move forward and try to determine if this track contains valid data. Actually, track 00 MUST contain some data in order for the disk to boot, but we will be using this procedure on other tracks which do not necessarily contain data.

The main thing which will identify a track as containing data is the presence of GAPS. GAPS are sections of the same byte repeated several times. Normally they are made up of \$FF's and are 6-20 in length. To see what these look like, insert your system master disk and read in track 00 as described above. Moving through the buffer with the arrow keys will reveal a large variety of values. Spaced out among these should be sections of FF's which contain about 6-20 in a row, depending on the exact disk. Normally DOS 3.2 disks have larger GAPS than DOS 3.3 disks. There should be many occurrences of the GAPS, spaced out so that you see one about every other time that you use the arrow keys to move forward or backward.

NOTE: You may see a second, smaller (2-5 \$FF's), GAP following a large GAP, with a small section of data in between. This is called the secondary GAP. When referring to a GAP here, we will always be talking about the primary GAP, not the secondary one.

Now try looking at other tracks on the disk. First look only at the full tracks (no .5 on the end). All of them will be similar to track 00 in the appearance of the GAPS. You may want to try this several times to become comfortable with locating GAPS on a given track.

Now read in a half track (.5 on the end). Scan memory to locate some of the GAPS. Since system master disks do not use half-tracks, the data which we see here is really 'cross-talk'. In other words, data was written on the full track, but the magnetic pattern spread out a bit, and so we see some data here. The tell-tale sign of this phenomena is that the GAPS will not be all the same. That is, they may have one or more values in them which are not consistent. This tells us that there is some data on this track, but that it is not valid data. Take a look at some other half-tracks so that you can tell if you are looking at a full track or a half track by examining the GAPS.

The next item which you need to be able to identify is a blank track. To do this, insert a blank (NON-initialized) disk into drive one. Read any track on this disk and scan through the memory addresses. There will be no GAPS found, and many of the bytes seen on a track like this will end in 0 (i.e. \$A0,\$B0,\$E0), which are not legal disk bytes. This means that the controller can find no valid data on the track. Some disks have portions of tracks which are not used, so you should always be sure to examine at least 24 screenfulls of information to make sure that there is no data at any point on the track.

Our next tool for finding data is the fact that valid data MUST be at least 1 track apart. In other words, if you locate data on track 3.5, then track 4 cannot have data and the next place where data can be is track 4.5. This is very helpful for finding tracks with data.

NOTE: If you locate data on a given track, it is a good idea to look at the tracks one half track to either side, to make sure that they look less valid than the one that you have selected as the real one.

Well, now that we know how to locate data on a track, we can begin at track 0 and step towards track 22, checking each track to see if it appears to have data on it. Most disks have a pattern to the position of the data, and if you can figure it out, you may be able to just check a few tracks to make sure, and then go on to step 2. Otherwise the data must be located one track at a time.

Most disks use the standard tracks (1,2,3,...,22), but there are some which use half-tracks and some which use all the way out to track 23 (which, by the way cannot be read on all drives since no drives were ever designed to go out that far).

When all tracks which contain some type of data are located, we can move on to step 2.

STEP 2:

Now we must tell NIBBLES AWAY][how to read the information on the tracks which we have found to contain valid data. This is done by going back to each of these tracks with the TBE and finding the Address mark for each one. The Address mark will be the first 3 bytes following the GAP. To see this in operation, take a look at a track from your system master disk. After each GAP you will see either 'D5 AA 96' for a DOS 3.3 master disk, or 'D5 AA B5' for a DOS 3.2 disk. These values should be noted down alongside of each track number which contains data. Many times there will be only one, or maybe 2 patterns for all tracks.

After this, we are ready to back-up these tracks. This is done by exiting the TBE (use 'Q') and then selecting 'M' for the modifiers menu. Then select 'B' for BACKUP modifier. When asked 'USE ADDRESS MARK' answer 'Y' and then type in the address mark which you noted down for the range of tracks to be backed-up. Simply press return to the rest of the questions and then return to the main menu. Select 'N' to enter NIBBLES AWAY][, and answer 'Y' to the question 'CHANGE DEFAULT OPTIONS'. Use the <RETURN> key to move to the 'START TRACK' prompt, and then enter the first track to be backed-up. Press return and then type in the last track to be backed-up with the current address marker setting. If the tracks in the specified range are not spaced at 1 track intervals, enter the interval at the 'TRACK INCREMENT' prompt. Press return for the following questions and begin the backup after inserting the disks when prompted. When you return to the main menu, repeat the above procedure for each range of tracks which contains a different address marker.

Now comes the moment of truth! Try to boot up the backed-up disk (if the original had a write-protect tab, the back-up should too!). If the backup boots, then all went successfully.

STEP 3:

If the back-up did not work properly then there are a few things to look for.

- 1....Did all of the tracks which should have backed-up do so? This can be seen while the back-up takes place as a 'Y' or an 'N' under that tracks status location. If some did not, then the address marker was probably not determined properly. If this is the case, then go back to the TBE and try those tracks again.
- 2....If everything seemed to go well, but the backup refuses to work (you may want to try the procedure again, maybe with the source and destination drives reversed, to make sure it was not a power glitch or other such occurrence which messed things up) the next step is to try the procedure with the 'SYNCHRONIZED COPY' option selected. Disks which use this method often make violent head movements during their boot procedure. This can be a clue to this type of protection.

Additional information:

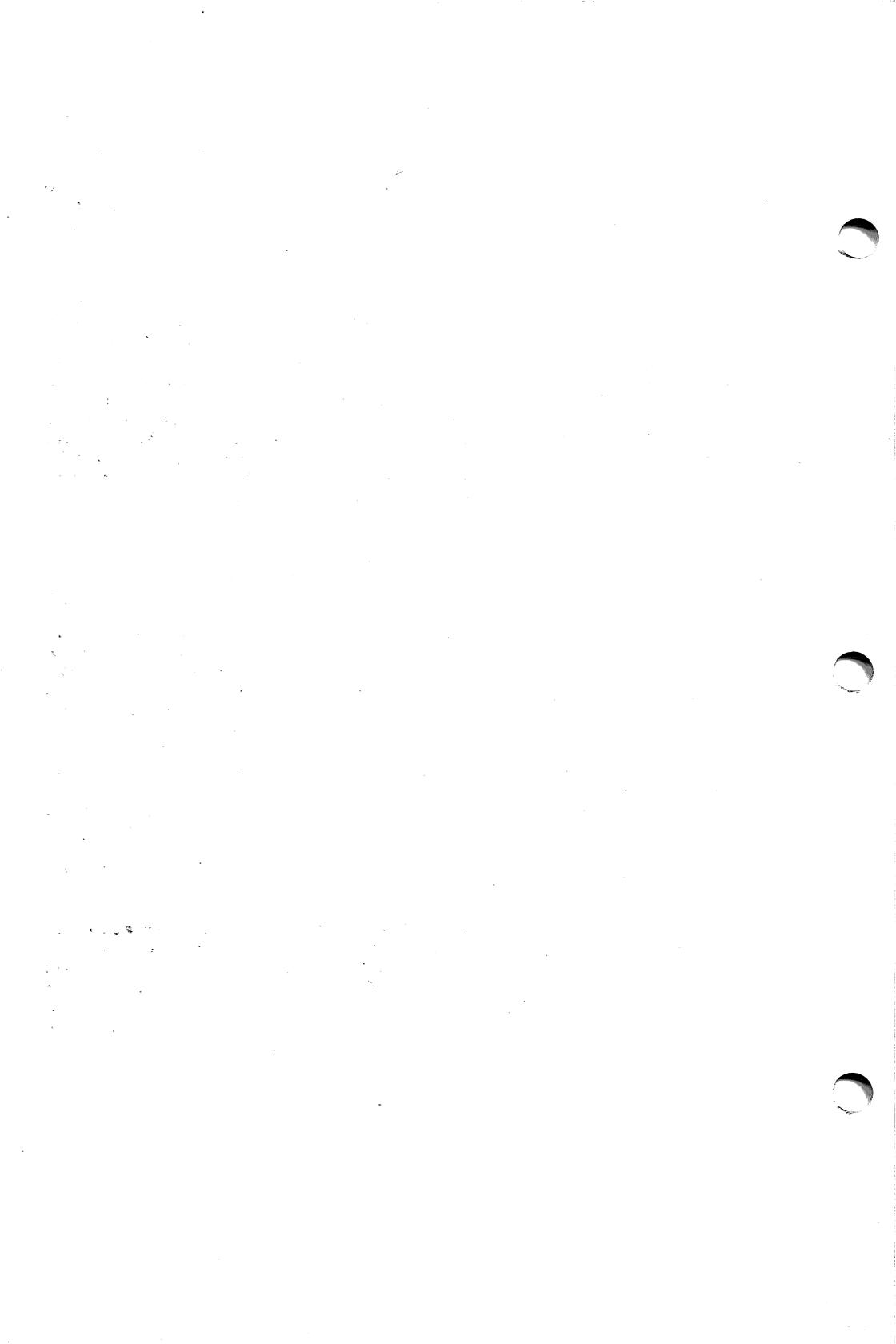
On some DOS 3.3 diskettes, the GAPS between the sectors are reduced in size. In some cases they can be as small as 4 or 5 bytes. When NIBBLES AWAY][finds the beginning of a section of data, it normally adds 8 bytes of SYNC just before the data. This will normally put SYNC bytes into the GAP before the data, where it should be. However, if a disk has very small GAPS, then the added SYNC can overwrite the end of the previous sector. The parameter FIX AMNT controls the number of SYNC bytes which are added, so this value can be reduced to prevent any data from being overwritten. The value that NIBBLES AWAY][uses for the SYNC which it puts in is contained in the parameter FIX VALU. Normally this is a \$7F, but it can be set to any desired value.

It should be noted that NIBBLES AWAY][regards any data byte which has its high bit cleared to be a SYNC byte. So the \$7F which is normally in this parameter means that a SYNC \$FF is to be added. If the 'OVERRIDE STANDARDIZER' option is selected, then NIBBLES AWAY][will not add any bytes, it will simply convert the data which is present before a sector into SYNC, without changing its value. This technique can also be used for disks whose GAPS are very small.

Another item to watch for is disks whose tracks appear to be very long. Some disk protection schemes put garbage on a portion of the track. When this garbage is read back, more bytes are read in than were written out. This causes the track to be longer than normal, and in some cases it becomes so long that the default parameters for NIBBLES AWAY][cannot find the data properly. The parameters DATA MIN and DATA MAX control the minimum and maximum track lengths (in increments of 256 bytes) which NIBBLES AWAY][will accommodate. The normal value of DATA MAX is \$1D, but this can be set to a higher value, such as \$25, if a track appears to be very long. Even though the track may read in as a large number of bytes, many of these will be removed by the nibble filter, since they are garbage bytes. This will assure that the amount of data written back out will not be too large to fit on the destination track.

When NIBBLES AWAY][finds a sector of data, it looks forward in the data to find a second occurrence of the same pattern. This insures that the sector has been read in and located correctly. On many disks, there is a primary section of data, called the address field, and then the actual data field follows. In between these is a small GAP, and many times it contains random information. This means that NIBBLES AWAY][should only match the number of bytes which are found in the address field, since the bytes in the GAP may not read as the same value every time. The parameter FIND MAX controls the number of bytes which are checked during this procedure. The default value of \$0C works in most cases, but some disks use a smaller address field which may require this parameter to be set to a smaller value. However, if this parameter is set too low, then NIBBLES AWAY][may identify the match for a section of data whose first few bytes are the same, but which differ later on. Therefore one should exercise caution when lowering this value.

Once the user becomes familiar with the procedures outlined in this section, he may want to look through the next chapter for some additional information.



APPENDIX B

Advanced Users Guide

An explanation of how to translate the values shown in the memory dump into which parameters to change and what to change them to is the topic of the next few paragraphs. We will begin with some basic information on the way in which information is stored on a diskette.

Before every sector written on a given track on a diskette, a section of SYNC-BYTES are written. These are normally \$FF's but other bytes can also be used. Next follows some type of address marker, which tells the computer which sector is about to pass under the head so that a particular sector can be located. After a few more SYNC-BYTES have been written, the actual data starts. This data is in an encrypted form, since the disk controller will not allow certain bytes to be written out properly. This means that only 4-6 bits out of a given byte from the disk contain actual data. After the data bytes, some closing bytes are usually written out, followed by the SYNC-BYTES which precede the next sector.

The sections of SYNC-BYTES are called GAPS, so the bytes in them are often referred to as GAPBYTES. These GAPBYTES can be picked out in a memory dump since they are usually in a large group (10-15 of them). NIBBLES AWAY][is initially set to recognize GAPBYTES of \$FE and \$FF. If the diskette is formatted with some other GAPBYTE, then NIBBLES AWAY][must be made aware of this. The parameters GAPBYTE1 and GAPBYTE2 set the allowable range for GAPBYTES. GAPBYTE1 should be set to the lowest value found in the GAP on a given diskette. GAPBYTE2 should be set to ONE MORE THAN the highest GAPBYTE found on that diskette. If the selected range of GAPBYTES is too large, sections of data may appear to NIBBLES AWAY][to be GAPS. This would cause a loss of data. Therefore the selected upper and lower limits should give a range large enough to cover all the GAPBYTES which are used, but should not be any larger (In most cases, only one byte is used for all GAPS). If, for example, a diskette is found to use \$AA's as GAPBYTES, then GAPBYTE1 should be set to \$AA and GAPBYTE2 should be set to \$AB.

NIBBLES AWAY][can also be instructed to look for address markers directly. This is done by entering the specific address mark for a track into the BACKUP MODIFIER. The value entered will then be searched for instead of looking for any GAPS on a given track. This method tends to be more reliable, and is sometimes necessary if the GAPS are composed of many different bytes.

After the address marker, the second GAP (section of SYNC BYTES) is encountered, and then the data marker. When the second GAP is written out by a program there is usually a bit-shift error which causes the controller to become 'unlocked', much as a video tape recorder does over a section of bad tape. When NIBBLES AWAY][encounters a GAP, it looks for the end of the GAP for the address marker. Then a duplicate of that address marker must be located further along in the buffer to show that the data is valid. NIBBLES AWAY][must know the minimum number of bytes that may be in an address marker, to know how many bytes must match, since the unlocking of the controller at the start of the second gap will cause different data to be read each time. Normally there are at least \$0C bytes in an address marker. If the amount is less, then FIND MAX must be adjusted to that value. Care should be taken not to adjust FIND MAX to a value less than \$03 since any less number of bytes may not specify a unique combination of bytes.

The number of bytes which make up a GAP is normally at least \$0F, but it can be much larger, as in the case of a DOS 3.2 diskette with many empty sectors, or it can be smaller, as on some protected disks. However, the number of GAPBYTES must be larger than \$04 due to the Apple][disk controller hardware. NIBBLES AWAY][has been set to look for at least \$0C GAPBYTES, but it may be necessary to alter this by reducing GAP SIZE if the GAPS are of a smaller size on the disk being backed-up.

On some diskettes which use non-standard GAPBYTES, there may be a transition from one value GAPBYTE to another in the middle of a GAP. This can cause the controller to 'unlock', creating a glitch in the data. This can be seen using the TBE as several random bytes in the middle of a GAP. NIBBLES AWAY][has an internal routine which detects these glitches and skips over them. The two parameters controlling this routine are FALSE LO and FALSE HI. FALSE LO is how far beyond the apparent end of a GAP NIBBLES AWAY][should look for more GAPBYTES. FALSE HI specifies up to what point GAPBYTES must be found if a GAP does not really exist. The initial values work in almost all cases and rarely require adjustment of any kind.

The glitch detector may be turned off if its operation interferes with the backup of a diskette. This is done by answering 'N' to the OVERRIDE GLITCH DETECT question in the BACKUP modifier.

If you are scanning over a diskette and the TBE reads in a track which is 'in between' two valid tracks, the data viewed may appear to be proper, except that there will probably be sections of 'glitches' in the GAPS, the address and data markers will change, and other slight variations will be seen because the disk drive head is reading a little bit from each of the two tracks to either side of it and mixing them together as it reads. This can be used to determine if a track is used or not, since two valid tracks CANNOT sit less than one full track apart on a diskette.

The values DATA MIN and DATA MAX specify the high order portion of the allowed length of a track. For example if DATA MIN is set to \$13 and DATA MAX is set to \$1D, then any track must have a length between \$1300 and \$1D00 bytes to be considered valid. These are the default values for these parameters, and should hold for most diskettes.

The size of the SYNC-BYTES is controlled by the parameter SYNC SIZ. If this value is set to 9, then 9 bit SYNC-BYTES will be written out in the GAPS and other selected locations. If this parameter is set to any other value, 10 bit SYNC will be used.

When NIBBLES AWAY][detects a GAP, it then finds the data following it. The GAPS are normally composed of SYNC-BYTES so these must be reinserted. The parameter FIX AMNT controls the number of GAPBYTES previous to the address mark which should be converted to SYNC. If the question 'OVERRIDE SYNC CONVERT' is set to 'Y', then SYNC will not be added. The parameter FIX VALU controls what the GAPS are converted to when SYNC is added. If the question 'OVERRIDE STANDARDIZER' is set to 'Y' then the values currently in the GAPS will be used as SYNC without changing them to anything else.

NIBBLES AWAY][uses the high bit of the data in the read/write buffer to signify whether or not it is to be written out as SYNC. If the high bit is set ('1'), then the byte will be written out normally. If the high bit is reset ('0'), then the byte will be written as SYNC, with its length controlled by the parameter SYNC SIZ. The 'H' option in the TBE can be used to toggle this bit to select any given byte as a SYNC-BYTE.

Some disk protection schemes use a technique known as bit-insert. This involves one SYNC-BYTE within a section of normal bytes. This cannot be detected by looking at the data in a track dump, due to the nature of the disk controller. The method used to reinsert this SYNC-BYTE is to find a set of bytes somewhere near the location of the SYNC-BYTE. This 'insert mark' is then entered into the BACKUP modifier. Normally the last byte of the insert mark is the SYNC-BYTE, however NIBBLES AWAY][provides a method to shift the point where the byte will be inserted backwards or forwards from the point where the insert mark is detected. The parameters controlling this are OFFSET + and OFFSET -. These define the positive and negative shift for the marker. The total shift is the sum of the two, so normally one parameter is zero and the other parameter specifies the entire shift in the desired direction (OFFSET + is positive while OFFSET- is negative). If both of these values were set to the same number, they would cancel each other out and the net result would be an offset of 0 (The default value).

The parameters PAGE LEN and LF VALUE control the printer output from the TBE. PAGE LEN is normally set to 66 lines (The standard paper size) but may be adjusted to any other desired value. (This value should not be set lower than \$06). The LFVALUE parameter is the value that will be sent to the printer after every carriage return printed. If your printer has auto-linefeed, then this should be set to \$00, since that is a null character and will cause no action on the printer.

NIBBLES AWAY][may be used with most parallel and serial cards which are compatible with Apple Pascal. Those which have hardware on the cards to perform their functions will operate. If the card is a 'firmware' type card which requires that the driving program call routines upon the card are not compatible. The easiest way to see if a given printer is compatible is to try it! NIBBLES AWAY][will tell you if the card in the assigned slot is not one of the valid types.

The parameter 'TRK CHOP', when set to a non-zero value, tells NIBBLES AWAY][to always write out 'TRK CHOP' pages of data to the disk. This means that a long track will be shortened to a fixed size. This is usefull for writing out a portion of a track by using a small number for 'TRK CHOP', typically something between 07 and 15.

The ctrl-R function in the TBE provides the user with a way to detect the SYNC bytes on a diskette, and determine where any insert marks are.

APPENDIX C

NOTES ON NIBBLE COUNTING

Nibble counting is a protection technique used by some manufacturers. It involves counting the number of nibbles present on a particular track when the disk is created. Since all disk drives spin at a slightly different speed, this number will vary from disk to disk. The nibble count is recorded at another point in the program, so that it can be verified when the program runs. The number of nibbles around a track will be constant, no matter what drive it is read on (As long as the drive's speed is within reason). In order to duplicate this, NIBBLES AWAY][has a nibble count feature included. It's use and abuse is described below.

To use the nibbles count option in NIBBLES AWAY][, a 'Y' must be supplied in response to the 'USE NIBBLE COUNTING' question in the BACKUP modifier. In order for the nibble counter to function correctly, an address mark should also be specified. Then the standard procedure should be used to backup the desired tracks, after making the CONTROL parameter changes noted below.

There are two types of tracks which can require nibble counting, those which have a standard amount of information, and those which contain only a few bytes of information with the rest of the disk taken up by SYNC-BYTES. The parameters SHIFT N+ and SHIFT N- control which type of track is being backed up. These parameters are set up for the first type of track mentioned. If the second type of track is being backed up, then the parameters should be changed to SHIFT N+ --> \$08 and SHIFT N- --> \$00 (This is the reverse of their current settings). For this second type of track, the parameter FIND MAX should also be set to \$03, since there usually are not enough stable bytes for the default value to work.

While nibble counting is running, four values are displayed on the screen. The first is preceded by a 'l=' and indicates the number of nibbles on the source track. After the '2=' is the current length of the destination track. This will vary as the process progresses, getting closer and closer to the original tracks length. The value after the 'p=' indicates an internal pointer to the write buffer. This pointer's value will change during the backup, but if its value exceeds \$8000 a WRITE ERROR will occur. This indicates that the drive speed was not within the range needed to backup that track. The disk speed test system can be used to adjust the speed of the drive to a HIGHER value. The backup can then be repeated and if the speed has been increased sufficiently, all will go successfully.

The number after the 'D=' indicates the difference between the two track lengths. The parameter TOLERANC may be set to the allowable difference between the two track (normally 0). The value of TOLERANC should not be set higher than \$07. If the difference value shows as a number less than 0 (e.g. \$FFFC) it means that the second track is shorter than the first, and NIBBLES AWAY][will correct in the other direction. When a difference in the allowable range is detected, it must be repeated at least MATCH NM times, so this parameter may be adjusted to assure that the nibble count is valid. The initial value of \$03 is sufficient in most cases.

Since nibble counting is probably the most difficult operation for NIBBLES AWAY][, it is also the one most prone to errors due to parameters not being set exactly right. If the value of 'P=' is decreasing, and it is the only value changing, then one or more parameters are not set properly. Readjusting the parameters and repeating the back-up should correct the problem.

NOTE: SYNC SIZ should always be set to \$09 when performing a nibble count. If any other value is used, unstable nibble counts on the destination disk may occur. A value of \$0A will usually allow those tracks where the 'P=' value gets very close to \$8000 and then fails via a WRITE ERROR to appear to backup properly. If this value is used, a larger value of MATCH NM (about \$0A) should be used to assure a proper nibble count.

APPENDIX D

DECIMAL-HEX-ASCII CONVERSION CHART

DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII
000	\$00	ctrl-@	042	\$2A	*	084	\$54	T
001	\$01	ctrl-A	043	\$2B	+	085	\$55	U
002	\$02	ctrl-B	044	\$2C	,	086	\$56	V
003	\$03	ctrl-C	045	\$2D	-	087	\$57	W
004	\$04	ctrl-D	046	\$2E	.	088	\$58	X
005	\$05	ctrl-E	047	\$2F	/	089	\$59	Y
006	\$06	ctrl-F	048	\$30	0	090	\$5A	Z
007	\$07	ctrl-G	049	\$31	1	091	\$5B	[
008	\$08	ctrl-H	050	\$32	2	092	\$5C	\
009	\$09	ctrl-I	051	\$33	3	093	\$5D]
010	\$0A	ctrl-J	052	\$34	4	094	\$5E	^
011	\$0B	ctrl-K	053	\$35	5	095	\$5F	_
012	\$0C	ctrl-L	054	\$36	6	096	\$60	`
013	\$0D	ctrl-M	055	\$37	7	097	\$61	a
014	\$0E	ctrl-N	056	\$38	8	098	\$62	b
015	\$0F	ctrl-O	057	\$39	9	099	\$63	c
016	\$10	ctrl-P	058	\$3A	:	100	\$64	d
017	\$11	ctrl-Q	059	\$3B	;	101	\$65	e
018	\$12	ctrl-R	060	\$3C	<	102	\$66	f
019	\$13	ctrl-S	061	\$3D	=	103	\$67	g
020	\$14	ctrl-T	062	\$3E	>	104	\$68	h
021	\$15	ctrl-U	063	\$3F	?	105	\$69	i
022	\$16	ctrl-V	064	\$40	@	106	\$6A	j
023	\$17	ctrl-W	065	\$41	A	107	\$6B	k
024	\$18	ctrl-X	066	\$42	B	108	\$6C	l
025	\$19	ctrl-Y	067	\$43	C	109	\$6D	m
026	\$1A	ctrl-Z	068	\$44	D	110	\$6E	n
027	\$1B	ctrl-[	069	\$45	E	111	\$6F	o
028	\$1C	ctrl-\	070	\$46	F	112	\$70	p
029	\$1D	ctrl-]	071	\$47	G	113	\$71	q
030	\$1E	ctrl-^	072	\$48	H	114	\$72	r
031	\$1F	ctrl-`	073	\$49	I	115	\$73	s
032	\$20	SPACE	074	\$4A	J	116	\$74	t
033	\$21	!	075	\$4B	K	117	\$75	u
034	\$22	"	076	\$4C	L	118	\$76	v
035	\$23	#	077	\$4D	M	119	\$77	w
036	\$24	\$	078	\$4E	N	120	\$78	x
037	\$25	%	079	\$4F	O	121	\$79	y
038	\$26	&	080	\$50	P	122	\$7A	z
039	\$27	'	081	\$51	Q	123	\$7B	{
040	\$28	(	082	\$52	R	124	\$7C	|
041	\$29	)	083	\$53	S	125	\$7D	}

DECIMAL-HEX-ASCII CONVERSION CHART

DEC	HEX	ASCII	DEC	HEX	ASCII	DEC	HEX	ASCII
126	\$7E	~	169	\$A9	)	212	\$D4	T
127	\$7F	DEL	170	\$AA	*	213	\$D5	U
128	\$80	ctrl-@	171	\$AB	+	214	\$D6	V
129	\$81	ctrl-A	172	\$AC	,	215	\$D7	W
130	\$82	ctrl-B	173	\$AD	-	216	\$D8	X
131	\$83	ctrl-C	174	\$AE	.	217	\$D9	Y
132	\$84	ctrl-D	175	\$AF	/	218	\$DA	Z
133	\$85	ctrl-E	176	\$B0	0	219	\$DB	[
134	\$86	ctrl-F	177	\$B1	1	220	\$DC	\
135	\$87	ctrl-G	178	\$B2	2	221	\$DD]
136	\$88	ctrl-H	179	\$B3	3	222	\$DE	^
137	\$89	ctrl-I	180	\$B4	4	223	\$DF	~
138	\$8A	ctrl-J	181	\$B5	5	224	\$E0	~
139	\$8B	ctrl-K	182	\$B6	6	225	\$E1	a
140	\$8C	ctrl-L	183	\$B7	7	226	\$E2	b
141	\$8D	ctrl-M	184	\$B8	8	227	\$E3	c
142	\$8E	ctrl-N	185	\$B9	9	228	\$E4	d
143	\$8F	ctrl-O	186	\$BA	:	229	\$E5	e
144	\$90	ctrl-P	187	\$BB	;	230	\$E6	f
145	\$91	ctrl-Q	188	\$BC	<	231	\$E7	g
146	\$92	ctrl-R	189	\$BD	=	232	\$E8	h
147	\$93	ctrl-S	190	\$BE	>	233	\$E9	i
148	\$94	ctrl-T	191	\$BF	?	234	\$EA	j
149	\$95	ctrl-U	192	\$C0	@	235	\$EB	k
150	\$96	ctrl-V	193	\$C1	A	236	\$EC	l
151	\$97	ctrl-W	194	\$C2	B	237	\$ED	m
152	\$98	ctrl-X	195	\$C3	C	238	\$EE	n
153	\$99	ctrl-Y	196	\$C4	D	239	\$EF	o
154	\$9A	ctrl-Z	197	\$C5	E	240	\$F0	p
155	\$9B	ctrl-[	198	\$C6	F	241	\$F1	q
156	\$9C	ctrl-\	199	\$C7	G	242	\$F2	r
157	\$9D	ctrl-]	200	\$C8	H	243	\$F3	s
158	\$9E	ctrl-^	201	\$C9	I	244	\$F4	t
159	\$9F	ctrl-~	202	\$CA	J	245	\$F5	u
160	\$A0	SPACE	203	\$CB	K	246	\$F6	v
161	\$A1	!	204	\$CC	L	247	\$F7	w
162	\$A2	"	205	\$CD	M	248	\$F8	x
163	\$A3	#	206	\$CE	N	249	\$F9	y
164	\$A4	\$	207	\$CF	O	250	\$FA	z
165	\$A5	%	208	\$D0	P	251	\$FB	{
166	\$A6	&	209	\$D1	Q	252	\$FC	|
167	\$A7	'	210	\$D2	R	253	\$FD	}
168	\$A8	(	211	\$D3	S	254	\$FE	~
						255	\$FF	DEL

APPENDIX E

MISCELLANEOUS NOTES

The following is a table of 'BYTE VALUES' that can be used to modify the address and data marks in the internal NIBBLES AWAY || read/write routines which are use in the Track/Sector Editor. These 'BYTE VALUES' should be entered into the GLOBAL modifier. The current value will be displayed and a new one may be entered.

<u>ITEM</u>	<u>DOS 3.2</u>	<u>DOS 3.3</u>
READ ADDR MARK 1	\$64D3	\$6CF0
READ ADDR MARK 2	\$6425	\$6CFA
READ ADDR MARK 3	\$642E	\$6CCF
READ CLOSE MARK 1	\$6417	\$6C34
READ CLOSE MARK 2	\$6419	\$6C3E
READ DATA MARK 1	\$64AD	\$6D42
READ DATA MARK 2	\$6467	\$6D54
READ DATA MARK 3	\$6468	\$6D59
READ CLOSE MARK 1	\$64F3	\$6C90
READ CLOSE MARK 2	\$64C5	\$6C9A
WRITE DATA MARK 1	\$6536	\$6DF6
WRITE DATA MARK 2	\$653D	\$6DFD
WRITE DATA MARK 3	\$6538	\$6DF8
WRITE CLOSE MARK 1	\$6576	\$6D36
WRITE CLOSE MARK 2	\$6546	\$6D06

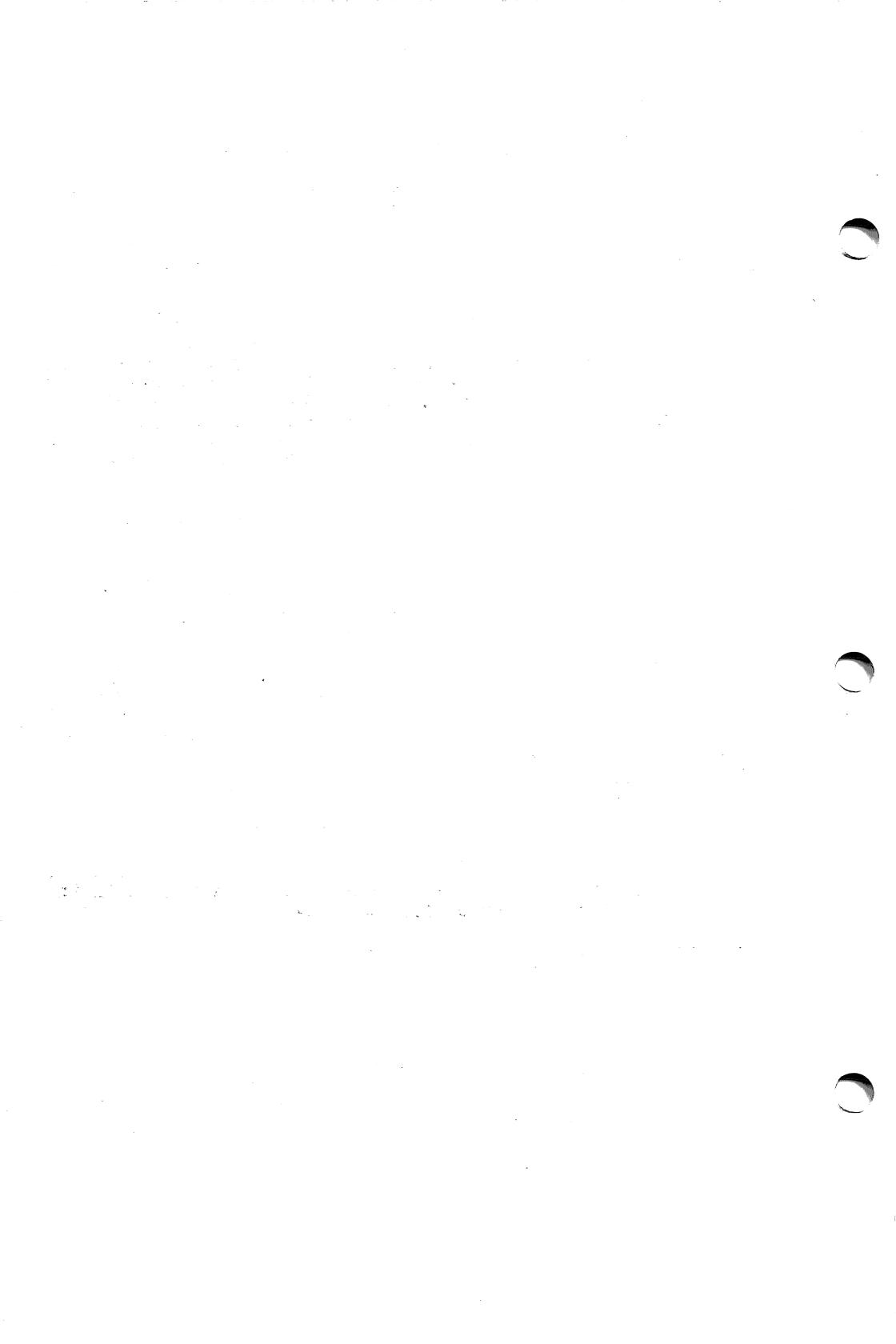


APPENDIX F

CONVERSION CHART

The following is a chart to convert LS parameters to their equivalent NIBBLES AWAY][parameters.

<u>LS PARM</u>	<u>NIBBLES AWAY][PARM</u>
44,45,46,47	Enter values seperated by spaces into BACKUP modifier after answering 'Y' to the 'USE ADDRESS MARK' prompt.
81,82,83,84	Enter values seperated by spaces into BACKUP modifier after andwering 'Y' to the 'USE INSERT MARK' prompt.
1B	'DATA MAX'
1D	'DATA MIN'
1E	'FIND MAX'
21	'SYNC SIZ' (Add \$08 for use in NIBBLES AWAY][)
2C	'FIX AMNT'
2D	'PTR SLOT'
2E	'LF VALUE' (Use \$0A for line feeds, or \$00 for none.)
34	'GAPBYTE1'
35	'GAPBYTE2' (Add \$01 to the value before entering.)
36	Select 'Y' for 'USE NIBBLE COUNT' prompt in BACKUP modifier.
37	'TOLERANCE'
4C	Use address mark of 'D5 AA 96' for 3.3 disks. 'D5 AA B5' for 3.2 disks.
53	Answer 'Y' to 'OVERRIDE STANDARDIZER' prompt in BACKUP modifier.



APPENDIX G

USAGE OF PARAMETER SHEETS

Listed on our parameter sheets are the parameters to change to back-up certain pieces of software which require more than the default values. If a number is listed in the right-hand column, it corresponds to the number of the Auto-Load file which will perform the listed function. To use the Auto-Load files, see chapter 6 in this manual.

To use the parameters listed change the parameters listed under 'PARAMETERS TO CHANGE' and then copy the range of tracks specified under COPY TRACKS. If 'BY' is listed, this should be entered as the 'TRACK INCREMENT', if it is not listed, the default value of 01 should be used. Parameters which are assigned values can be accessed under the CONTROL parameter modifier. The parameters 'Addr' and 'Ins' listed below should be entered under 'ADDRESS MARK' and 'INSERT MARK', respectively, in the BACKUP modifier.

When the word SECTMOD appears it means that a sector is to be changed using THE Track/Sector Editor. The destination disk should be placed into drive 1, then perform the changes listed. The command format is:

SECTMOD [F=NN,C=XX,S=YY,T=ZZ] / Change address A1 from A2 to A3

The meaning of NN,XX,YY,ZZ,A1,A2 and A3 are explained below:
NN---This will be either 13 or 16, and represents the disk format to be used, this should be set by selecting the 'O' option in the TSE and then pressing 'F' until the proper format is shown in inverse.
XX---This will be either ON or OFF and should be set using the checksum option on the options page, as above ('C' to toggle).
YY---This is the sector to be read in.
ZZ---This is the track to be read in.

After setting these options, use the 'R' option to read the given sector into the buffer. Then change the information in the sector following the convention listed below:

A1---This is the location to be changed in the buffer.
A2---This is the old value.
A3---This is the new value.

If multiple changes are listed, they should be performed in sequence.

After making changes to a sector, it should be written back out to the disk with the 'W' option.

Below is an example of a parameter listing and how to go about entering it into NIBBLES AWAY][.

The parameter would be listed like this:

John Doe Software Inc:

```
ABC Programname ---- 0-A.....Addr=D5 AA 96
                      B-18 by 1.5.....Ins=DE AA EB, SYNC SIZ=0A
                      19.5-21.5.....FIND MAX=25
                      SECTMOD [F=16,C=OFF,T=01,S=05]
                        Change address 23 from 14 to 76
                        Change address 56 from 34 to 9A
                      SECTMOD [F=16,C=OFF,T=02,S=0F]
                        Change address 10 from 47 to 48
```

- To perform this parameter, we must do the following steps:
1. The 'Addr' must be entered by going into the 'BACKUP' modifier. To do this you press 'M' for modify, then 'B' for backup. NIBBLES AWAY [then asks if you would like to 'USE ADDRESS MARK'. You should answer 'Y', then you will be prompted to enter the address mark. Enter it as shown, in this case type 'D5 AA 96' and the RETURN to enter the value. Since we are not entering any other parameters on this page we can press return for all of the rest of the questions on this page. From the MODIFIER menu, we can press 'Q' to go back to the main menu. Since no other changes are listed to the right side of the first line in our parameter, we can proceed to copy the tracks.
 2. We select 'N' from the main menu to enter the backup system. Then we should select 'Y' since we wish to change the starting and ending track values listed on the screen. By pressing return for the values prior to the starting track parameter, their values will not change. We should now enter in the starting track listed, in this case it is zero. Then we press return and enter the ending track, then press return. Entering return for the rest of the values will leave them as they are. Then we are prompted to insert our original and duplicate diskettes into their respective drives and press a key. This will cause the first line of our parameter to execute.
 3. The next step lists some changes on the right hand side, so we must do these first. The first is an insert mark, which is done through the BACKUP modifier. We enter this as we did above, by pressing 'M' and then 'B'. We are now again asked if we wish to enter an address mark, and our previous address mark is still showing. Since the parameter does not say to remove the address mark, we should leave it as is. Pressing return will select the default value of 'Y' and move us to the line where we can enter an address mark. Pressing return again will move us to the next question and leave the address mark unchanged. The next question asks if we wish to use an insert mark. We should answer 'Y' to this question, and then enter the insert mark as shown in the parameter, 'DE AA EB', and then press return.
 4. After this we answer with a return to the rest of the questions on this page, which returns us to the MODIFIERS menu. The next item to change is a name with a value equated to it. Any item of this type is found in the

CONTROL modifier menu. We can select this menu by typing 'C' from the MODIFIERS menu. Two columns of names will be shown on the screen with our parameter, SYNC SIZ, shown in the second column. We can use the left and right arrow keys to move the cursor so that it is positioned next to the parameter we desire. Pressing the space bar will then prompt for a new value to be entered, in our case we wish to enter a '0A'. Pressing return will place the new value into the list, and we can press 'Q' to return to then MODIFIERS menu, and since no more changes are listed to the right, we can press 'Q' again to return to the main menu.

5. Now we want to press 'N' to enter the backup system, and enter 'Y' to change the track locations listed. We move down as shown above, and enter 'B' as the starting track, '18' as the ending track, and '1.5' as the track increment. We then enter return for the rest of the values and press space to start this section of the backup.
6. For the next line, we must change an item which is on the CONTROL modifiers menu. To do this we enter 'M' and then 'C' as we did above. We then move the cursor to 'FIND MAX' in the right hand column, press space to enter a new value, and type in '25' followed by a return. Then we press 'Q' twice to get back to the main menu.
7. Then we use the 'N' option to enter the backup system, and enter the starting and ending track locations as before, noting that the track increment has automatically gone back to 1, which is what we want since none is specified in the current line of our parameter. We answer all of the rest of the questions, and then press space to complete this portion of the parameter.
8. Now we begin the SECTORMODS. To do this we must first remove both disk from their drives, and then place the duplicate disk into drive 1. Then we enter the sector editor to begin. The first item listed is at track 01, sector 05. To set this we must select 'T', which will prompt for a track, where we enter 01 and return, and then we select 'S', which prompts for a sector, and enter 05 and return. Now we press 'O' to enter the options page. The format listed on the screen will be 16, the same as the one that we want, but the checksum will be on, and we want it off. To change this we simply press 'C' and the value will toggle to 'OFF'. Now we press return to get back to the sector editor. At this point we press 'R' to read the sector from the disk into the screen buffer. The disk may make a few noises, but in a few seconds the data displayed should change and the disk drive will go off.
9. To change address 23 we must move the cursor to that position, in this case we would have to move down 2 locations with the 'M' key (the I,J,K, and M keys move the cursor in the standard control diamond), and over three locations with the 'K' key (remember, the leftmost position is 0, not 1). The value under the cursor should now be as listed in the parameter, in this case a 14. To change this we press the space bar, and type in the new value, in our case it would be a 76, and then press return to enter the

value. Now we have another change to make to this same sector, so we move the cursor to location 56, and change the 34 that should currently be there to a 9A. Now that all of the changes to this sector have been made, we can write the sector back to the disk with the 'W' command.

10. The second SECTMOD listed uses a different track and sector location so we must set these new values to perform the last step of this parameter. We set the track value to 02 and the sector value to 0F, and then check to see that the format is still set to 16, and the checksum is still off. We then read the sector with the 'R' option, and move the cursor to location 10. Here we change the 47 which should be there to a 48. Now we can write the sector back to the disk with the 'W' command.

At this point we have completed the backup, and the disk in drive 1 should be a working back-up of your original disk. As in this example, all parameters should be performed from top to bottom, exactly as shown.

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