



**ALTOS DIAGNOSTIC EXECUTIVE**

**VERSION 2.6F**

**MARCH 10, 1982**

**Altos Computer Systems  
World Headquarters  
2360 Bering Drive  
San Jose, CA 95131  
U.S.A.  
(408) 946-6700  
Telex: 171562 ALTOS SNJ**

**Altos Manual Part Number: 690-11493-002**

**Copyright 1982**

## TABLE OF CONTENTS

1.	Altos Diagnostic Executive (ADX) Version 2.6F .....	1
1.1	Diagnostic Command Categories .....	1
1.1.1	SETUP/FORMAT/COPY UTILITIES .....	2
1.2	ADXSETUP Utility .....	2
1.3	FLPYFORM Utility .....	4
1.4	BOOTCOPY Utility -- One Floppy Disk Drive .....	6
1.5	FLPY Utility .....	7
1.6	System and Floppy Drive Tests .....	9
1.7	CPUTST85 .....	9
1.8	FLPYTEST Utility .....	10
1.9	PRNTEST .....	12
1.10	MEMTEST .....	12
1.10.1	Hard Disk Functions/Tests .....	13
1.10.2	Hard Disk (8") Test Facility, V3.7 .....	14
1.10.2.1	Format Disk Drive .....	14
1.10.2.2	Verify Addresses for All Sectors on Disk .....	15
1.10.2.3	Seek Test with Optional Verify .....	16
1.10.2.4	Write Entire Disk .....	16
1.10.2.5	Read Entire Disk .....	17
1.10.2.6	Set Flag Byte for a Specific Sector .....	19
1.10.2.7	Hard Disk Read/Write Error Test .....	20
1.10.2.8	Miscellaneous Functions .....	22
1.11	HARDS8 .....	23
1.11.1	HRDINIT8 .....	23
1.11.2	ALLOC .....	24

# ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F

## 1. ALTOS DIAGNOSTIC EXECUTIVE (ADX) VERSION 2.6F

Included with your system is the Altos Diagnostic Executive (ADX) disk, version 2.6F. This version is to be used only with ACS 8000-10, ACS 8000-12, ACS 8000-14, ACS 8000-15 systems. The disk is serialized and comes in double density. After powering on the system, you will see the following display:

```
ALTOS COMPUTER SYSTEMS
Monitor Version 6.05
```

Press any key to interrupt Boot operation

Press any key within two seconds and the following display will come on the screen:

```
Enter 1 to Boot from Hard Disk
Enter 2 to Boot from Floppy Disk
Enter 3 to Boot from Tape Unit
Enter 4 to Boot from Diagnostics
```

Place the diagnostic disk into the drive and select Option 2. The screen will display the following:

```
2
Booting diagnostics from Floppy Disk...
```

```
ALTOS ADX 2.00
ALTOS DIAGNOSTIC MONITOR VERS. 2.6
```

### \*\*\*DIAGNOSTIC COMMAND DIRECTORY\*\*\*

FLPYFORM	FLPYTEST	ADXSETUP	BOOTCOPY
PRNTEST	MEMTEST	FLPY	CPUTST85
HRDINIT8	ALLOC	HARDS8	

REQUEST:

Altos recommends that you make a backup copy of the diagnostic disk and use that copy to perform all diagnostic operations. The original should be stored in a safe place. To make a backup copy, you will need to use FLPYFORM and BOOTCOPY utilities of ADX and several utilities of CP/M or MP/M operating system. Refer to your operating system guide for making backup copies.

### 1.1 Diagnostic Command Categories

The utilities and tests of the command directory can be broken down into three categories and are described in subsequent subsections. The prompts that will be displayed and the required responses are also given. The three categories are given below:

# ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F

## 1.1 Diagnostic Command Categories (cont.)

1. SETUP/FORMAT/COPY UTILITIES
2. COMPUTER AND FLOPPY DRIVE TESTS
3. HARD DISK FUNCTIONS/TESTS

### 1.1.1 SETUP/FORMAT/COPY UTILITIES

The utilities given below are designed for your computer system.

ADXSETUP            FLPYFORM            BOOTCOPY            FLPY

The above utilities are most widely used by the end-user.

### 1.2 ADXSETUP Utility

This utility is used to specify baud rates for the console terminal, printer and auxiliary port. You should specify the default density for the floppy drives. After the screen displays the command menu, select ADXSETUP as follows:

REQUEST: ADXSETUP            <CR>

The screen will display the following:

```
ALTOS COMPUTER SYSTEMS
BOOT SETUP PROGRAM, VERSION
SELECT BAUD RATE FROM THE FOLLOWING LIST FOR CONSOLE #1
```

```
0  DON'T CHANGE CONSOLE BAUD RATE
1  110 BAUD
2  300 BAUD
3  600 BAUD
4  1200 BAUD
5  2400 BAUD
6  4800 BAUD
7  9600 BAUD
```

Select the baud rate applicable to your terminal by the list item number. The Altos system requires that console terminal #1 have a 9600 baud rate. After you have made your selection, press RETURN. You will be prompted for the baud rates for consoles #2,#3, and #4 together.

The next display will prompt you to select the baud rate for the printer as follows:

# ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F

## 1.2 ADXSETUP Utility (cont.)

**SELECT PRINTER BAUD RATE FROM THE FOLLOWING LIST**

- 0 CENTRONICS PRINTER (PARALLEL PORT)**
- 1 110 BAUD**
- 2 300 BAUD**
- 3 600 BAUD**
- 4 1200 BAUD**
- 5 2400 BAUD**
- 6 4800 BAUD**
- 7 9600 BAUD**

Select the applicable baud rate for the printer you are using with your system by list item number. Please note that if you are using a Centronics printer which is operating as a parallel device as opposed to a serial connected printer, then you will select 0. If you are using a Centronics printer that is serially connected, select the applicable baud rate. You may have to consult the User's Manual for the printer to determine this specification. Make your selection and press RETURN.

The next display is to determine the baud rate for the auxiliary port. Since this port is not presently used, select 0 and press RETURN.

You will then determine the default density mode for the floppy disk drives. The display will be as follows:

- SELECT DEFAULT MODE FOR FLOPPY DISKS,**
- 0 (SINGLE)**
  - 1 (BLOCKED DOUBLE DENSITY)**
  - 2 (UNBLOCKED DOUBLE DENSITY)**

Normally you would select Option 1 (blocked double density) since it allows more storage space. Make note of the option you do select as you will want to thereafter format all your disks in that density. If you wish to change the disk drive density mode you will have to run ADXSETUP again.

Blocked double density means that the default mode of the disk is 512 byte sectors. The operating system will set the computer hardware to initialize to the default density depending on this selection. This selection effects the diagnostic disk on boot and any other disk you might insert while performing a diagnostic operation and it does affect all floppy disk drives. Make your selection and press RETURN. If you make an error and select any number other than 0,1, or 2, you will receive an error message and be asked to select again.

The next display will be for determining whether you have a single- or double- sided floppy disk:

- SELECT SINGLE OR DOUBLE HEADED DISKS, 1 (SINGLE), 2 (DOUBLE)**

## ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F

### 1.2 ADXSETUP Utility (cont.)

Select Option 1. The screen will display the following:

**PLACE DISK WITH BOOT TO BE UPDATED IN EITHER DRIVE A:  
OR DRIVE B: REMOVE DIAGNOSTIC DISK IF NECESSARY  
REPLY WITH DRIVE LETTER ("A" OR "B") WHEN READY TO  
PROCEED**

If you are updating the diagnostic disk you are presently using, enter the letter A and press RETURN. If you have another copy of the diagnostic disk and wish to update that disk, remove the diagnostic disk presently in use and place the disk to be updated in the drive and press RETURN. The screen will display the following:

**ADX BOOT SECTOR SUCCESSFULLY UPDATED  
REPLACE DIAGNOSTIC DISK IN DRIVE A:  
HIT <CR> WHEN READY**

If the diagnostic disk you updated is not the diagnostic disk you are using, place that diagnostic disk in drive A and press RETURN.

### 1.3 FLPYFORM Utility

This command allows the user to (1) format floppy disks prior to using them for the first time, or (2) reformat a disk that has been previously formatted. Note that anytime you format a floppy disk you erase all data on that disk. You will be able to format floppy disks for either single, blocked (512 byte sectors) double density, or unblocked (128 byte sectors) double density, and perform formatting on any logical drive A,B,C, or D. You must refer to your ADXSETUP routine and the density mode you established for the floppy drive when formatting a blank diskette. Be extremely careful that you do not accidentally format the diagnostic disk. To execute FLPYFORM, follow the procedure below.

Insert the diagnostic disk in the drive. Press the reset button on the front panel. Select FLPYFORM as follows:

**REQUEST: FLPYFORM <CR>**

**ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F**

**1.3 FLPYFORM Utility (cont.)**

The screen will display the following:

**...ALTOS FLOPPY DISK FORMAT ROUTINE...  
VERSION 2.00**

- 1. STANDARD SINGLE DENSITY FORMAT**
- 2. DOUBLE DENSITY FORMAT FOR CP/M AND DIAGNOSTIC DISKS**
- 3. DOUBLE DENSITY FORMAT FOR MP/M**
- 4. DOUBLE DENSITY WITH 512 BYTE SECTORS FOR CP/M AND MP/M**
- 5. END THIS PROGRAM**

**SELECT FORMAT OPTION BY NUMBER**

Again, you must know the drive density you selected during ADXSETUP and select appropriate option by list item number; press RETURN. The screen will display the following:

**PLACE DISK TO BE FORMATTED IN AVAILABLE DRIVE  
REMOVE DIAGNOSTIC DISK IF NECESSARY  
WHEN READY TO PROCEED  
REPLY WITH DRIVE LETTER:**

Insert the blank disk into the drive; close the loading door, enter the drive designation on the terminal and press RETURN. Your disk is now being formatted. When the task is complete, the screen will display the following:

**DISK IN < > HAS BEEN SUCCESSFULLY FORMATTED**

**...ALTOS FLOPPY DISK FORMAT ROUTINE...  
VERSION 1.10**

- 1. STANDARD SINGLE DENSITY FORMAT**
- 2. DOUBLE DENSITY FORMAT FOR CP/M AND DIAGNOSTIC DISKS**
- 3. DOUBLE DENSITY FORMAT FOR MP/M**
- 4. DOUBLE DENSITY FORMAT WITH 512 BYTE SECTORS FOR CP/M AND MP/M**
- 5. END THIS PROGRAM**

**SELECT FORMAT OPTION BY NUMBER**

To end this program, select Option 5 and press RETURN. The next prompt will take you back to the diagnostic menu:

**REPLACE DIAGNOSTIC DISK IN DRIVE A:  
HIT <CR> WHEN READY**

**1.4 BOOTCOPY Utility--One Floppy Disk Drive**

The BOOTCOPY utility is designed for systems that have only one floppy disk drive. However, this utility will work just as well on systems with two or more floppy disk drives. It allows you to copy the operating system tracks, 0 and 1, from a source disk such as the operating system disk, to any object disk that has been properly formatted. The object disk should be in the same density as the source disk. If you have one floppy disk drive and one or more hard disk drives, follow the procedure below.

Format a blank disk using the FLPYFORM utility discussed in subsection 2.3. This will now be the object disk. To perform the BOOTCOPY operation you will need the diagnostic disk, a source disk and the object disk.

Insert the diagnostic disk into drive A. Select BOOTCOPY as follows:

**REQUEST: BOOTCOPY <CR>**

The screen will display the following:

**BOOTCOPY VERSION 2.00**

**SOURCE ON A:  
TYPE <CR>**

When this prompt is given, remove the diagnostic disk and place the source disk in the drive; press RETURN. You will then be prompted to remove the source disk from drive A and insert the object disk as follows:

**OBJECT ON A:  
TYPE <CR> <CR>**

**BOOTCOPY COMPLETE  
INSERT DIAGNOSTIC DISK**

**NOTE:** At this point, the object disk contains system tracks 0 and 1. It does not contain data tracks. If you wish to transfer data from the system disk onto the object disk, follow the PIP procedure outlined in the Altos Computer Systems current version of CP/M, or the Altos Computer Systems current version of MP/M copy or transfer data from the source disk to the object disks.

1.5 FLPY Utility

This utility allows the user to perform the functions listed in the submenu below. Since this utility requires that you have at least two floppy disk drives on your system, it does not apply to the ACS 8000-12 or ACS 8000-14 computer unless you have added more floppy drives. It also requires that you copy like disks to like disks. If you have a double density source disk, your object disk must also be double density. To perform this utility format the object disk using the FLPYFORM utility or list item 0 on the submenu below. Then return to the diagnostic menu. After selecting FLPY, you will see the following screen display:

...ALTOS FLOPPY DISK COPY ROUTINE...  
VERSION 2.1

Select one of the following options:

- |   |   |
|---|---|
| 0. Format disk only                           | (Formats floppy disk)   |
| 1. Copy system tracks                         | (Copies system tracks onto formatted disk)  |
| 2. Copy SINGLE density disk                   | (Copies entire disks in single density when object disk is formatted in single density) |
| 3. Copy SINGLE density disk data only         | (Copies data only onto single density disks)  |
| 4. Copy DOUBLE density disk data only         | (Copies data from double density disks to formatted double density disks)               |
| 5. Copy DOUBLE density disk                   | (Copies entire double density disk onto a formatted double density disk)                |
| 6. Copy BLOCKED DOUBLE density disk           | (Copies 512 byte sectored double density disks)   |
| 7. Copy BLOCKED DOUBLE density disk data only | (Copies data from 512 byte sectored double density disks)                               |
| 8. End this program                           |   |

1.5 FLPY Utility (cont.)

For single density disks the screen will display the following:

```
ALL TRACKS WILL BE COPIED

+SOURCE IN A
+OBJECT IN B
+TYPE <RETURN>          <CR>
```

For double density disks the screen will display the following:

```
ALL TRACKS WILL BE COPIED

WHAT KIND OF DISK ARE YOU COPYING?

1.  MP/M
2.  CP/M OR DIAGNOSTIC DISK
3.  OTHER (OR DON'T KNOW)

+SOURCE IN A
+SOURCE IN B
+TYPE <RET>          <CR>
```

Remove the diagnostic disk from drive A and insert the source disk. Insert the object disk in drive B. Press RETURN. If the source or object disk has errors or unlike densities, the following display will appear:

```
PERMANENT DISK ERROR, DRIVE DD TRACK TT SECTOR SS STATUS 10
PERMANENT SOURCE ERROR EXIT
...FUNCTION FAILED...
```

If there are no source or object disk errors the function will complete successfully and the screen will display the following:

```
+FUNCTION COMPLETE
+REPLY WITH "R" TO REPEAT OR <RET> TO END:          <CR>

INSERT DIAGNOSTIC DISK IN A:  TYPE <RET>          <CR>
```

Once the task is completed, it is a good idea to boot the new diskette or to look at the directory of the new disk to ensure that you have copied the desired information.

**1.6 System and Floppy Drive Tests**

The following tests fall under this category:

**CPUTST85                  FLPYTEST                  PRNTEST                  MEMTEST**

The end-user should not have to use these tests unless there are problems with drives, printer, memory, or the CPU PCB. Consult with your distributor.

**1.7 CPUTST85**

The following routines test various functions of the 8500 CPU board and system. To enter a test routine type the number of the test after the prompt. If the test is completed with no errors, a "NO ERRORS" message will appear and the test will continue looping (for debugging purposes) until the ESC key is pressed. Tests 4 and 5 do not print anything on the screen. Test 4 requires that the user move the CRT terminal cable to the various serial connectors and see that keys pressed on the keyboard are echoed to the screen. Test 5 requires that a test fixture be connected to the network connector and a scope check of pins 12 and 13 of IC 17C be made. Both tests 4 and 5 are terminated by pressing the ESC key.

- 0. Print this message**
- 1. Test write protect function**
- 2. Test DMA chip and DMA banking.\***
- 3. Test memory banking.\***
- 4. Run and echo test for RS232 channel (hit ESC to return)**
- 5. Test Network channel (hit ESC to return)**
- 6. Test 9511**
- 7. Return to operating system**

**Type the number of the test (0-7)**

When test 6 is run, if the AMD9511 floating point processor option is not installed, you will receive an ERROR DETECTED message. To terminate this test, press the ESC button.

\*Tests 2 and 3 will not run if your system is pinned for OASIS.

1.8 FLPYTEST Utility

This test allows the user to test all aspects of operation of the floppy disk drive. For the FLPYTEST to discriminate between media problems with the floppy disk and hardware problems, the user should use a diskette that is known to be free of errors.

After receiving the diagnostic menu on the screen select FLPYTEST as follows:

REQUEST: FLPYTEST <CR>

Have two scratch diskettes (formatted, data free) available for this test. The following will appear on the screen:

Floppy disk test and stress analysis version 2.00

\*\*\*HIT ESC TO EXIT\*\*\*

Load scratch diskettes in drive(s) to be tested  
Hit <CR> when ready to proceed

ARE DISKETTES REALLY SCRATCH?? Y OR N:

Use diskettes with 128 byte sectors.  
MODE 1 diskettes not supported.  
Enter "S" for single density, "D" for double:

Will the terminal be connected during the test?  
Enter Y or N:

If you select N, the terminal is disconnected and the test will run continuously.

STARTING WRITE/READ DATA INTEGRITY TESTS

...WRITE PHASE

..DISK 0  
Trk: <Side:> (Disk 0 is in Drive A)

..DISK 1  
Trk: <Side:> (Disk 1 is in Drive B)

...READ PHASE

..DISK 0  
Trk: <Side:>

..DISK 1  
Trk: <Side:>

1.8 FLPYTEST Utility (cont.)

Scratch diskettes should have the same default modes and should be either single-sided or double-sided. Note that if you have double-sided disk drives, you will see the side that is being tested. Between the screen displays DISK 0 and DISK 1 during the WRITE and READ operations there are pauses. during this time the system is writing to or reading from the disk. If terminal is disconnected, test will continually repeat.

Upon completion of the WRITE/READ operations, you will be given the following prompts:

**SWAP ALL DISKETTES, A: TO B:, B: TO A:, ETC.  
THEN HIT <CR> WHEN READY**

After you have swapped diskettes a second READ phase will occur; the disk that was written by drive A will be read by drive B; the disk that was written by drive B will be read by drive A. This only occurs when the system has two floppy drives so this test is not performed on systems having only one floppy disk drive.

**STARTING HEAD LOAD DELAY TESTS**

**HIT ESC TO EXIT  
<CR> TO REPEAT TEST**

During this test the system rapidly selects and de-selects the floppy disk drives for short periods. You will then see the display:

**DISK TEST COMPLETED  
DTEST ERROR SUMMARY**

**TOTAL TRACKS PASSED n (number of tracks)**

**DRIVE 0 READ 0000 ( ), WRITE 0000 ( ), REF 0000 ( )  
DRIVE 1 READ 0000 ( ), WRITE 0000 ( ), REF 0000 ( )  
DRIVE 2 READ 0000 ( ), WRITE 0000 ( ), REF 0000 ( )  
DRIVE 3 READ 0000 ( ), WRITE 0000 ( ), REF 0000 ( )  
REPLACE SYSTEM DISK IN A:, HIT <CR> WHEN READY**

The first four digits will be in hex and the second four digits will be in decimal. The numbers given will be the number of errors that were found during the test. Eventhough the test made several passes and picked up a given number it will repeat that as another error.

# ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F

## 1.9 PRNTEST

Select PRNTEST after the request on the diagnostic command directory. This command causes the following characters to be displayed on the terminal and to be printed on the printer when the printer is connected:

REQUEST: PRNTEST <CR>

PRINTER TEST 1.1

```
!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
```

The screen will display the characters shown above. If you have properly performed ADXSETUP, your printer will print the characters shown above, or their equivalent, on your particular printer.

## 1.10 MEMTEST

MEMTEST command allows the user to test all but a small portion of system RAM for possible errors. Since the program itself occupies some memory, that portion cannot be tested. After inserting the diagnostic disk into drive A and booting up the system, you will see the diagnostic menu. Select MEMTEST as follows:

REQUEST: MEMTEST <CR>

The screen will display the following:

ALTOS BOOT MEMORY TEST VERSION 1.1

VALID TEST MEMORY RANGE (HEX) 0000 - F8FF

SELECT MEMORY BANK TO BE TESTED

You will be prompted four times to select memory bank. If you wish to select only one memory bank, select bank, 0,1,2, or 3, press RETURN. Press return to bypass subsequent memory bank select option. You will now receive the following screen display:

STARTING ADDRESS (HEX)?  
ENDING ADDRESS (HEX)?

**1.10 MEMTEST (cont.)**

Refer to section 1, figure 1-5, matrix map for memory address selections. Memory test range is given in the screen display above. Select the starting and ending addresses and press RETURN after each selection.

Memory testing will now begin:

The screen will display .,;! as it tests. These four characters indicate that one pass has been completed. You should allow the test to make eight passes.

If you wish to stop the test without terminating it, and see the results, press S (STOP) on the keyboard and the results will be displayed. If you wish to terminate the test, see the results and select another memory bank, press R (RESTART) on the keyboard.

To go back to the diagnostic menu, press the RESET button on the computer.

**1.10.1 Hard Disk Functions/Tests (HARDS8)**

The hard disk test used on the computer system is called HARDS8. This test consists of twelve tests or functions. In order to run HARDS8 simply enter the command following:

**REQUEST: HARDS8 (Press RETURN)**

The screen will display the following:

```
***Hard Disk (8") Test Facility V3.4***
Specify Configuration of HARD DISK to be tested.
Default Configuration is:
Drive Number           : 1
Cylinders per Drive    :256
Number of Heads        : 4
Sector Size            :512
Press RETURN to bypass a selection.
Enter Drive Number     ("1" or "2")      <CR>
```

See section 1.6 Operating Guide for default values for your ACS 8000-12 or ACS 8000-14.

The screen will display the following:

```
***Hard Disk (8") Test Facility V3.4***

1. Format Disk Drive
2. Verify Addresses for all Sectors on Disk
3. Seek Test with Optional Verify
4. Write entire Disk
5. Read entire Disk
```

**1.10.1 Hard Disk Functions/Tests (cont.)**

6. Set Flag Byte for a Specific Sector
7. Hard Disk Read/Write Error Test
8. Miscellaneous Functions
9. Terminate this Test Series

Select required function by number:

**1.10.2 Hard Disk (8") Test Facility, V3.7**

In the following subsections each of the facility and test of HARDS8 will be discussed in detail.

**1.10.2.1 Format Disk Drive**

This function formats each sector on the hard disk drive. This function will erase flag byte indications of bad sectors (obtained from the Shugart Error Map provided with each computer and all data). Sectors previously marked as bad will now be marked as valid. Unless these sectors are re-marked as bad sectors, data written on these bad sectors will be lost.

**WARNING: THIS HARDTTEST FUNCTION CHANGES DATA  
ON THE HARD DISK AND MAY CAUSE LOSS OF USER DATA**

Once you have selected test 1 and pressed RETURN, the screen will display the following:

**\*\*\*DO NOT RUN THIS TEST WITHOUT PERMISSION FROM ALTOS CUSTOMER  
SERVICE\*\*\* CALL (408) 946-6700**

Do you want to continue?

Password: SOTLA

If you wish to continue, enter Y and press RETURN. You will return to the hard test selection menu. If you enter N and press RETURN, you will return to the hard test selection menu. The reason for this is that a "password" is required to run the hard disk format function. You can obtain this password from your distributor or from Altos Customer Service. Before that "password" is given to you, an attempt will be made to determine whether a format of the hard disk is necessary. Since this function does destroy user data this safeguard was made a part of the function.

If you have obtained the password, enter that password, and pressed return, the screen will display the following:

**\*\*\*THIS TEST WILL ERASE FILES ON THE HARD DISK\*\*\***

Do you want to continue? Y or N:

**1.10.2.1 Format Disk Drive (cont.)**

If you have determined that this is indeed the function you wish to perform, respond with Y and press RETURN. The format process will begin and you will see a count from 0 to 255 appear on the screen as each cylinder is formatted. Once complete the screen will return to the hard disk menu and you will be prompted to make a selection.

**REMEMBER:** You have formatted the disk but you have not flagged any bad sectors, nor have you allocated dummy files to those bad sectors. This should be done before any attempt is made to transfer user data to the hard disk. See subsection 1.10.2.6.

**1.10.2.2 Verify Addresses for All Sectors on Disk**

This is an address check. It is non-destructive to user data. This test will read every sector on the hard disk and check the first three bytes. These bytes contain the cylinder, head/drive and sector numbers.

If you wish to run this test, select 2 and press RETURN. The screen will display the following:

**PRESS ANY KEY WHEN "READY" TO START THIS TEST**

Once any key is selected a return is automatically generated and the test begins. You will see a count displayed at the bottom of the screen as the tracks are checked. Any bad sectors encountered which have been flagged as being bad will cause a BAD SECTOR display. Any bad sectors encountered which have not been flagged earlier as bad will cause a CRC error display. Once completed, the screen will display the hard disk test menu again with the following notation at the bottom:

**...ADDRESS CHECK COMPLETED**

You will be prompted to select which hard disk test or function you wish to perform.

**1.10.2.3 Seek Test with Optional Verify**

This test will seek between two operator specified cylinders and, at the operator's request, verify the addresses at head 0, sector 0 of each specified cylinder.

Select test 3 and press RETURN. The screen will display the following:

**PRESS ANY KEY WHEN "READY" TO START THIS TEST**

Press any key, return is automatically generated and the screen will display:

**ENTER "SEEK" FIRST CYLINDER NUMBER:**

Refer back to the beginning portion of HARDS8 where you specified how many cylinders you had on your system. You are going to do a seek operation between two of those cylinders. You can seek between cylinder 0 and cylinder 255 at the extreme, or cylinder 0 and cylinder 1 at minimum.

Select first cylinder number, press RETURN, select ending cylinder number and press RETURN again. The screen will display the following:

**DO YOU WANT TEST VERIFICATION OF THE CYLINDER NUMBERS? (Y OR N)**

To the operator it doesn't appear to make any difference whether Y or N is selected, the cylinder numbers will be displayed as the seek is performed, but if Y is selected the logic of the system reads data for each cylinder. With Verification selected, a BAD SECTOR display will be generated if any bad sector that has been flagged is encountered. If the head 0 and sector 0 address of the specified cylinder has not been previously flagged as a bad sector, and the I.D. block for that sector is bad, a RECORD NOT FOUND display will be generated. The system may not be performing the seek operation properly. To verify that SEEK is performing properly, select another cylinder.

**1.10.2.4 Write Entire Disk**

This function will write a two-byte character to the data block for each track of the disk. This character can be selected by the operator.

**WARNING: THIS HARDTTEST FUNCTION CHANGES DATA ON THE HARD DISK AND MAY CAUSE LOSS OF USER DATA**

To perform the write test, select test 4 and press RETURN. The warning that this test will destroy files on the hard disk will appear and you will be asked if you wish to continue. If you do, enter Y and press RETURN. You will now be asked if you wish to write a specific pattern. If you have a

**1.10.2.4 Write Entire Disk (cont.)**

specific pattern which you prefer to use then enter Y and press RETURN. You will be prompted to select the pattern you wish to use. If you have no specific pattern, enter N and press RETURN. The system will then write its own character, E5H, on the disk. You will see the count, track by track, as it writes to the disk.

There are four different situations that could occur and the error display will vary depending on which situation does occur:

1. Attempting to write to a sector which has been flagged earlier as being bad will cause a BAD SECTOR display.
2. While attempting to write to a sector which has not been flagged earlier as being bad, a sector is encountered in which the ID Block CRC Bytes are bad. This will cause a CRC error display.
3. While attempting to write to a sector which has not been flagged earlier as being bad, but the I.D. block is bad. a RECORD NOT FOUND display will be generated regardless of the condition of the CRC portion of that I.D. block.
4. If a sector is encountered in which the sector I.D. block is good but the data block is bad, no error display will be generated. If a READ test were subsequently performed this error condition could be detected.

**1.10.2.5 Read Entire Disk**

This function will read each sector of each track of the hard disk. This is done using a memory buffer area. Before reading, a sector memory buffer has FFH written into it and as each sector is read into this buffer the contents of that sector write over the FFH that is located there. After each sector is read FFH is again written to the memory buffer and the next sector will again write over the FFH. This "flushing" of the memory buffer is done to ensure that each sector's contents are accurately read.

Select test 4 and press RETURN. A menu of display options will be presented as follows:

**1.10.2.5 Read Entire Disk (cont.)**

**Hard Disk "read" display options are:**

- 1. DO NOT display data if any error.**
- 2. Display data only if a STATUS error.**
- 3. Display data only if a COMPARE error.**
- 4. Display data if a STATUS or COMPARE error.**

**Select option by number:**

If Option #1 is selected, the test will begin, but if any status or compare errors are encountered, only the error display will be generated. The contents of the data block will not be displayed.

If Option #2 is selected, the hard disk controller will send back status errors (BAD SECTOR, RECORD NOT FOUND, CRC) when the controller is unable to locate and properly identify a sector. The data block is passed unchecked but a check is made of the CRC portion of the data block for CRC errors. The contents of any sector found in error will be displayed as well as the error message.

If Option #3 is selected, the operator is given the option of selecting a one- or two-byte character to be used for the test as follows:

**Patterns can be specified by entering:**

**1- for 256 byte pattern (hex 00....FF)**

**One- or two-byte pattern - enter pattern in binary, octal, decimal or hex**

**select pattern:**

If the operator does select a pattern to be read, it should be the same pattern as was used if a write test was performed just before this test. This check is made by having the CPU compare the contents of the data block against the operator selected pattern.

In the event that a compare error is detected, the error message will be displayed and the contents of the sector which was found in error will also be displayed. Since the data block does have a CRC area associated with it, that CRC is also checked. It is possible, but unlikely, that the data could be compared favorably, but the CRC bits be found in error. If this did occur, a CRC ERROR display would be generated.

If Option #4 is selected, the operator will again be given the opportunity to select a pattern to be used. In this case, both status and compare errors would be displayed as well as the contents of the sector found in error.

**1.10.2.6 Set Flag Byte for a Specific Sector**

This function may be done in one of two ways:

- a. The operator can select a cylinder, head and sector to be flagged;
- b. The error map data provided by Shugart can be used.

**WARNING: THIS HARDTEST FUNCTION CHANGES DATA ON THE HARD DISK AND MAY CAUSE LOSS OF USER DATA**

Select Test #6 and press RETURN. The display will be as follows:

**PRESS ANY KEY WHEN "READY" TO START THIS TEST**

The next display will be:

**Hard Disk 'Flag Bad Sector' options are:**

1. Disk Error Map
2. Cylinder, Head, Sector

Make your selection and press RETURN. If you select Option 1, you will be prompted to enter TRK, HD, byte count and length (bits). Once these entries have been made and RETURN has been pressed, the bad sector range will be displayed as follows:

**Bad Sector Range: Cylinder = n: Head = n: Sector(s) = n**

**Do you want to continue this test? Y or N**

If you enter Y, you will be prompted to begin entering data for the next bad sector to be flagged. If you enter N and press RETURN, you will return to the hard disk menu and the display.

**...  
BAD SECTORS HAVE BEEN FLAGGED**

will appear.

Please note that this function sets flags for bad sectors but it does not allocate dummy files to those sectors which you have flagged. Refer to Test #8 for the procedure to use for allocating dummy files to sectors which you have flagged using this function.

1.10.2.7 Hard Disk Read/Write Error Test

This function tests all aspects of the disk by writing and reading a variety of data patterns to the entire disk. The display will show all hard errors (bad sectors) and CRC errors. To terminate the test, press ESC. The program will then go back and erase the entire disk and automatically flag those sectors which is identified as being bad.

**WARNING: THIS HARDTEST FUNCTION CHANGES DATA ON THE HARD DISK AND MAY CAUSE LOSS OF USER DATA**

Select Test #7 and press RETURN. The display will inform you that the test will erase files on the hard disk and ask if you want to continue (Y or N). Enter Y, press RETURN.

**PRESS ANY KEY WHEN "READY" TO START**

Your selection of options on how you want the errors displayed are as follows:

**Hard Disk "reliability" display options:**

1. **Continuous Display on Terminal**  
-Used with terminals with cursor control such as the ADM31, Televideo 912. Not all cursor control terminals will operate with Option 1.
2. **Display Error Summary at the End of each Pass**  
-For use with any terminal.
3. **Display Error Summary only at the End of the Test**  
-For use when no terminal is attached.

**Select option by number:**

When you have selected an option, you will be asked:

**DO YOU WANT TO DISPLAY DATA IF A CRC ERROR? Y OR N <CR>**

**DO YOU WANT TO "WRITE" SPECIFIC PATTERNS? Y OR N**

If you respond Y to writing specific patterns, you will see:

1.10.2.7 Hard Disk Read/Write Error Test (cont.)

As many as four (4) patterns may be specified, as follows:

Enter one- or two-byte pattern in binary, octal, decimal, or hex

Press RETURN to bypass a pattern selection

Select Pattern #1:

Assuming you want to write E5H on the disk, enter E5H here and press RETURN. Now press RETURN for the other three options. The display will now show all four patterns which are going to be used in the test as follows:

Pattern #1 revisited: E5E5H  
Pattern #2 revisited: 5555H  
Pattern #3 revisited: AAAAH  
Pattern #4 revisited: FFFFH

PRESS ANY KEY WHEN "READY" TO CONTINUE THIS TEST

You may specify patterns for all four tests if you wish. If, for any reason, you choose not to specify a pattern to be read in Pattern #1, 0000H will be used by the system.

Once you press any key, the screen will fill with the display which is used for this test. You will also hear the hard disk as the heads seek the patterns to the disk.

Notice that all patterns are shown, hard errors and soft errors are separated into individual categories. If you have bad sectors on your hard disk, you will be able to see the computer record the bad sectors as it encounters them. The counter also increments as it writes from track to track. It will take quite some time to run this test in its entirety. It is a good idea to let the test run overnight, if possible. When you decide to terminate the test you must press ESC. The test will complete the pass it is presently performing.

This is a good place to define "soft" and "hard" errors. An error is considered to be a soft error when one attempt has been made, unsuccessfully, to read data. These tests will make three attempts to read data.

A RECAL is made between each attempt. If the read is successful on the second or third attempt then that sector had a soft error. A certain amount of soft errors is acceptable as that data is recoverable. If, however, the data is not read after three attempts, a hard error is declared flagged and allocated.

**1.10.2.7 Hard Disk Read/Write Error Test (cont.)**

Use this test to map bad hard disk sectors that test #6 has located. Also run either HARD8 if you have installed CP/M; ALLOC, if you have installed MP/M; or INITDIS, if you have installed OASIS, after completing this test.

The Hard Disk Read/Write Error Test first queries whether to display or quiet the running error table. Then it runs the error test. At the test completion, it queries whether to print the test results. It responds to the printing query selection by displaying a final Error Summary Table of the entire test. Hard error and soft error counts are not adjusted in this final summary table.

During the test, if the program finds a soft error three consecutive times, it will declare it to be a hard error. The program reduces the soft error count by three every time it increments the hard error count by one, on the running error table.

The final program prompt screen prompts you to PRESS ANY KEY to flag all the bad sectors and erase the disk.

The program returns to the ADX COMMAND DIRECTORY at its completion. Proceed to run either HARDINIT8, ALLOC, or INITDIS; depending upon the operating system you have installed on your computer system.

**1.10.2.8 Miscellaneous Functions**

At present, this program provides these functions:

1. Select disk error "status" display Option
2. Display a Sector
3. Terminate this series of tests

**1.10.2.8 Miscellaneous Functions**

At present this selection provides three unique functions:

1. Select Disk Error "status" Display Option
2. Display a Sector
3. Terminate this Series of Tests

Option 1 allows you to alter the way displays are provided on other hard disk tests.

**1.10.2.8 Miscellaneous Functions (cont.)**

Option 2 allows you to display a sector on the screen. In ASCII on the right side of the screen, in HEX on the left side.

- a. Option 1 - Select the option by number and press RETURN. The display will be as follows:

**DO YOU WANT THE DISK ERROR "STATUS" MESSAGE DISPLAYED?  
(Y OR N)**

If you select Y, then no change will be made to the way in which error messages are displayed. If you select N, then some of the tests will have the display deleted entirely while others will be modified such that no amplifying data on any error encountered will be displayed.

- b. Option 2 - Select Option 3 and press RETURN. The display will be as follows:

**\* Display Hard Disk Sector \***

**Enter Cylinder Number:           (select and press RETURN)  
Enter Head Number:               (select and press RETURN)  
Enter Sector Number:             (select and press RETURN)**

- c. Option 3 - Terminate this series of tests.

The contents of that sector will be displayed. In HEX on the left side of the screen, and in ASCII on the right side.

To return to Test #8, press any key.

To terminate Test #8, select Option #3 and press RETURN. The display will return to the hard disk test menu.

**1.11     HRDINIT8 and ALLOC:**

The following two utilities "HRDINIT8" and "ALLOC" are used to manage bad sectors on the hard disks and one of them should be run depending on which version of the operating system you are using. If you are going to use MP/M 2.1 then run "HRDINIT8", otherwise run "ALLOC". The two utilities should be run only after you run "HARDS8" function 7. Function 7 of HARDS8 flags all bad sectors. Sectors can also be flagged bad by using function 6 of HARDS8.

**1.11.1 HRDINIT8:**

If you are installing MPM V2.1 on your system with a hard disk then you should run this program.

Boot the system from an ADX disk with HRDINIT8 as a menu choice and run HRDINIT8. Answer the queries from HRDINIT8 carefully.

HRDINIT8 will take about 5 minutes to erase every sector on the physical disk. If there are any bad sectors encountered, these sectors will have alternates assigned. A record of those assignments will be written to the last sector of cylinder 0, track 0 at the end of HRDINIT8. While the disk is being erased the cylinder number will be displayed on the screen.

If you have a second hard disk and you have not already initialized it, you should do so at this time. If at some later time you add a second hard disk, you can initialize it without affecting the first disk by replying "N" the first time you receive the following HRDINIT8 message:

**\*\*\* Warning disk initialization is destructive \*\*\***

**Do you want to continue, reply with "Y" OR "N"**

You will then be given the chance to initialize the second hard disk.

**1.11.2 ALLOC:**

If you are installing MPM V1.13 or CP/M 2.24F0 on your system, you should run this program.

Boot the system from an ADX disk with ALLOC as a menu choice and run ALLOC. Answer the queries from ALLOC carefully. ALLOC will take about 5 minutes to read every sector on the disk. Dummy files will be allocated under user 31 to cover the bad sectors. While the entire disk is being read the cylinder numbers will be displayed on the screen. When dummy files are assigned, the cylinder number, the head number, the bad sector number and the block which will be allocated to the dummy file will be displayed on the screen.

If you have a second hard disk and you have not already initialized it, you should do so at this time. If at a later time you add a second hard disk, you can allocate dummy files without affecting the first hard disk by replying "N" the first time you receive the following message:

**ALTOS DIAGNOSTIC EXECUTIVE VERSION 2.6F**

**Do you want to continue, (Y/N)**

You will then be given the chance to allocate dummy files  
to the second hard disk.