

**MARK 3  
PERIPHERAL INTERFACE BOARD  
DISK DIAGNOSTIC  
VERSION 3.1**

**Preliminary Documentation**

**Revision 02**

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## Section 1

### INTRODUCTION TO MARK 3 DISK DIAGNOSTIC PROGRAM

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#### 1.1 GENERAL DESCRIPTION

POINT 4 Data Corporation provides a diagnostic program for the MARK 3 Computer that verifies communications between the MARK 3 Peripheral Interface Board (PIB) and fixed disk. The program may be provided on disk with the IRIS Operating System or supplied on the stand-alone Mark 2/3/4 System Diagnostic streamer tape cartridge.

The standard MARK 3 Disk Diagnostic program can be used to verify that the PIB and peripherals are operational and to isolate problems within a system. A stop-and-loop-on-error option is provided to allow analysis of an error condition or to print the error message and continue operating. If errors are logged, they will be displayed at the end of all testing. Some tests require that additional information be entered prior to execution.

The diagnostic includes 5 options that provide comprehensive testing of the control logic and the peripherals. The tests performed by each option are described in separate sections.

Commands are entered at the terminal by typing the appropriate command character or string followed by <RETURN>. This <RETURN> is not shown unless it is the only command required or it follows a control character. When the standard diagnostics are entered for the first time, DEBUG is relocated to 60000 (octal). This allows entry to DEBUG via a menu option.

## 1.2 HARDWARE CONFIGURATION

The hardware configuration required for the operation of the MARK 3 Disk Diagnostics is as follows:

1. POINT 4 MARK 3 CPU and PIB
2. Display Terminal
3. QIC-02 Streamer Tape Unit
4. Fixed Disk Drives (refer to Appendix A for a list of drives)

## 1.3 RESTRICTIONS

1. The disk diagnostic destroys portions or all of the disk depending on the option selected. The disk should be backed up prior to running the diagnostics. The Read Verify does not destroy data and therefore a backup is not required.
2. After any option (except Read Verify) is run, the MARK 3 DISUTILITY must be used to format the disk drive.
3. Help messages are available only for the Drive Name and Entry Number prompts. Entering H at any other time will cause unpredictable results. When displaying a list of drives for the MARK 3, <CTRL-S> can be used to stop the display, <CTRL-Q> to resume the display.

## Section 2

### OPERATING PROCEDURES AND STANDARD MESSAGES

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#### 2.1 LOADING THE MARK 3 DISK DIAGNOSTIC

##### 2.1.1 LOADING FROM THE SYSTEM DIAGNOSTIC TAPE

The standard MARK 3 Disk Diagnostic may be loaded from the system diagnostic tape as follows:

1. Insert the system diagnostic tape into the streamer tape unit.
2. On the front panel, press RESET.
3. Type H; this loads the System Executive and the following messages are displayed:

```
*** POINT 4 DATA CORPORATION ***
15442 DEL AMO AVENUE, TUSTIN, CA.
PHONE NO.(714)-838-2225
*** MARK 2/3/4 SYSTEM DIAGNOSTICS - VERSION n.n ***
```

```
NUMERIC INPUT AND OUTPUT IS OCTAL
ENTER DESIRED NUMBER OF PASSES (DEFAULT=1)
```

where

n.n - current program revision number

Press <RETURN> and the following menu is displayed:

```
*** THE MAXIMUM NUMBER OF PROGRAM SELECTIONS IS 5 ***
*** SYSTEM DIAGNOSTICS ***
1 = TAPE (MARK 2/4)
2 = DISK-DISKETTE (MARK 2/4)
3 = MUX (MARK 2/3/4)
4 = MAP AND MEMORY (MARK 4)
5 = TAPE (MARK 3)
6 = DISK (MARK 3)
*** STANDARD DIAGNOSTICS ***
7 = DISK-DISKETTE-TAPE (MARK 2/4)
10 = MUX (MARK 2/3/4)
11 = MAP AND MEMORY (MARK 4)
12 = TAPE (MARK 3)
13 = DISK (MARK 3)
PRESS RETURN TO EXIT SELECTIONS
```

4. Enter selection 13 and the following message is displayed:

READING DATA

This indicates that the MARK 3 Disk Diagnostic is being loaded.

After the diagnostic is loaded, the following messages are displayed:

```
*** POINT 4 DATA CORPORATION ***
15442 DEL AMO AVENUE, TUSTIN, CA.
PHONE NO.(714)-838-2225
*** MARK 3 DISK DIAGNOSTICS - VERSION n.n ***
```

```
NUMERIC INPUT AND OUTPUT IS OCTAL-EXCEPT FOR ERROR LOG
*** DIAGNOSTIC DESTROYS EXISTING DATA-DO BACKUP ***
STOP AND LOOP ON ERROR(Y or N)
```

where

n.n - current program revision number

If Y is entered in response to the stop-and-loop-on-error query, the program will go into a loop condition after logging the error and displaying the error messages. If N is entered, the program logs the error, displays the error messages and continues.

Enter your selection to this option and the following message is displayed:

```
ENTER DESIRED NUMBER OF PASSES (DEFAULT=1)
```

Enter any octal value from 1 to 177777. The Main Menu is then displayed (refer to Section 2.2).

## 2.1.2 LOADING FROM THE IRIS OPERATING SYSTEM

The standard MARK 3 Disk Diagnostic program and DEBUG can be loaded from the IRIS Operating System by shutting down the system from the Manager's account as follows:

```
SHUTDOWN <CTRL-E>key<CTRL-E>DI.M3DK.n.n,@40000
```

where

key - password assigned to the SHUTDOWN command by the system manager (the default is X)

n.n - current program revision

A line of information is then displayed on the screen.

To enter DEBUG, enter

```
J40000
```

Once the diagnostic is executed, DEBUG will reside at 60000 instead of 40000.

To execute the diagnostic program, enter

```
J2
```

The POINT 4 messages are then displayed. Proceed to Section 2.2.

## 2.2 THE MAIN MENU

The test options are designed to do a specific test or a group of tests, depending on the option selected. These test options are selected via the Main Menu. The format of the menu is as follows:

ENTER DESIRED TEST OPTION

A = QUICK DISK TEST

B = FORMAT-VERIFY DISK

C = READ VERIFY DISK

D = WRITE-READ-COMPARE DISK

E = QUICK TEST-FORMAT-VERIFY-WRITE-READ-COMPARE DISK

F = ENTER DEBUG (RESIDES AT 60000)

To execute any option, enter the letter designator at the command prompt (>) and press <RETURN>. The test options are described in detail in Section 3.

## 2.3 STANDARD QUERY MESSAGES FOR ALL TESTS

The following query message is displayed when the diagnostic is first invoked:

STOP AND LOOP ON ERROR (Y or N)

If Y is entered, the program will go into a loop after logging the error and displaying error messages. If N is entered, the program logs the error, displays error messages and continues.

ENTER DESIRED NUMBER OF PASSES (DEFAULT=1)

Enter an octal value from 1 to 177777.

ENTER DRIVE NAME OR TABLE ENTRY NUMBER

Enter the drive name or code number. If the drive code is unknown, type H to display the list of drives supported by the MARK 3. To stop the display enter <CTRL-S>, to resume the display enter <CTRL-Q>.

The program prompts

ENTER DRIVE NUMBER (DEFAULT=0)

The valid drive numbers are 0, 1, 2.

## 2.4 STANDARD ERROR MESSAGES

### 2.4.1 DISK DRIVE STATUS REGISTER

FROM ADDRESS = nnnnnn (nnnnnn=memory or listing address where failure occurred)

EXPECTED = nnnnnn (nnnnnn=expected status)

ACTUAL = mmmmmm (mmmmmm=actual status received)

CIOB ADDRESS = nnnnnn (nnnnn=address of the disk input-output control block)

OP-CODE = nnnnnn (nnnnnn=command being executed at time of failure)

CYLINDER NUMBER = nnnnnn (nnnnnn=cylinder number at time of failure)

SURFACE NUMBER = nnnnnn (nnnnnn=surface number at time of failure)

SECTOR NUMBER = nnnnnn (nnnnnn=sector number at time of failure)

DRIVE STATUS DECODES TO:

DRIVE NOT READY  
DRIVE FAULT  
WRITE PROTECTED  
NOT ON CYLINDER  
DRIVE NOT SELECTED  
SEEK ERROR

## 2.4.2 TERMINATION STATUS REGISTER

The first 7 messages described in Section 2.3.1 will also be displayed prior to the Termination Status. The Termination Status Register messages are as follows:

TERMINATION STATUS DECODES TO:  
DRIVE NOT READY  
DRIVE FAULT  
WRITE PROTECT ERROR  
NO ID COMPARE  
ADDRESS CRC ERROR  
DATA CRC ERROR  
SEEK ERROR  
FORMAT ERROR  
SYNC ERROR  
ALTERNATE SECTOR

A detailed description of the Drive Status Register and the Termination Status Register can be found in the MARK 3 Peripherals Interface Manual.

## Section 3

### MARK 3 DISK DIAGNOSTIC TEST DESCRIPTIONS

---

#### 3.1 QUICK DISK TEST - OPTION A

This option provides a fast means of determining whether the PIB can access the disk drive. This option first recalibrates the disk drive, then 10 tracks are formatted on surface zero. These are done in increments of 10 (i.e., 10, 20, 30, etc.). The same tracks are then read and verified. The last function of this option is to write the last cylinder number to the last surface on the disk. This data is then read back and compared.

The progress messages displayed from this option are as follows:

DISK DIAGNOSTIC IN PROGRESS

\*\*\* QUICK DISK TEST COMPLETED \*\*\*

COMPLETED PASS NUMBER = nnnnnn  
(nnnnnn=current pass number)

\*\*\* ALL PASSES COMPLETED \*\*\*

If errors are detected, the error messages listed in Sections 2.3.1 and 2.3.2 may be displayed. In addition, the following error messages may be displayed:

FORMAT ERROR

READ DATA ERROR

WRITE DATA ERROR

### 3.2 FORMAT-VERIFY DISK - OPTION B

This option is selected to format and verify all or part of a disk. Entry of additional information will be required. The following query message is then displayed:

FORMAT COMPLETE DISK (Y or N)

If **N** is entered, the starting and ending surface, cylinder, and sector numbers will be requested.

VERIFYING DISK

COMPLETED PASS NUMBER = nnnnnn  
(nnnnnn=current pass number)

\*\*\* ALL PASSES COMPLETED \*\*\*

If errors are detected, the error messages listed in Sections 2.3.1 and 2.3.2 may be displayed. In addition, the following error messages are displayed:

FORMAT ERROR

READ DATA ERROR

### 3.3 READ VERIFY DISK - OPTION C

This option is selected to read and verify data on all or part of a disk. Entry of additional information will be required. The following query message is then displayed:

VERIFY COMPLETE DISK (Y or N)

If **N** is entered, the starting and ending surface, cylinder, and sector numbers will be requested.

The following message is then displayed:

VERIFYING DISK

COMPLETED PASS NUMBER = nnnnnn  
(nnnnnn=current pass number)

\*\*\* ALL PASSES COMPLETED \*\*\*

If errors are detected, the error messages listed in Sections 2.3.1 and 2.3.2 may be displayed. In addition, the following message is displayed:

READ DATA ERROR

### 3.4 WRITE-READ-COMPARE DISK - OPTION D

This option is selected to write-read-compare data for a complete or partial disk. Entry of additional information will be required. The following query message is then displayed:

WRITE-READ-COMPARE COMPLETE DISK (Y or N)

If **N** is entered, the starting and ending surface, cylinder, and sector numbers will be requested.

WRITING DATA - PATTERN = nnnnnn (nnnnnn=one of three data patterns: 1666666, 1333333, 66666)

READING-COMPARING DATA - PATTERN = nnnnnn (nnnnnn= one of three data patterns: 166666, 133333, 66666)

COMPLETED PASS NUMBER = nnnnnn  
(nnnnn=current pass number)

\*\*\* ALL PASSES COMPLETED \*\*\*

If errors are detected, the error messages listed in Sections 2.3.1 and 2.3.2 may be displayed. In addition, the following messages are displayed:

WRITE DATA ERROR

READ DATA ERROR

DATA COMPARE ERROR

FROM ADDRESS = nnnnnn (nnnnn=memory or listing address where failure occurred)

EXPECTED = nnnnnn (nnnnnn=expected data pattern)

ACTUAL = nnnnnn (nnnnnn=actual data pattern read)

SECTOR NUMBER = nn (nn=failing sector number)

WORD NUMBER = nnn (nnn=first failing word within the sector)

### 3.5 QUICK DISK TEST-FORMAT-VERIFY-WRITE-READ-COMPARE - OPTION E

This option is selected to run all tests in the Main Menu. Entry of additional information will be required. For specific query, progress and error messages displayed from this option, refer to the individual test descriptions in the previous sections.

### 3.6 ENTER DEBUG - OPTION F

This option is designed to allow entry to DEBUG from the Main Menu. Prior to entering DEBUG, this option checks the first location to ensure it has the correct contents (512). If this value is correct, the program jumps to location 60000 and displays the following message:

GOING TO DEBUG

If the value is not as expected, the following error message is displayed and control returns to the Main Menu:

DEBUG NOT LOADED, OR HAS BEEN MODIFIED

Appendix A

DISK DRIVES SUPPORTED BY THE MARK 3

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<u>Name</u>	<u>Size</u>	<u>Name</u>	<u>Size</u>
CDC32	32MB	OKI80	80MB
LARK	16MB	CAL80	80MB
CDC64	64MB	CAL300	300MB
CDC96	96MB	WREN	19MB
CDC40	40MB	NEC42	42MB
CDC80	80MB	BASF	20MB
CDC300	300MB	PRIAM	35MB
LARK2	50MB	FINCH	24MB
AMP40	40MB	BASF40	40MB
AMP80	80MB	FUJ84	84MB
AMP300	300MB	PRIAM70	70MB
MMX200	200MB	PRIAM34	34MB
FUJ135	135MB	PRIAM68	68MB
FUJ168	168MB	FUJ335	335MB