MARK 3

PERIPHERAL INTERFACE P'

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CONTENTS

Section 1

INTRODUCTION

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 the streamer tape unit. 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 Tape Diagnostic can be used to verify that the PIB and streamer tape unit are operational and to isolate problems within a system. If errors are detected, error messages are displayed and a running count is maintained. The total number of errors detected is 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 streamer tape unit. 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 if it follows a control character. When the standard diagnostic is entered for the first time, DBUG is moved from location 40000 (octal) to 60000. This allows entry of DBUG via a menu option.

1.2 HARDWARE CONFIGURATION

The hardware configuration required for the operation of the
MARK 3 Tape Diagnostic is as follows:

1. POINT 4 MARK 3 CPU and PIB

2. Display terminal

3. QIC-02 Streamer Tape Unit

Section 2

OPERATING PROCEDURES AND STANDARD MESSAGES

2.1 LOADING THE MARK 3 TAPE DIAGNOSTIC

The standard MARK 3 Tape Diagnostic program can be loaded from
the System Diagnostic Tape as follows:

1. Insert the system diagnostic tape in the streamer tape unit.

2. On the front panel, press RESET.

3. Type H; this loads the System Diagnostic 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 12 and the following message is displayed:

    READING DATA

    This indicates that the MARK 3 Tape 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 TAPE DIAGNOSTICS - VERSION n.n ***

        NUMERIC INPUT AND OUTPUT IS OCTAL
        *** INSTALL SCRATCH TAPE ***
        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 display error messages and go into a loop condition or rerun the test that failed. If N is entered, the program adds to a running error count, displays error messages and continues. The error count is displayed after all testing is completed.

The diagnostic then prompts

    ENTER TEST OPTION

Type H to display a list of test options available. (Refer to Section 2.2 for a list of the test options.) Make your selection 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).

2.2 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 TEST OPTION
A = WRITE-READ-COMPARE TAPE
B = WRITE TAPE
C = READ TAPE
D = ERASE TAPE
E = RETENSION TAPE
F = ENTER DBUG (RESIDES AT 60000)
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To execute an option, enter the letter designator at the command prompt (>) and press <RETURN>.

These test options are described 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 display error messages and go into a loop condition or rerun the test that failed. If N is entered, the program adds to a running error count, displays error messages and continues. The error count is displayed after all testing is completed.

    ENTER DESIRED NUMBER OF PASSES (DEFAULT=1)

Enter any octal value from 1 to 177777.

2.4 STANDARD ERROR MESSAGES

EXCEPTION ERROR

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

EXPECTED = nnnnnn (nnnnnn=status or expected data pattern)

ACTUAL = nnnnnn (nnnnnn=status or actual data read)

STATUS REGISTER DECODES TO:
POWER ON OR RESET
BEGINNING OF MEDIA
MARGINAL BLOCK DETECTED
NO DATA DETECTED
ILLEGAL COMMAND
FILE MARK DETECTED
BAD BLOCK NOT LOCATED
UNRECOVERABLE DATA ERROR
END OF MEDIA
WRITE PROTECTED
UNSELECTED DRIVE
CARTRIDGE NOT IN PLACE
TIMEOUT (a function did not complete in a pre-determined amount of time)
READY NOT OFF AFTER COMMAND
EXCEPTION BIT NOT ON AFTER RESET
DIRECTION ERROR
READY NOT ON
FILE MARK NOT FOUND
READY OR EXCEPTION NOT ON
DOING RETRIES
TAPE COMPARE ERROR
WORD NUMBER = nnn (nnn=first word that failed in a block (400 words))
NUMBER OF BLOCKS RE-WRITTEN OR SOFT ERRORS READ = nnnnnn
    (In write mode nnnnnn indicates the number of blocks re-written. If this number exceeds 400, clean the tape heads, change the test tape and run the test again. If the count is still the same, there may be a problem with the tape unit.
    In read mode nnnnnn indicates soft errors read, clean the tape head and rerun the test. If the problem persists, there may be a problem with the tape unit.)
NUMBER OF EXTENDED GAPS OR READ BUFFER UNDERRUNS = nnnnnn
    (nnnnnn should always be zero when running the diagnostic. If this value is other than zero, there may be a problem with the tape unit.)

Section 3

MARK 3 TAPE DIAGNOSTIC TEST DESCRIPTIONS

3.1 WRITE-READ-COMPARE TAPE - OPTION A

This option is selected to write-read-compare three data patterns (166666, 133333, 66666). In addition, this option verifies that the exception bit is set when a RESET command is issued. It verifies that file marks are detected and that a rewind command positions the tape at "BOT". The ready bit is checked when commands are issued to verify that it goes off and comes back on in a pre-determined amount of time. If errors are detected, refer to Section 2.3.1 for a description of the error messages that may be displayed. The following progress messages are displayed:

    *** TAPE IN RETENSION NEXT MESSAGE IN 2 MINUTES ***

    *** REWINDING TAPE ***

    RESET BIT ON AFTER RESET COMMAND-TEST OK

    WRITING TO TAPE-PATTERN = nnnnnn (nnnnnn=one of these data
    patterns: 166666, 133333, 66666)

    COMPARING DATA

    DATA COMPARE OK

    FILE MARK DETECTED

    READING TAPE-PATTERN = nnnnnn (nnnnnn=one of these data
    patterns: 166666, 133333, 66666)

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

    *** ALL PASSES COMPLETED ***

3.2 WRITE TAPE - OPTION B

This option is selected to write a pattern to streamer tape. A
specific pattern may be entered or the default pattern may be
used. Entry of additional information will be required. The
query and progress messages displayed by this option are as
follows:

    ENTER NUMBER OF BLOCKS

    ENTER PATTERN TO WRITE-READ (DEFAULT=66666)

    EXCEPTION BIT ON AFTER RESET-TEST OK

    RESET BIT ON AFTER RESET COMMAND-TEST OK

    *** REWINDING TAPE ***

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

    *** ALL PASSES COMPLETED ***

    WRITING TO TAPE PATTERN = nnnnnn (nnnnnn=pattern input by
    the technician or the default value)

    *** NO TAPE ERRORS ***

This option is designed to be used as a troubleshooting aid for
error detection. It can be used to scope for various signals
while writing to tape. In addition, the tape unit can be
monitored to determine whether the unit switches tracks as
required. If errors are detected, the error messages listed in
Section 2.3.1 may be displayed.

3.3 READ TAPE - OPTION C

This option is selected to read data from a tape and verify the CRC. It is intended that this option would read a tape generated by Option B. Entry of additional information will be required. The following query and progress messages are displayed by this option:

    ENTER NUMBER OF BLOCKS

    EXCEPTION BIT ON AFTER RESET-TEST OK

    RESET BIT ON AFTER RESET COMMAND-TEST OK

    *** REWINDING TAPE ***

    READING TAPE PATTERN =

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

    *** ALL PASSES COMPLETED ***

    *** NO TAPE ERRORS ***

This option is designed as a troubleshooting aid for error detection. It can be used to scope for various signals while reading from tape. In addition, the unit can be monitored to determine whether the unit is switching tracks as required. If errors are detected, the error messages listed in Section 2.3.1 may be displayed.

3.4 ERASE TAPE - OPTION D

This option is selected to erase a streamer tape. In addition to erasing tape, this option satisfies the retension option described in Section 3.5. The following progress messages are displayed:

    *** REWINDING TAPE ***

    *** ERASING TAPE-NEXT MESSAGE IN 2 MINUTES ***

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

    EXCEPTION BIT ON AFTER RESET-TEST OK

    RESET BIT ON AFTER RESET-TEST OK

    *** ALL PASSES COMPLETED ***

This option can be used to scope for various signals while the tape is being erased. If errors are detected, the error messages listed in Section 2.3.1 may be displayed.

3.5 RETENSION TAPE - OPTION E

This option is selected to retension the tape being used for testing. It is suggested that this option be used after a tape has been used for short read or writes (10 passes). The following progress messages are displayed:

    *** TAPE IN RETENSION-NEXT MESSAGE IN 2 MINUTES ***

    *** REWINDING TAPE ***

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

    EXCEPTION BIT ON AFTER RESET-TEST OK

    RESET BIT ON AFTER RESET COMMAND-TEST OK

    *** ALL PASSES COMPLETED ***

This option should also be run if the history of the tape being used for testing is unknown. It can be used to scope for various signals while the tape is in retension. If errors are detected, the error messages listed in Section 2.3.1 may be displayed.

3.6 ENTER DBUG - OPTION F

This option is designed to allow entry to DBUG from the Main
Menu. Prior to entering DBUG, 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 DBUG

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

    DBUG NOT LOADED, OR HAS BEEN MODIFIED