HEWLETT PACKARD

7970E HP-IB 1000 A/L-Series

Verifier Manual

HEWLETT-PACKARD COMPANY
Data Systems Division
11000 Wolfe Road
Cupertino, California 95014

MANUAL PART NO. 07970-90980
Printed in U.S.A. December 1983
E1283

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

PRINTING HISTORY

The Printing History below identifies the Edition of this Manual and any Updates that are included. Periodically, Update packages are distributed which contain replacement pages to be merged into the manual, including an updated copy of this Printing History page. Also, the update may contain write-in instructions.

Each reprinting of this manual will incorporate all past Updates, however, no new information will be added. Thus, the reprinted copy will be identical in content to prior printings of the same edition with its user-inserted update information. New editions of this manual will contain new information, as well as all Updates.

To determine what manual edition and update is compatible with your current software revision code, refer to the appropriate Software Numbering Catalog, Software Product Catalog, or Diagnostic Configurator Manual.

First Edition ..... Mar 1982
Second Edition ..... Aug 1982
Third Edition ..... Dec 1982
Fourth Edition ..... Dec 1983

Table of Contents

LIST OF TABLES

Chapter 1
OVERVIEW

Introduction

The 7970E HP-IB Verifier is designed to provide the user with a means of exercising and verifying operation of the 7970E Option 626 Magnetic Tape Drive connected to the 1000 A/L-Series computer. It verifies all of the basic functions of the tape drive and built-in device controller, except as noted under "Limitations". It gives the user the ability to select the tests to be run, to specify how errors will be handled, etc. However, these test choices may be made only when the program is started or after the test aborts.

The verifier is a memory-resident program contained in a minimum memory-based RTE operating system. This combination appears to the user as a stand-alone program. It accesses the tape drive via the magnetic tape driver DD.23 and HP-IB interface driver ID.37.

Required Hardware

The following hardware is required in order to run the 7970E HP-IB 1000 A/L-Series Verifier:

- HP 1000 A- or L- Computer

- Diagnostic Input Device:

  HP 264X Terminal with mini-cartridge tape unit, or
  HP Flexible Disc Drive, or
  HP Mini Flexible Disc Drive, or
  HP Micro Flexible Disc Drive, or
  HP 7908/11/12/14 Disc Drive with Integrated Cartridge Tape, or
  1600 bpi Magnetic Tape Drive.

- 12009A HP-IB Interface PCA.

- Virtual Control Panel (VCP) Interface:

  12005A/B Asynchronous Interface Card, or
  12007A/12044A HDLC Interface Card, connected to a 26XX Display Terminal.
  or
  12040B Mux Interface Card connected to a 37214A Systems Modem and a 26XX Display Terminal connected to port 0 of this Systems Modem.

- 12040B Mux Interface Card connected to a 37214A Systems Modem, if VCP terminal is connected to 12005A/B or 12007A/12044A.

- 7970E Option 626 HP-IB Magnetic Tape Drive with connecting cables.

- Magnetic Tape (Minimum 40 feet long).

Required Software

The following software is required in order to run the 7970E HP-IB verifier:

- 7970E Magnetic Tape Drive Verifier (included in the 24398A/B Peripheral Diagnostic Package), available in the following media:

Media	24398A (L-Series)	24398B (A-Series)	
		ASIC as VCP	MUX as VCP
3.5" Flexible Disc	NA	24398-13415	24398-13423
5.25" Flexible Disc	24398-13401	24398-13409	24398-13420
8" Flexible Disc	24398-13403	24398-13407	24398-13419
Minicartridge (Terminal)	24398-13302	24398-13319	NA
CS/80 Cartridge Tape (Disc Drive)	24398-13301	24398-13318 or 02196-13301*	24398-13318 or 02196-13301*
1600 BPI Magnetic Tape	NA	24398-13501	24398-13501

* supplied with CS/80 disc based systems

- 7970E HP-IB 1000 A/L-Series Verifier Manual (P/N 07970-90980).

Organization

The 7970E HP-IB 1000 A/L Series Verifier is composed of a set of selectable tests. Immediately upon completion of loading, the verifier executes one pass, consisting of a default set of tests. The user may then restart with different options--such as to select the desired tests, determine whether messages and/or error halts are to be permitted or suppressed, etc. After the program begins test execution, the only control capability which may be implemented is that of aborting the test sequence. A building block approach is used to test; that is, the most basic functions are tested before the more complex functions.

Limitations

As the 7970E HP-IB 1000 A/L Series Verifier does not indicate the specific board or subsystem of the 7970E that has failed, the program is referred to as a verifier. Although it may in some cases provide some diagnostic capability, it does not guarantee operation of these features of the drive that are not accessible through the standard mag tape drive DD.23. Due to this fact, capabilities such as the READ BACKWARD function, master/slave configurations, DTE status bit, and MTE status bit are not tested. Also, HP-IB address settings other than "0" (diagnostics before rev 2340) or "4" (diagnostics with rev 2340 or later) and the unit select settings on the tape drive other than "0" are not tested.

Chapter 2
OPERATING INSTRUCTIONS

System Configuration

The following steps describe the set-up procedure for using the 7970E HP-IB A/L-Series Verifier. Since the initial switch settings vary according to the customer's particular configuration, the operator should note their settings before making any changes. When the procedure is completed, the operator should return the switches to their original positions, so that the customer may resume normal computer use.

Initial Verifier Set-Up

To use the 7970E HP-IB 1000 A/L-Series Verifier, perform the following steps.

1. Turn the power switches on the computer and terminal to the OFF position.

2. Set the boot-select switch in the Processor PCA or the Processor Frontplane (of the 1000 A/L-Series Computer) as follows to cause the computer to enter the VCP routine after power up:

Processor PCA Switch	#1 2 3 4 5 6 7 8
Setting	1 0 0 0 0 0 0 1

1 = open = up, 0 = closed = down

3. Connect the 7970E tape drive that is to be tested to the appropriate 12009A HP-IB Interface PCA by using an HP-IB cable.

   A. Set the unit select switch on the front panel of the tape drive to "0".

   B. Set the U1 switch on the 12009A HP-IB Interface PCA connected to the tape drive as follows (switch U1 faces the rear of the PCA card cage):

12009A PCA Switch U1	#1 2 3 4 5 6 7 8
Setting	1 0 0 1 0 1 1 1

1 = open = up, 0 = closed = down

This sets the 12009A to select code 27B.

C. Set the U16 switch on the 12009A HP-IB Interface PCA to any position; the settings do not affect verifier operation.

D. Set the HP-IB address selector switch (next to the HP-IB cable receptacle in the tape drive) to "0" (rev code before 2340) or "4" (rev code 2340 or later).

4. Connect a terminal to the HP 12005A/B Interface PCA. (If the verifier is to be loaded from minicartridge tape, this terminal must be an HP 264X.)

A. Set the U1 switches on the HP 12005A/B Interface PCA that is connected to the minicartridge tape input device as follows (U1 is the switch pack which faces the rear of the computer card cage):

HP 12005A/B Switch U1	1 2 3 4 5 6 7 8
Setting	X 0 0 1 0 0 0 0

where X = 0 if VCP
X = 1 if not VCP
1 = open (up)
0 = closed (down)

B. The U21 switch on the 12005A/B Interface PCA should be set for the normal operation of the terminal. Attached to the card U21 is the switch facing the side of the computer card cage.

5. Mux (12040B) card or 37222A Modem card switches.

Switch No.	--	1 2 3 4 5 6 7 8
Setting (L-Series)	--	X 0 0 1 0 0 0 1
(A-Series)	--	X 0 0 1 0 0 1 1

where X = 0 if VCP
X = 1 if not VCP
1 = open (up)
0 = closed (down)

6. If the verifier is to be loaded into memory from flexible disc or from the cartridge tape drive in the 7908/11/12/14 disc drive, and if the tape drive to be tested is not connected to the same 12009A interface card as the flexible disc or 7908/11/12/14 disc drive unit, set switch U1 on the interface card connected to the input device. Set bits 3 to 8 on switch U1 to an unused select code. Note this switch setting for use in the boot load command.

7. Connect the flexible disc drive unit to the 12009A HP-IB Interface PCA using an HP-IB cable if loading from flexible disc. Note the HP-IB address and unit number on the flexible disc drive. They are located on the front or side of the unit, depending on the disc drive unit used. These numbers are needed by the boot loader command.

Loading The Verifier

To load the verifier into memory, first turn on the power to the terminal, then to the computer and tape drive. (Self-tests for the computer and the terminal must have passed before the verifier can operate correctly.) Mount a tape with a write ring installed on the tape drive; press LOAD and ON-LINE. Load the verifier from the specified input device as follows:

Loading from Minicartridge Tape

NOTE

The diagnostic cannot be booted from minicartridge tape when the VCP terminal is connected to port 0 of the MUX card. In order to boot the diagnostic from minicartridge tape, connect the VCP terminal to a 12005A/B ASIC card.

1. Insert the verifier minicartridge tape into the left tape unit of an HP 264X terminal.

2. Hit the break key to get the VCP prompt, then enter the following VCP command:

   VCP>%BCT10020 (for terminal connected to ASIC card with select code 20B.)

   If loading from the right tape drive unit, enter %BCT10120.

NOTE

If the message "ER" is displayed on the terminal, an error has been detected during the load. Load the verifier from another input device.

The verifier will be loaded into memory. During execution all the test messages will be printed on the console for operator reference.

Loading from Flexible Disc

This procedure only works for those diagnostics on flexible disc with revision code 2340 or later.

8-inch Floppy

1. Insert the 8-inch floppy into the left or right disc drive unit.

2. Hit the break key to get the VCP prompt, then enter the following VCP command:

   VCP>%BDCbuscfile

   where:

   b - the HP-IB address of the flexible disc drive unit (0-7).

   u - the flexible disc drive unit number:

   0 if the floppy is in the left disc drive unit or if there is only one disc drive unit.

   1 if the floppy is in the right disc drive unit.

   sc - the octal select code of the HP 12009A HP-IB interface to which the flexible disc drive is connected.

   file - name of the diagnostic to be loaded:

   MTVER - for terminal connected to ASIC card.
   MTVERM - for terminal connected to port 0 of MUX card.

The verifier will be loaded into memory. During execution all the test messages will be printed on the console for operator reference.

5.25-inch Minifloppy and 3.5-inch Microfloppy

1. Insert the minifloppy or microfloppy into the left or right disc drive unit.

2. Hit the break key to get the VCP prompt, then enter the following VCP command:

   VCP>%BDCffbusc

   where:

   ff - file number =2 for MTVER and MTVERM.

b - the HP-IB address of the flexible disc drive unit (0-7).

u - the flexible disc drive unit number:

0 if the floppy is in the left disc drive unit or if there is only one disc drive unit.

1 if the floppy is in the right disc drive unit.

sc - the octal select code of the HP 12009A HP-IB interface to which the flexible disc drive is connected.

The verifier will be loaded into memory. During execution all the test messages will be printed on the console for operator reference.

Loading from CS/80 Cartridge Tape

1. Insert the CS/80 cartridge tape into the cartridge tape drive.

2. Hit the break key to get the VCP prompt, then enter the following VCP command:

```
VCP>%BDCffbusc
```

where:

ff - file number:

Diagnostic on 24398B Diagnostic tape

MTVER = 6B
MTVERM = 26B

Diagnostic on RTE-A Primary/Diag/Master

MTVER = 22B
MTVERM = 42B

b - the HP-IB address of the CS/80 tape drive unit (0-7).

u - the cartridge tape drive unit number.

sc - the octal select code of the HP 12009A HP-IB interface to which the cartridge tape drive is connected.

The verifier will be loaded into memory. During execution all the test messages will be printed on the console for operator reference.

Loading from Magnetic Tape

1. Mount the magnetic tape.

2. Hit the break key the get the VCP prompt, then enter the following VCP command:

   VCP>%BMTffbusc

   where:

   ff - file number:

   MTVER = 4B
   MTVERM = 14B

   b - the HP-IB address of the magnetic tape drive unit (0-7).

   NOTE

   If using a second magnetic tape drive connected to a different 12009A HP-IB Interface PCA than the magnetic tape drive being tested, the HP-IB address of this magnetic tape drive must be different than the address of the magnetic tape drive being tested.

   u - the magnetic tape drive unit number.

   sc - the octal select code of the HP 12009A HP-IB interface to which the magnetic tape drive is connected.

The verifier will be loaded into memory. During execution all the test messages will be printed on the console for operator reference.

Loading from CS/80 Disc

1. Hit the break key to get the VCP prompt, then enter the following VCP command:

   VCP>%BDCbuscfile

   where:

   b - the HP-IB address of the CS/80 drive.

   u - the CS/80 drive unit number.

   sc - the octal select code of the HP 12009A HP-IB interface to which the CS/80 drive is connected.

   file - name of the diagnostic to be loaded:

   MTVER - for terminal connected to ASIC card.
   MTVERM - for terminal connected to port 0 of MUX card.

The verifier will be loaded into memory. During execution all the test messages will be printed on the console for operator reference.

Verifier Operation

The computer loads the verifier from the specified input device and begins execution . The program writes the message indicating that the RTE system is ready, then writes the following message:

"7970E HP-IB MAG TAPE A/L-SERIES VERIFIER"

After the above message appears, the verifier then executes one pass using the default test selection (tests 3, 4, 6-19). Upon completion, the verifier prints the message "PASS 1 COMPLETE" and stops. To continue operation, press any key. The computer will respond "RTE:".

NOTE

The bootable verifier filename is MTVER when the ASIC card is used as VCP and MTVERM when the MUX card is used as VCP. If the verifier is booted via the MUX, drop the final "M" when running the verifier; for example, use RU,MTVER and not RU,MTVERM.

The following command should then be entered, using the parameters listed below for the test(s) desired:

"RU,MTVER,1110B,MessageHalt,Tests1,Tests2,NumPasses"

Press RETURN, and the terminal responds:

"7970E HP-IB MAG TAPE A/L-SERIES VERIFIER"

The parameters for the command are defined as follows:

MessageHalt - 1 - Suppress information messages; halt after error messages.

2 - Print error and information messages; suppress error halts.

3 - Print error and information messages; permit error halts.

4 - Suppress error and information messages; suppress halts.

Tests1 - Set the bit corresponding to the tests being run (see Table 2-1 or 2-2).

Tests2 - Set the bit corresponding to the tests being run (see Table 2-1 or 2-2).

NumPasses - Number of passes to execute, -1 to repeat indefinitely.

Table 2-1. Test/Bit Selection

	Tests1																Tests2		
BIT NO.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	15	14	13
TEST NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

There is a correspondence between the test being run and bit selected in the octal word. The octal selection result is represented in Table 2-2.

Table 2-2. Test/Octal Selection

	TEST NO.	OCTAL NO.	TEST DESCRIPTION
	1	-	NOT USED
	2	40000B	Power On Test
	3	20000B	Identify Test
	4	10000B	Loopback Test
T	5	4000B	Manual Test
E	6	2000B	Write Gap Test
S	7	-	NOT USED
T	8	400B	Write Test
S	9	200B	Backspace/Forward Space Record Test
1	10	100B	Backspace/Forward Space File Test
	11	40B	Read/Write Test
	12	-	NOT USED
	13	10B	Rewind and Busy Test
	14	4B	BOT Checks
	15	2B	Tape Runaway Test
	16	-	NOT USED
T			
E	17	-	NOT USED
S	18	-	NOT USED
T	19	20000B	Rewind at End of Pass
S			
2			

NOTE: To select a combination of tests, add the appropriate octal numbers.

1. Default Parameters

   If any of the last four parameters are not supplied, they will default as listed below:

   MessageHalt - 3 (Print error and information messages; permit error halts)

   Tests1 - 32777B (tests 3, 4, 6-15)

   Tests2 - 20000B (test 19)

   NumPasses - 1

   If the parameter for Tests1 is supplied but no parameter is supplied for Tests2, Tests2 defaults to "0". Conversely, if the parameter for Tests1 is not supplied and a parameter is supplied for Tests2, Tests1 defaults to "0".

2. Common Test Selections

   Some commonly used test selections and their run commands are as follows:

   A. To execute all tests that do not require manual intervention, with message and error halts enabled, enter the following command:

      "RU,MTVER,1110B,3,32777B,20000B"

   B. To execute all tests (including manual tests) with message and error halts enabled, enter the following command:

      "RU,MTVER,1110B,3,77777B,20000B"

   C. To execute all tests (except those with manual intervention and those tests containing rewind), with message and error halts enabled, enter the following:

      "RU,MTVER,1110B,3,31763B,0"

NOTE

We recommend not doing test 19 immediately following test 2. Test 2 places the magnetic tape drive off line and does not rewind the tape to load point. This causes error message E04 since the tape drive is unable to complete test 19 (rewind or end of pass).

Aborting Test Execution

To abort test execution, perform the following procedure:

1. Press any key on the system console. The computer will respond with a message indicating the RTE system is ready.

2. Enter the command "BR,MTVER" and press the RETURN key.

   When the program finishes the current test, it will respond with:

   "BREAK--Enter directive (C,T,P,D)"

3. Respond by entering one of these abort option codes, then press the RETURN key:

   C - (or blank) Continue with normal execution.

   T - Restart the current test.

   P - Start at the beginning of the pass. (After this command is entered, the system responds: "READY DRIVE AND ENTER SPACE FOLLOWED BY RETURN." The user complies b pressing a space and the RETURN key.)

   D - Prepare program to be restarted. (After this command is entered, another run command may be entered to restart verifier execution with a new option selection.)

Messages

The 7970E HP-IB 1000 A/L-Series Verifier produces three types of messages during test execution: error messages, information messages, and directive messages.

Error Messages

Error messages indicate that a failure condition in the device under test is detected. If halts are enabled during verifier start-up, execution halts after an error message. When a halt occurs, the message causing the halt will be printed (even though the run command requested message printing to be suppressed). To resume execution, respond by entering one of the following execution option codes, then press the RETURN key:

C - (or blank) Continue with normal execution.

N - Resume execution with next test.

T - Restart the current test.

P - Start at the beginning of the pass. (After this command is entered, the system responds: "READY DRIVE AND ENTER SPACE FOLLOWED BY RETURN." The user complies by pressing a space and the RETURN key.)

D - Prepare program to be restarted. (After this command is entered, another run command may be entered to restart verifier execution with a new option selection.)

Information Messages

Information messages provide information about the testing process (such as the pass number or number of retries). These messages are not followed by halts.

Directive Messages

Directive messages request the user to take some action needed in the testing process. These messages cannot be suppressed, and are always followed by a halt. To continue, comply with the request, then enter one of the execution option codes (shown above), and press the RETURN key.

NOTE

Certain situations occasionally call for the user to enter a number requested by the computer. These directive messages are explained in Table 3-2.

Chapter 3
VERIFIER PERFORMANCE

Test Overview

Each of the verifier's tests is designed to verify operation of a portion of the device. A list of the available tests is provided in Table 3-1. A list of messages (Table 3-2), along with the status register format (Table 3-3) is provided at the end of this section.

Table 3-1. Available Tests

TEST	DESCRIPTION
1	NOT USED
2	Power On Test
3	Identify Test
4	Loopback Test
5	Manual Test
6	Write Gap Test
7	NOT USED
8	Write Test
9	Backspace/Forward Space Record Test
10	Backspace/Forward Space File Test
11	Read/Write Test
12	NOT USED
13	Rewind and Busy Test
14	BOT Checks
15	Tape Runaway Test
16	NOT USED
17	NOT USED
18	NOT USED
19	Rewind at End of Pass

Test Notes

The following notes are common to all tests listed:

1. In the following test descriptions, numbers followed by a "B" are octal numbers; all other numbers are decimal numbers.

2. All records written are 2048 bytes long unless otherwise noted.

3. The tests that write data use a "Standard Data Pattern" (defined as follows) unless otherwise noted.

   A. The first byte of the record contains the number of the record relative to the beginning of the test, beginning with 1.

   B. The rest of the record contains the binary counting sequence beginning with 0 and counting through 255.

   C. The counting sequence (not the record number) is repeated until the desired record length is obtained.

4. The tape drive UNIT SELECT switch must be set to "0" for all tests.

5. Error message E04 may indicate that the Byte 3 DIO 1 status bit ("Tape unit has been placed on-line") is in error. This message does not indicate an error condition. There is another status bit in error which caused the message.

Test Descriptions

Each test description contains the following information:

What function is under test.
Description of test execution.
Whether the test requires manual intervention.

Test 1 NOT USED

Test 2 Power On Test

The Power On test verifies that the unit under test indicates the correct POWER ON status, and that the Parallel Poll response can be cleared.

NOTE

When Test 2 is run, the tape unit must be the only device connected to the 12009A HP-IB Interface PCA. All other devices must be physically disconnected or powered down.

The Power On Test is executed as follows:

1. The verifier issues information message I12, which asks the user to turn the power switch on the tape drive off and then on again. The verifier then pauses. The user should turn the power switch on the tape drive "OFF", wait approximately three seconds for the capacitors in the power supply to discharge, and turn the tape drive "ON". The user then presses the space bar and the RETURN key.

2. The program issues a Parallel Poll. If the response is incorrect, error message E05 results. The program then checks the value of the Device Specified Jump (DSJ) register.

3. If the value is not 1, error E01 message occurs. If the response to the poll is still asserted, error message E14 occurs. The status of the device is then requested.

4. All status bits should be 0 except for the power restored bit (Byte 3 DIO 6). If the status is not correct, error message E04 results.

Test 3 Identify Test

The Identify test verifies that the tape unit responds to an identify request sequence as follows:

1. The verifier issues an identify request sequence. If the device does not respond, error message E33 results.

2. The program then checks the identify data bytes returned. If the two bytes of identification are incorrect, error message E17 results. The correct identification is "603B".

Test 4 Loopback Test

The Loopback test verifies that the tape unit's loopback facility functions correctly. This test verifies that the CHI and processor, as well as the data buffer FIFOs and associated logic, work correctly. This is accomplished in the following manner:

1. The computer sends 256 bytes of data to the tape drive loopback facility and reads back 129 bytes. The octal value of the first byte of data sent is 377B. This byte is followed by bytes of data representing binary counting series 0 through 376B. If the 256 bytes are not accepted, error E33 results.

2. If a Parallel Poll response is not received after the data is sent, error message E13 results.

3. If fewer than 129 bytes are returned, error message E10 results.

4. If the data returned is incorrect, error message E07 results.

Test 5 Manual Test

The Manual test provides the capability to check the write protect feature and the REWIND AND GO OFF-LINE command. It is executed as follows:

1. Subtest 1

   The verifier issues information message I18 which asks the user to load a tape without write ring, and to press LOAD and ON-LINE on the tape drive. After this is completed, the user should resume verifier execution by pressing a space and the RETURN key. Or, the user may advance to subtest 3 within this test by typing "3" before pressing the RETURN key. Otherwise, the program continues with subtest 2.

2. Subtest 2

   Subtest 2 indicates that the Write Protect status bit sets when the mounted tape does not have a write ring. This is done in the following manner:

   A. The verifier requests the Tape Drive status.

   B. If Write Protect status is not reported, error message E29 results.

3. Subtest 3

   Subtest 3 verifies that the REWIND AND GO OFF-LINE command operates properly. This is accomplished as follows:

   A. The program issues information message I22 which asks the user to mount a tape with a write ring installed, then press LOAD and ON-LINE on the tape drive.

   B. The program then issues WRITE GAP sequence followed by a REWIND AND GO OFF-LINE command. The user visually determines that the unit rewinds. If the unit does not go off-line, error message E23 results.

   C. The program then issues information message I24 which instructs the user to put the unit on-line.

Test 6 Write GAP Test

The Write GAP test verifies that the tape drive can execute a WRITE GAP command, and is executed as follows;

1. Subtest 1

   In preparation for the Write GAP Test, the verifier issues a REWIND command to ensure that the tape is positioned at BOT. If the BOT bit is not set after the rewind, error message E04 results.

2. Subtest 2

   The program performs a WRITE GAP operation, then checks BOT status to verify that the tape is advanced off the BOT marker. If BOT status is still reported after the WRITE GAP command, error message E28 results.

Test 7 NOT USED

Test 8 Write Test

The Write test verifies that a WRITE RECORD sequence executes correctly. To accomplish this:

1. The test writes 50 records, followed by an End-of-File (EOF) mark. It does not check data integrity, but only indicates that a WRITE RECORD and WRITE FILE MARK command successfully execute. If a Parallel Poll response does not occur during any write sequence or if data handshaking stops, error message E33 results.

2. If a writer error is detected, the verifier attempts to rewrite the record. This is repeated until the record is successfully written, or until 34 attempts have been made. The number of attempts to rewrite the record will be reported by information message I34. If the record is not successfully written after 34 retries, error message E04 results.

Test 9 Backspace/Forward Space Record Test

The Backspace/Forward Space Record Test verifies that the backspace and forward space record functions operate properly, and is tested as follows:

1. Subtest 1

   The verifier writes an End-of-File (EOF) mark, 50 records, and another EOF in preparation for the Backspace/Forward Space Record test.

2. Subtest 2

   A. In Subtest 2, the program issues a BACKSPACE RECORD command. If EOF status is not reported, error message E08 results.

   B. This is followed by 50 BACKSPACE RECORD commands. If EOF status is reported after any BACKSPACE RECORD command, error message E09 results.

   C. An additional BACKSPACE RECORD command is then sent. If EOF status is not reported, error message E08 occurs.

3. Subtest 3

   A. In this subtest, a FORWARD SPACE RECORD command is issued. If EOF status is not reported after execution of this command, error message E08 occurs.

   B. This is followed by 50 FORWARD SPACE RECORD commands. If EOF status is reported after any of the FORWARD SPACE RECORD commands, error message E09 results.

   C. An additional FORWARD SPACE RECORD command is sent. If EOF status is not reported after this command, error message E08 results.

Test 10 Backspace/Forward Space File Test

The Backspace/Forward Space File test verifies that the backspace and forward space file functions operate properly, and is tested as follows:

1. Subtest 1

   The verifier writes two EOFs followed by 50 groups, each of which consists of one record followed by an EOF. An additional EOF is then written. This produces a block consisting of 50 records separated by EOFs, with a double EOF at each end of the block.

2. Subtest 2

   The verifier backspaces 52 files and checks the tape status. If EOF status is not reported after each operation, error E04 results. It then issues a BACKSPACE RECORD command. If the tape unit does not return EOF status after the backspace completes, error message E08 results.

3. Subtest 3

   The verifier performs 52 FORWARD SPACE FILE operations. If EOF status is not indicated after the completion of each operation, error message E04 results. After this sequence is completed, a FORWARD SPACE RECORD command is issued. If EOF status is not reported, error message E08 results.

Test 11 Read/Write Test

The Read/Write test verifies the read and write functions of the tape drive. This is accomplished as follows:

1. Subtest 1

   The verifier writes an EOF, 50 records, then another EOF. It then backspaces two files.

2. Subtest 2

   A. The verifier reads one record and checks for EOF status. If EOF status is not indicated, error message E08 results.

   B. The verifier then reads the 50 records and checks the data and status after each record is read. If an MTE error is detected, the verifier attempts to reread the record. This is repeated until the record is successfully read, or until 11 attempts have been made to reread the record. The number of attempts to reread the record will be reported by information message I34. If the record is not successfully read after 11 retries, error message E04 results. If the data read does not agree with the data written, error message E07 results. If EOF is reported, error message E09 results.

   C. The verifier then reads another record. If EOF status is not returned after this record, error message E08 results.

Test 12 NOT USED

Test 13 Rewind and Tape Unit Busy Test

The Rewind and Tape Unit Busy test verifies that the rewind function will operate properly, and that the tape unit busy and rewinding bits will be set. This is accomplished as follows:

1. Subtest 1

   The verifier writes 10 WRITE GAP commands in preparation for the Rewind and Tape Unit Busy test.

2. Subtest 2

   A. The verifier issues a REWIND command, and checks for TAPE UNIT BUSY status and REWINDING status while the unit is rewinding. If the desired status is not returned, error message E04 results.

   B. The verifier then waits for the rewind to finish. This is signaled by a rewinding status bit clear. If no tape motion occurs and no message appears after approximately 10 seconds following completion of the rewind, the rewind status bit did not clear. At this point, it is necessary to restart the verifier.

   C. After the rewind is completed, the verifier checks for BOT status. If BOT status is not indicated, error message E04 results.

Test 14 BOT Test

The BOT test verifies that backward motion commands are not executed at BOT. This is accomplished as follows:

1. Subtest 1

   The verifier issues a REWIND command. If BOT status is not returned after the rewind finishes, error message E04 results.

2. Subtest 2

   The verifier issues a BACKSPACE RECORD command. If BOT status is not returned, error message E04 results.

3. Subtest 3

   The verifier issues a BACKSPACE FILE command. If BOT status is not returned, error message E04 results.

Test 15 Tape Runaway Test

The Tape Runaway test verifies that a tape runaway condition is reported if one exists. This is accomplished as follows:

1. Subtest 1

   The verifier writes an EOF. This is followed by 76 WRITE GAP commands (7.24 meters, 23.75 feet). The program next issues a BACKSPACE FILE command which positions the tape in front of the file mark. If the TAPE RUNAWAY status bit is set after the backspace finishes, error message E04 results.

2. Subtest 2

   The verifier writes an EOF followed by 90 WRITE GAP commands (8.57 meters, 28.13 feet). The program next issues a BACKSPACE FILE command. If TAPE RUNAWAY status is not returned, error message E30 results.

Test 16 NOT USED

Test 17 NOT USED

Test 18 NOT USED

Test 19 Rewind at End of Pass

The Rewind at End of Pass test causes the tape to be rewound at the end of each pass by issuing a rewind command to the tape drive. This test allows the user to select the option of rewinding at the end of each pass.

The following is a list of Verifier Error, Information, and Directive Messages. Numbers followed by a "B" are octal numbers; all other numbers are decimal numbers. A number sign (#) indicates the position of a number supplied at run-time.

Table 3-2. Error, Information and Directive Messages

Message No.	Description
E01	DSJ is # should be #
E04	Status is #B #B #B should be #B #B #B
E05	Poll response is #B should be #B
E07	Byte # is #B should be #B
E08	EOF not found where expected
E09	EOF found where not expected
E10	Read # bytes, expected #
E11	Byte counter = #, expected #
I12	Turn power Off and On
E13	No poll response
E14	Poll response not cleared
E17	Identify is #B, should be #B
I18	Mount tape without write ring, press LOAD and ON-LINE
I22	Mount tape with write ring, press LOAD and ON-LINE
E23	Unit still on-line
I24	Put unit on-line
I25	EOT
E28	GAP command failed to move tape
E29	WRITE PROTECT status not set
E30	Tape runaway fail
E33	HP-IB time-out
I34	# Retries

Table 3-3. Status Registers

STATUS REGISTER 1
DIO Lines 1 = On-line 2 = Multiple Track Error (MTE) 3 = File Protected (Not Write Enabled; No Write Ring) 4 = Command Rejected 5 = Single Track Error (STE) 6 = End-of-Tape (EOT) 7 = Load Point (LP)/Beginning-of-Tape (BOT) 8 = End-of-File (EOF)
STATUS REGISTER 2
DIO Lines 1 = Interface Busy 2 = Tape Unit Busy 3 = Rewinding 4 = Tape Runaway 5 = Data Timing Error (DTE) 6 = Selected Tape Unit LSB 7 = Selected Tape Unit MSB 8 = Reserved
STATUS REGISTER 3
DIO Lines 1 = Tape Unit 0 has been placed on-line 2 = Tape Unit 1 has been placed on-line 3 = Tape Unit 2 has been placed on-line 4 = Tape Unit 3 has been placed on-line 5 = Command Parity Error 6 = Power has been restored 7 = Reserved 8 = Reserved

MANUAL PART NO. 07970-90980
Printed in U.S.A. December 1983
E1283

HEWLETT-PACKARD COMPANY
Data Systems Division
11000 Wolfe Road
Cupertino, California 95014