

ABSOLUTE BINARY NO. 12597-16001
DATE CODE 1725

HIGH SPEED TAPE READER/PUNCH DIAGNOSTIC

reference manual

For HP 2737A/B, 2748A/B, and 2758A Tape Readers and
HP 2753A/B and 2895A/B Tape Punches with 12597/02116-6135 Interfaces



HEWLETT-PACKARD COMPANY
11000 WOLFE ROAD, CUPERTINO, CALIFORNIA, 95014

MANUAL PART NO. 12597-90031
MICROFICHE PART NO. 12597-90032

Printed: JUN 1977
Printed in U.S.A.

NOTICE

The information contained in this document is subject to change without notice.

HEWLETT-PACKARD MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Hewlett-Packard.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated to another program language without the prior written consent of Hewlett-Packard Company.

Copyright © 1977 by HEWLETT-PACKARD COMPANY

**Library Index Number
2DIAG.070.12597-90031**

TABLE OF CONTENTS

	Page
Section I	
INTRODUCTION	
General	1-1
Required Hardware	1-1
Required Software	1-1
Section II	
PROGRAM ORGANIZATION	
Organization	2-1
Test Control and Execution	2-1
Selection of Test by Operator	2-1
Message Reporting	2-1
Diagnostic Limitations	2-2
Priority String	2-2
Continuous Loop	2-2
60 Hz - 50 Hz Selection For Paper Tape Reader Speed Test	2-3
Section III	
OPERATING PROCEDURES	
Operating Procedure	3-1
Running the Diagnostic	3-1
Restarting	3-1
Test Selection by Operator	3-1
Section IV	
DIAGNOSTIC PERFORMANCE	
Test Description	4-1
Test 00 - Basic I/O Test on Punch	4-1
Test 01 - Basic I/O Test on Reader	4-3
Test 02	4-3
Test 03	4-3
Test 04 Continuous Loop Read 1	4-3
Test 05 Continuous Loop Read 2	4-4
Test 06 Punch-Verify	4-4
Test 07 Utility-Punch the Loop	4-4
Test 10 Utility-SWR Punch	4-5
Test 11 Utility-Reader Speed Test	4-5
Test 12 Utility-Punch Speed Test	4-5
Test 13 Utility-2753 Status Test	4-5
Test 14 Utility-2895 Manual Functions Test	4-6
Error Information Messages/Halt Codes	4-6

LIST OF ILLUSTRATIONS

Data Pattern of Continuous Tape Loop	2-3
Operating Procedure Flowchart	3-2

LIST OF TABLES

Required Hardware	1-1
Initial Switch Register Setting	3-5
Switch Register Options	3-5
Test Selection Summary	3-6
Halt Code Summary	4-5
Error Information Messages and Halt Codes	4-6

Section I
INTRODUCTION

1-1. GENERAL

This diagnostic verifies the proper operation of the HP tape punches, punched tape readers and interfaces described in Table 1-1.

The serial number of this diagnostic is 146200. The diagnostic serial number is located in memory location 126_g.

1-2. REQUIRED HARDWARE

The diagnostic runs on any 2100 series computer, with at least 4K of memory and at least one of the devices listed in Table 1-1.

To fully run the diagnostic, both the tape punch and reader with its interface must be present, but either (punch or reader) may be exercised independently of the other.

The console device is optional for error and message reporting. If the console has reader capability, it may be used for loading the diagnostic program in the event the tape reader is not present, or unable to read a punched tape. If the console has punch capabilities it may be used to punch a test loop tape. Any one of the diagnostic input devices listed in the diagnostic configurator manual can be used to load the configurator and the diagnostic.

Table 1-1. Required Hardware

HP MODEL NUMBER	DESCRIPTION	INTERFACE NUMBER
2737A/B	Tape Reader	12532A
2748A/B	Tape Reader	12597A-002
2758A	Tape Reader with Reroller	12597A-002
2753A/B	Tape Punch	12597A-003
2895A/B	Tape Punch	12597A-005

1-3. REQUIRED SOFTWARE

The following software is required:

- a. Diagnostic Configurator product no. 24296A used for equipment configuration and as a console driver. The product includes the following part numbers:

Binary object tape	Part No. 24296-60001
Manual	Part No. 02100-90157

- b. High speed paper tape reader/punch binary object tape part no. 12597-16001.

Section II
PROGRAM ORGANIZATION

2-1. ORGANIZATION

This 4K diagnostic program contains a control section and initialization section and nine tests. The initialization section prepares the diagnostic to accept the select codes and options required by the tests.

Basic I/O is available to be executed on the interface boards of both the reader and the punch, which represent tests 0 and 1.

In the standard diagnostic test execution there are:

- 1 punch only test (test 2)
- 3 read only tests (tests 3, 4 and 5), and
- 1 punch/read test (test 6)

In addition, there are 6 utility programs (tests 7-14).

2-2. TEST CONTROL AND EXECUTION

The program outputs a title message to the console device for operator information then executes the tests according to the options selected on the Switch Register by the operator. The control section mainly checks Switch Register bits 15, 14, and 12.

The program also keeps count of the number of passes that have been completed and will output the pass count at the completion of each pass (if Switch Register bit 10 is clear). The count will be reset only if the program is restarted.

Test sections are executed one after another in each diagnostic pass. User selection or default will determine which test sections will be executed. (Refer to paragraph 2-3.)

2-3. SELECTION OF TEST BY OPERATOR

The operator has the capability to select his own tests or sequence of tests with the help of Switch Register Bit 9. Paragraph 3-4 outlines the test selection.

2-4. MESSAGE REPORTING

There are two types of messages: error and information. Error messages are used to inform the operator when the interface board fails to respond to a given control or sequence. Information messages are used to inform the operator of the progress of the diagnostic or to instruct the operator to perform some operations related to the function of the unit. In this case, an associated halt will occur to allow the operator time to perform the function. The operator must then press RUN. If a console device is used, the printed message will be preceded by E (error) or H (information) and a number (in octal). The number is also related to the halt code when a console device is not available. Examples of error and information messages are as follows:

Example - Error with halt

Message: E031 PUNCH TIME OUT

Halt Code: 102031₈ (T-register or Memory Data Register)

Example - Information with halt

Message: H024 PRESS PRESET (EXT & INT), RUN

Halt Code: 102024₈

Example - Information only

Message: H025 BI-O COMP

Halt Code: None

Error messages can be suppressed by setting Switch Register bit 11 and error halts can be suppressed by setting Switch Register bit 14. This is useful when looping on a single section that has several errors. The A-register contains incorrect data value and the B-register contains the expected value when an error halt takes place.

Information messages are suppressed by Switch Register bit 10. Operator intervention is suppressed by setting Switch Register bit 8 (i.e., Preset Test in BI-O). When Switch Register bit 12 is set, the tests that are selected will be repeated. All operator intervention will be suppressed.

2-5. DIAGNOSTIC LIMITATIONS**2-6. PRIORITY STRING**

The capability of the interface board to receive, pass and deny priority is not completely checked by this diagnostic. If the board does not receive priority (i.e., PRH from next lower select code) an error E014 NO INT will occur. To check this, remove a board of a lower select code and run the Basic I/O Test and the above mentioned error should occur. Checking the ability of the board to pass or deny priority is beyond the scope of this diagnostic.

2-7. CONTINUOUS LOOP

Tests number 04, 05 and 11 require a continuous tape loop for execution. This loop may be generated by selecting Test 07 if a high speed HP 2895A/B Paper Tape Punch or a HP 2752/54 Teleprinter is available. The user must specify via S-Reg bit 14 during the configuration if the continuous tape loop will be created by the paper tape punch or the teleprinter (see Figure 3-1 and Table 3-1). Figure 2-1 shows one iteration of the data pattern. Test 07 will create 3 iterations preceded by a leader, separated by 20 feedholes and succeeded by a trailer.

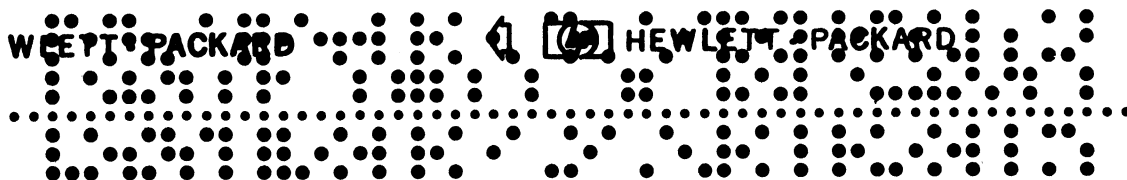


Figure 2-1. Data Pattern of Continuous Tape Loop

2-8. 60 HZ - 50 HZ SELECTION FOR PAPER TAPE READER SPEED TEST

The paper tape reader speed test (Test 11) requires an AC line frequency specification. This can be accomplished during the initial switch register setting with the help of bit 15. S-Reg bit 15 must be cleared when the reader is powered from a 60 Hz line and be set if powered from a 50 Hz line.

Section III

OPERATING PROCEDURES

3-1. OPERATING PROCEDURE

A flowchart of operating procedures is provided in Figure 3-1.

NOTE: If running the diagnostic without a console device, particular attention should be given to the test descriptions in Section 4. Tests 4,5, and 6 require the operator to change the state of Switch Register Bit 0 in order to start the tests.

3-2. RUNNING THE DIAGNOSTIC

The program will now execute the diagnostic according to options selected in the Switch Register. At the completion of each pass of the diagnostic, the pass count is printed on the console device for operator information. If Switch Register Bit 12 was not selected, the computer will halt with 102077₈ in the Memory Data Register. At this point, the A-register contains the pass count. To run another pass, the operator need only press RUN.

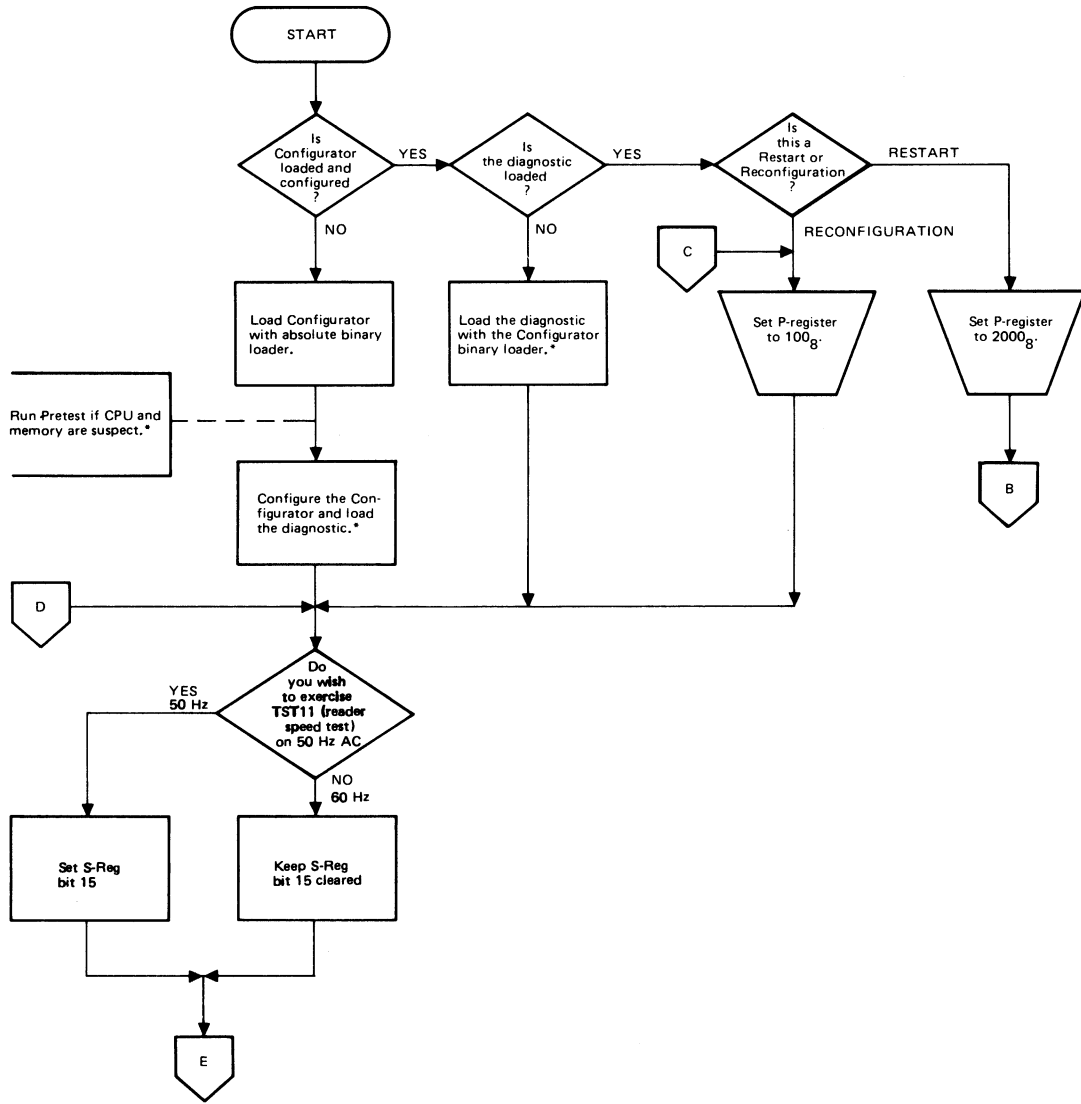
3-3. RESTARTING

The program may be restarted by setting the P-register to 2000₈, select switch register options found in Table 3-1 and pressing run.

If a trap cell halt occurs (106077₈), the user must determine the cause of the interrupt or transfer of control to the location of the M-register. The program may need to be reloaded to continue.

3-4. TEST SELECTION BY OPERATOR

The control portion of the program allows the operator the option to select a test or sequence of tests to be run. The operator sets Switch Register bit 9 to indicate that he wants to make a selection and presses RUN. The computer will come to a halt 102075₈ to indicate it is ready for the selection. If the program is running, the test in progress will be completed and then the program will halt. Now the operator loads the A-register with the tests desired, bit 0 of the A-register represents Test 00, bit 1 represents Test 01, and so on up to bit 12, which represents Test 14, and presses Run. The operator-selected test(s) will then be run. For a definition of executable and default tests, see Table 3-3.



* Refer to Section II in the Diagnostic Configurator Reference Manual.

Figure 3-1. Operating Procedure Flowchart (Sheet 1 of 3)

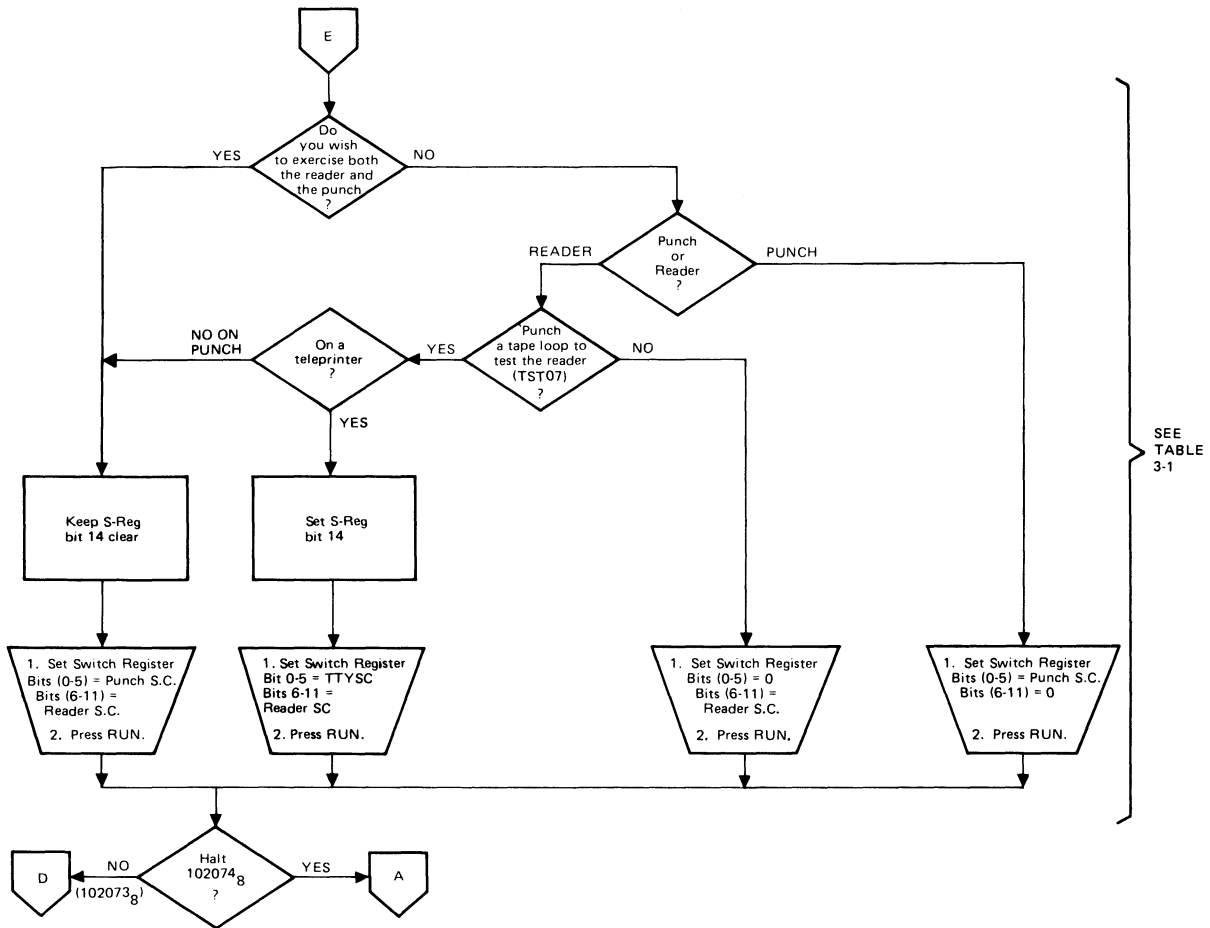


Figure 3-1. Operating Procedure Flowchart (Sheet 2 of 3)

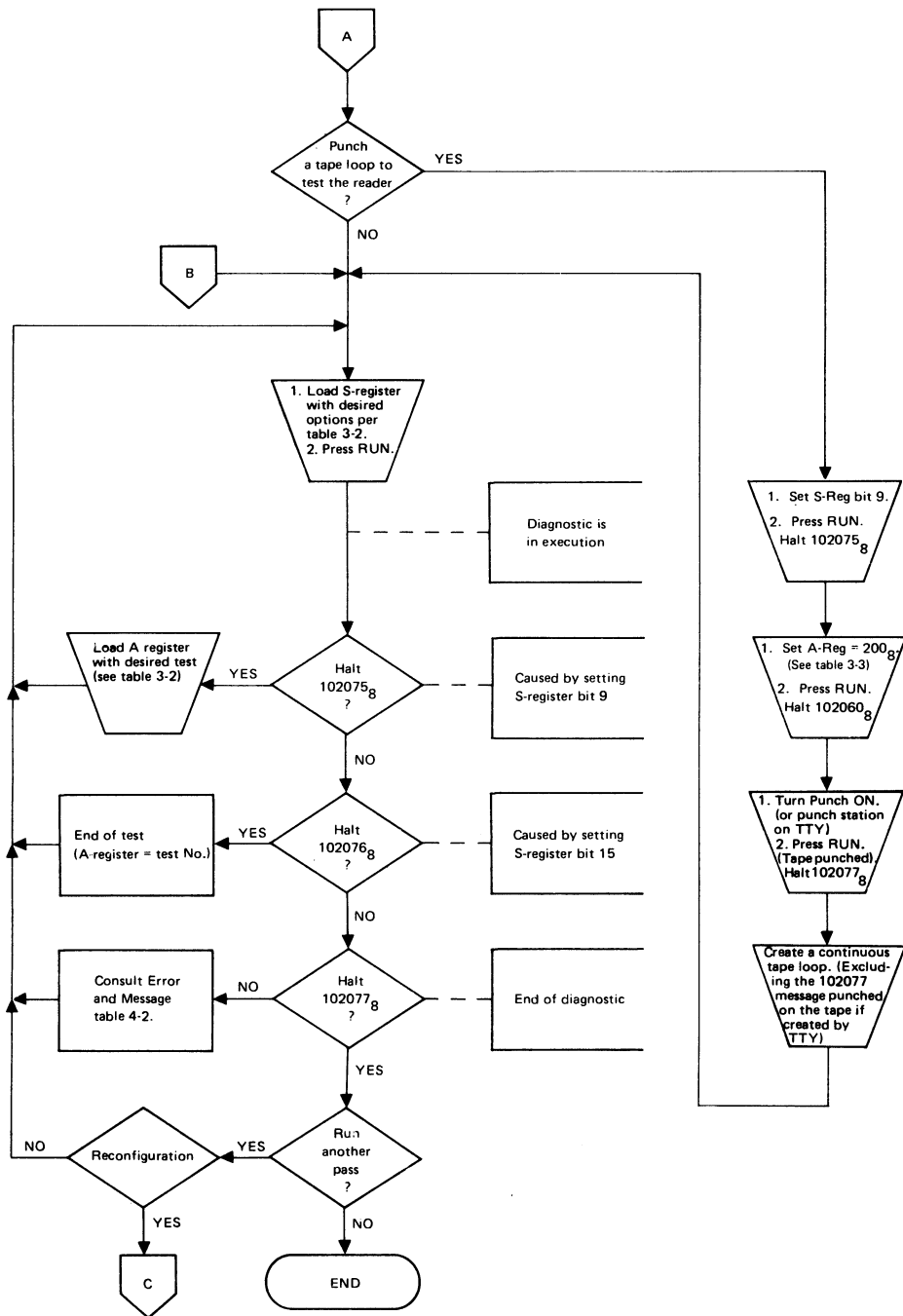


Figure 3-1. Operating Procedure Flowchart (Sheet 3 of 3)

Table 3-1. Initial Switch Register Setting

BIT	MEANING IF SET
0-5	SC of 2753A/B or 2895A/B Paper Tape Punch. (If the continuous test loop (TST07) must be punched on a teletype enter SC of teletype).
6-11	SC of 2737A, 2748A/B or 2758A Paper Tape Reader.
12-13	Reserved.
14	Continuous test loop (TST07) must be punched on teletype.
15	Reader speed test (TST11) must be exercised on a 50 Hz line frequency.

Table 3-2. Switch Register Options

BIT	MEANING IF SET
0	START/EXIT Tests
1	ABORT Test3
2	RESYNC
3	Variable Record Length Output (TST02)
4	Time Delays Between Reads
5	Indicates 2737 Photoreader (TST11)
6	Indicates 2753 Punch (TST12)
7	Loop on TST11, TST12
8	Suppress tests requiring operator intervention
9	Abort current diagnostic execution and halt (102075); user may specify a new group of tests in the A-register by clearing bit 9 and then pressing RUN.
10	Suppress non-error messages
11	Suppress error messages
12	Repeat all selected tests after diagnostic run is complete without halting. Message "PASS XXXXXX" will be output before looping unless bit 10 is set or console is not present. Also, those tests requiring operator intervention will be suppressed.
13	Repeat last test executed (loop on test).
14	Suppress error halts
15	Halt (102076) at the end of each test; the A-register will contain the test number in octal.

Table 3-3. Test Selection Summary

A-REGISTER BIT	IF SET WILL EXECUTE
0	*Test 00 BIO on Punch Interface
1	*Test 01 BIO on Reader Interface
2	*Test 02 Punch all Character Combinations
3	*Test 03 Verify all Character Combinations
4	*Test 04 Continuous Loop Read Delays
5	*Test 05 Continuous Loop Variable Lengths
6	*Test 06 Punch/Verify
7	Test 07 Utility-Punch Loop Required for 4, 5 and 11
8	Test 10 Utility-Punch Switch Register Contents
9	Test 11 Utility-Reader Speed Test
10	Test 12 Utility-Punch Speed Test
11	Test 13 Utility-2753 Status Check
12	Test 14 Utility-2895 Manual Functions Test
13-15	Reserved
B-register	Reserved

*Default Tests invoked by clearing A Register at test selection time.

Section IV
DIAGNOSTIC PERFORMANCE

4-1. TEST DESCRIPTION

4-2. TEST 00 - BASIC I/O TEST ON PUNCH

The message "H050 BI-O ON PUNCH" is printed on the console, and 8 subtests are executed to perform Basic I/O.

Subtest 1 - Checks the ability to clear, set, and test the interrupt system. The following instruction combinations are tested:

```
CLF 0 - SFC 0
CLF 0 - SFS 0
STF 0 - SFC 0
STF 0 - SFS 0
```

Errors in the above sequences produce error messages E000-E003 as shown in Table 4-2.

Subtest 2 - Checks the ability to clear, set, and test the card select code. The following instruction combinations are tested:

```
CLF CH - SFC CH
CLF CH - SFS CH
STF CH - SFC CH
STF CH - SFS CH
```

Errors in the above sequences produce error messages E005-E010 as shown in Table 4-2.

Subtest 3 - Checks that the test select code does not cause an interrupt with the Flag and Control set on the card and the interrupt system off. The sequence of instructions is shown below:

```
STF 0
STF CH
STC CH
CLF 0
```

The CLF 0 instruction should inhibit an interrupt from occurring. Error message E004 occurs if CLF 0 fails.

Subtest 4 - Checks that the Flag of the card under test is not set when all other select code Flags are set. Error message E011 occurs if a Flag is set incorrectly.

Subtest 5 - Checks the ability of the card to interrupt. With the Flag and Control set and the interrupt system on, there should be an interrupt on channel CH; if not, error message E014 occurs. Checks that the interrupt occurred where expected. The interrupt should not occur before a string of priority-affecting instructions are executed. The following instructions are used to check the holdoff operation:

```
STC 1
STF 1
CLC 1
CLF 1
JMP *+1,I
DEF *+1
JSB *+1,I
DEF *+1
NOP
```

Error messages E012 and E105 will occur if this is not true. Checks that another interrupt doesn't occur when the interrupt system is turned back on. Error message E013 will occur if this is not true. Checks that no instruction was missed during the interrupt (E026 INT EXECUTION ERROR).

Subtest 6 - Checks that with the interrupt system on and the CH Control and Flag set, there is no interrupt following a CLC CH instruction. The following sequence of instructions are used:

```
STC CH
STF CH
STF 0
CLC CH
```

If the CLC CH fails to inhibit an interrupt, error message E016 will occur.

Subtest 7 - Checks that the CLC 0 instruction inhibits interrupts when the CH Control and Flag are set. The following sequence of instructions is used:

```
CLF CH
STC CH
STF CH
STF 0
CLC 0
```

If the CLC 0 fails to inhibit an interrupt, error message E017 will occur.

Subtest 8 - Checks that the PRESET (EXTERNAL and INTERNAL if applicable) switches on the operator panel performs the following actions:

1. Sets all Flags (EXTERNAL).
2. Clears all Control (EXTERNAL).
3. Turns off the interrupt system (INTERNAL).
4. Clears the I/O data lines (EXTERNAL).

4-3. TEST Ø1 - BASIC I/O TEST ON READER

The message "HØ55 BI-O ON READER" is printed on the console.

Next, Basic I/O is executed again, but this time using the select code of the reader interface board.

Other than the "HØ55 B-IO ON READER" message, information messages and error halts and messages are the same as those used to describe any errors detected in Test Ø.

4-4. TEST Ø2

The identification message "HØ51 ALL CHARACTER COMBINATIONS - PUNCH ONLY, TURN PUNCH ON, PRESS RUN" is printed on the console.

When RUN is pressed, a 6Ø character all zeros leader is punched. Next, an all ones character is punched, reversed e.g. bit Ø becomes bit 7, bit 1 becomes bit 6, etc., and punched again then the original character is decremented and output to the punch again. This continues until an all zeros character is output. Then the character is again punched, incremented, etc. Finally a trailing all zeros pattern is output and the routine terminates.

Variable record length output can be selected by setting Switch Register bit 3 to a one.

4-5. TEST Ø3

Test Ø3 starts with the identification and instruction messages: "HØ52, ALL CHARACTER COMBINATIONS - VERIFY. HØ53 TEAR TAPE AT PUNCH - PLACE IN READER, PRESS RUN."

Using an interrupt type driver for read operation, the test Ø2 generated tape is read and proper punching operation is verified.

No data buffer is employed by Test Ø2 or Test Ø3. All the work in changing the data pattern is done by the subroutine named FLOPP which uses the A, B, and EXTEND registers.

If an error is found, the operator may choose to abort the routine. This can be done by setting Switch Register bit 1 to a 1.

4-6. TEST Ø4 - CONTINUOUS LOOP READ 1

Test Ø4 uses a continuous loop* for an input. The instruction message "HØ54 PLACE LOOP IN READER - TO START READ, SET BIT Ø TO 1 TO EXIT TEST, SET BIT Ø to Ø", is output, and then the routine waits for the operator to set bit Ø to a 1.

*See Figure 2-1, Paragraphs 2-7 and 4-9.

When the operator starts the test, delays between reads can be started by setting SWR bit 4 to a one. The standard data pattern is read five times at different reader speeds.

In the event of an error, the tape loop can be synchronized to the data buffer pointer by setting SWR bit 2 to 1.

This will cause the message "HØ43 RESYNC" to be output on the console, and the RESYNC operation will occur. Then Switch Register bit 2 should be reset.

To exit Test Ø4, Switch Register bit Ø must be set back to Ø.

4-7. TEST Ø5 - CONTINUOUS LOOP READ 2

Test Ø5 is similar to Test Ø4. The same tape loop is used for read/verify and the routines share many common subroutines.

The main difference is that variable record lengths are used for this test. Error handling routines, and the RESYNC routines are identical.

4-8. TEST Ø6 - PUNCH-VERIFY

The instruction message "HØ56 TURN PUNCH ON, PRESS RUN, PUNCH ROUTINE WILL START.
LOAD THE TAPE BEING PUNCHED INTO READER
TO BEGIN READ, SET BIT Ø TO 1
TO EXIT, SET BIT Ø TO Ø"

is printed on the console, and the routine halts the computer.

When RUN is pressed, the Switch Register is checked to insure bit Ø = Ø, (this is done to prevent the read operation from starting before the operator can place the punched tape in the reader) and the punch routine begins.

When the operator places bit Ø to a 1, the read routine begins. At this time, the punch and read routines run together.

This operation will continue until bit Ø is reset. Then the punch operation continues until the entire buffer is output, the message "HØ57 TO COMPLETE, TEAR TAPE - PRESS RUN" is output on the console, and the computer halts. The operator may then complete this routine by following the above instructions.

4-9. TEST Ø7 - UTILITY - PUNCH THE LOOP

The message "HØ6Ø TO MAKE LOOP, PUNCH ON AND RUN" is output, and the computer halts. If the operator, during the initial switch register setting, set bit 14 = 1 and entered the SC of a 2752/54 teletype into bits Ø-5, he can punch the tape loop on the teleprinter. If bit 14 = Ø and bits Ø-5 = SC of punch the loop can be punched on the paper tape punch. The operator can make a loop by following these instructions. Three iterations of the data buffer will be output to the punch. This tape can then be made into a loop using a tape repair patch, or transparent tape.

4-10. TEST 10 - UTILITY - SWR PUNCH

This utility routine outputs Switch Register bits 0-7 to the punch. This routine must be selected by the operator. For continuous output set Switch Register bit 13 to a one. To exit this routine, set Switch Register bit 13 to zero.

4-11. TEST 11 - UTILITY - READER SPEED TEST

Test 11 is the Reader Speed Test which uses the continuous loop.* It is another Utility Test which may be selected by the operator. In a 50 Hz line frequency environment the operator must have set S-Reg bit 15 during the initial switch register setting. The initial message is output instructing the operator to select a Switch Register bit to differentiate between 2748/58 and 2737 Photoreaders, and the program halts the computer. If the reader is a 2737, bit 5 should be set to a one. If the reader is a 2748/58, bit 5 should be set to a zero, and run must be pressed. The reader will then advance tape, and the program will calculate the reader speed. If the speed is correct, the test is terminated. If a slow speed is detected, the error is reported and the A Register contains the number of actual characters read, the B Register contains the expected number of characters.

If the operator wishes this test to continue longer than the normal one second, he may set Switch Register bit 7 to a one prior to the start of test 11 execution. To exit this loop condition, Switch Register bit 7 should be set to a zero.

4-12. TEST 12 - UTILITY - PUNCH SPEED TEST

Test 12 is the Punch Speed Test. Like the Reader Speed Test, it must be selected by the operator, and like the Reader Test it requires a Switch Register input from the operator to inform the program which punch is being tested. Switch Register bit 6 must be set to 1 if the punch is a 2753, and set to a 0 if the punch being tested is a 2895.

An instruction message is output informing the operator of the need to set or clear bit 6, and the program halts awaiting this information.

If the operator wishes to extend the execution time of this test, Switch Register bit 7 should be set to a one prior to the start of execution. To exit this loop condition, Switch Register bit 7 must be set to a zero.

4-13. TEST 13 - UTILITY - 2753 STATUS CHECK

Test 13 is the 2753 High Speed Punch Status Test. It consists of one bit check the operator is told to remove the tape supply reel to force an error, and when run is pushed, bit 5 from the punch interface is checked to insure the ability of the interface detecting a low supply reel condition. The operator is then instructed to reinstall the supply reel, and when run is pressed, the bit 5 is tested for a zero condition and the test is exited.

*See Figure 2-1, Paragraph 2-7, and 4-9.

4-14. UTILITY - 2895 MANUAL FUNCTIONS TEST

Test 14 is a test of the manual functions of the 2895 punch. There are eight functions to be tested. Each test is started by an instruction message, telling the operator what to do. The term 'PRESS RUN' in the messages, refers to the computer run switch.

The eight functions are:

1. POWER ON SWITCH.
2. DC ON SWITCH
3. TAPE FEED SWITCH
4. FEED HOLE SWITCH
5. CODE HOLE SWITCH
6. LOW TAPE SWITCH/INDICATOR
7. LOOSE TENSION ARM/ERROR INDICATOR
8. TIGHT TENSION ARM/ERROR INDICATOR

4-15. ERROR INFORMATION MESSAGES/HALT CODES

Table 4-1 summarizes the halt codes and Table 4-2 provides a complete description of the individual halts.

Table 4-1. Halt Code Summary

HALT	MEANING
TESTS 0 ₈ to 14 ₈ 102000 - 102066 106000 - 106022	Error (E) & information (H) messages 00-66 ₈ . Error (E) & information (H) messages 100-122 ₈
CONTROL 102073 102074 102075 102076 102077 106077	Select code(s) input error. Select code(s) input complete. User selection request. End of test (A = test number). End of diagnostic run. Trap cell halts in location 2-77 ₈ .

NOTE: See Table 4-2 for complete explanation of individual halts.

Table 4-2. Error Information Messages and Halt Codes

HALT CODE	SECTION	MESSAGE	COMMENTS
102000	Test 0 & 1	E000 CLF 0-SFC 0 ERROR	CLF/SFC 0 combination failed. CLF did not clear Flag or SFC caused no skip with Flag clear.
102001	Test 0 & 1	E001 CLF 0-SFS 0	CLF/SFS 0 combination failed. CLF did not clear Flag or SFS caused skip with Flag Clear.
102002	Test 0 & 1	E002 STF 0-SFC 0 ERROR	STF/SFC 0 combination failed. STF did not set Flag or SFC caused skip with Flag set.
102003	Test 0 & 1	E003 STF 0-SFS 0 ERROR	STF/SFS 0 combination failed. STF did not set Flag or SFS caused no skip with Flag set.
102004	Test 0 & 1	E004 CLF 0 DID NOT INHIBIT INT	With card Flag and Control set, CLF 0 did not turn off interrupt system.
102005	Test 0 & 1	E005 CLF CH-SFC CH ERROR	CLF/SFC CH combination failed. CLF did not clear Flag or SFC caused no skip with Flag clear.
102006	Test 0 & 1	E006 CLF CH-SFS CH ERROR	CLF/SFS CH combination failed. CLF did not clear Flag or SFS caused skip with Flag clear.
102007	Test 0 & 1	E007 STF CH-SFC CH ERROR	STF/SFC CH combination failed. STF did not set Flag or SFC caused skip with Flag set.
102010	Test 0 & 1	E010 STF CH-SFS CH ERROR	STF/SFS CH combination failed. STF did not set Flag or SFS caused no skip with Flag set.
102011	Test 0 & 1	E011 STF XX SET CARD FLAG	Select code screen test failed. A-register contains XX ₈ where XX = select code that caused that card Flag to set.
102012	Test 0 & 1	E012 INT DURING HOLD OFF INSTR	Interrupt occurred during an I/O instruction or a JMP/JSB indirect instruction.
102013	Test 0 & 1	E013 SECOND INT OCCURRED	Card interrupted a second time after initial interrupt was processed.

Table 4-2. Error Information Messages and Halt Codes (continued)

HALT CODE	SECTION	MESSAGE	COMMENTS
102014	Test 0 & 1	E014 NO INT	No interrupt occurred with card Flag and Control set and the interrupt system on.
102015	Test 0 & 1	E015 INT RTN ADDR ERROR	Interrupt did not occur at the current location in memory.
102016	Test 0 & 1	E016 CLC CH ERROR	CLC CH did not clear card Control with the interrupt system on.
102017	Test 0 & 1	E017 CLC 0 ERROR	CLC 0 did not clear Control with the interrupt system on.
102020	Test 0 & 1	E020 PRESET (EXT) DID NOT SET FLAG	PRESET (EXT) did not set the card Flag.
102021	Test 0 & 1	E021 PRESET (INT) DID NOT DISABLE INTS	PRESET (INT) did not disable the interrupt system.
102022	Test 0 & 1	E022 PRESET (EXT) DID NOT CLEAR CONTROL	PRESET (EXT) did not clear Control.
102023	Test 0 & 1	E023 PRESET (EXT) DID NOT CLEAR I-O LINES	PRESET (EXT) did not clear I/O data lines.
102024	Test 0 & 1	H024 PRESS PRESET (EXT & INT), RUN	Press PRESET (External, Internal) and RUN.
None	Test 0 & 1	H025 BI-0 COMP	Basic I/O tests completed.
102026	Test 0 & 1	E026 INT EXECUTION ERROR	Interrupt was not processed correctly. No instruction was missed during the interrupt.
102031	Test 2,3,6, 7, 10	E031 PUNCH TIME OUT	The punch did not respond to an STC punch, C instruction.
102032	Test 6	E032 PUNCH ROUTINE NOT COMPLETED	The interrupt punch routine didn't complete after the read operation stopped.
102033	Test 2,3,6	E033 LOW TAPE SUPPLY	The tape supply in the punch is low.
102040	Test 3,4,5,6	E040 BAD = XXXXXXXX GOOD = XXXXXXXX	The A-register contains the bad pattern and the B-register has the expected pattern.

Table 4-2. Error Information Messages and Halt Codes (continued)

HALT CODE	SECTION	MESSAGE	COMMENTS
102041	Test 3,4,5	E041 READER TIME OUT	The Reader did not respond to an STC Reader, C instruction. Normally, this error halt will occur if the operator fails to press the Read button on the 2748A/B Reader or places the Load/Read lever on a 2737A to Read. The program can be started again by readying the reader and pressing RUN. If, however, the reader is faulty, and this message halt is valid, the diagnostic must be restarted @ 2000 to continue operation.
102042	Test 6	E042 MISSING SYNC CHARACTER	The SYNC character which was punched to terminate Test 6 was not found where expected.
102043	Test 4	H043 RESYNC	After reporting an error, the loop can be re-synchronized to the start of a data pattern by placing SW bit 5 = 1.
102044	Test 3	E044 READER INTRPT DRIVER TIME OUT	Reader failed to respond after an STC,C in interrupt driver.
102045	Test 3,4,5,6	E045 SYNC CHARTR NOT FOUND AFTER 1000 (OCTAL) CHARTRS	Reader is not reading data holes, but is responding with Flags.
102050	Test 0	H050 BI-O ON PUNCH	Information message.
102051	Test 2	H051 ALL CHARTR COMBINATIONS, PUNCH ONLY TURN PUNCH ON, PRESS RUN	Test 2 Header/Instruction message.
102052	Test 3	H052 ALL CHARTR COMBINATIONS, VERIFY TEAR TAPE AT PUNCH, PLACE IN READER, PRESS RUN	

Table 4-2. Error Information Messages and Halt Codes (continued)

HALT CODE	SECTION	MESSAGE	COMMENTS
None	Test 4,5	H054 PLACE LOOP IN READER, PRESS RUN TO START READ, SET BIT \emptyset TO 1, TO EXIT TEST, SET BIT \emptyset TO \emptyset	
None	Test 1	H055 BI-O ON READER	
102056	Test 6	H056 TURN PUNCH ON, PRESS RUN. PUNCH ROUTINE WILL START. LOAD THE TAPE BEING PUNCHED INTO READER. TO START READ, SET BIT \emptyset TO 1 TO EXIT, SET BIT \emptyset TO \emptyset	Instructions.
102057	Test 6	H057 TO COMPLETE, TEAR TAPE, PRESS RUN	Completes Test 6
102060	Test 7	H060 TO MAKE LOOP, PUNCH ON AND RUN	Instruction for the routine which generates the tape loop.
102061	Test 6	H061 RESET BIT \emptyset	Bit \emptyset must start out reset, until at least one data buffer has been output.
102062	Test 10	H062 OUTPUT BIT \emptyset -7 TO PUNCH. TO START SET BIT 13, PRESS RUN. TO EXIT CLEAR BIT 13.	Used to loop Test 10.
102063	Test 11	H063 READER SPEED TEST. PLACE LOOP IN THE READER BIT 5= \emptyset FOR 2748-58, BIT 5=1 FOR 2737. PRESS RUN	Executes for 1 second. Bit 7=1 for longer execution.
102064	Test 11	E064 2737 SPEED SLOW	The Read operation was too slow. A-REG = Number of characters read per sec B-REG = Number of characters expected per sec
102065	Test 11	E065 2748-58 SPEED SLOW	The Read operation was too slow.
None	Test 11	H066 TEST 11 COMPLETE	

Table 4-2. Error Information Messages and Halt Codes (continued)

HALT CODE	SECTION	MESSAGE	COMMENTS
102073	Configuration	None	I/O select code entered at configuration is invalid. Must be greater than 7 ₈ . Reenter a valid select code and press RUN.
102074	Configuration	None	Select code entered during configuration is valid. Enter program option bits in Switch Register and press RUN.
102075	Test Control	None	Test selection request resulting from Switch Register bit 9 being set. Enter in A-registers the desired group of tests to be executed and press RUN. (See Table 3-1.)
102076	Test Control	None	End-of-test halt resulting from Switch Register bit 15 being set (A-register has the test number). To continue, press RUN.
102077	Test Control	PASS XXXXXX	Diagnostic run complete. Register options may be changed (A-register has the pass count). To continue, press RUN.
103000	Test 12	H1ØØ PUNCH SPEED TEST. BIT 6=Ø FOR 2895 OR BIT 6=1 FOR 2753-PRESS RUN	Executes for 1 second. Bit 7=1 extends execution time for the duration of Bit 7=1.
103001	Test 12	EØØ1 2753 SPEED SLOW	Error message for 2753
103002	Test 12	E1Ø2 2895 SPEED SLOW	Error message for 2895
None	Test 12	H1Ø3 TEST 12 COMPLETE	
103004	Test 13	H1Ø4 2753 HIGH SPEED TAPE PUNCH STATUS CHECK REMOVE SUPPLY REEL, PRESS RUN	
103005	Test 13	E1Ø5 DID NOT DETECT LOW TAPE STATUS	

Table 4-2. Error Information Messages and Halt Codes (continued)

HALT CODE	SECTION	MESSAGE	COMMENTS
103006	Test 13	E106 REPLACING SUPPLY REEL DID NOT CLEAR STATUS	
103007	Test 13	H107 REPLACE SUPPLY REEL, PRESS RUN	
None	Test 13	H110 STATUS CHECK COMPLETE	Exit back to control
None	Test 14	H111 2895 MANUAL FUNCTIONS TEST	Test 14 has no diagnostic ability. It is a test instructing the operator to perform manual functions. There are no error (E) messages
103012	Test 14	H112 PRESS 'POWER ON' - PRESS RUN	
103013	Test 14	H113 PRESS 'DC ON', 'READY' SHOULD ILLUMINATE- PRESS RUN	
103014	Test 14	H114 PRESS 'TAPE FEED', SHOULD FEED BLANK TAPE PRESS RUN	
103015	Test 14	H115 PRESS 'FEED HOLE', SHOULD FEED TAPE WITH FEED HOLES - PRESS RUN	
103016	Test 14	H116 PRESS 'CODE HOLE', SHOULD FEED FULLY PUNCHED TAPE-PRESS RUN	
103017	Test 14	H117 REMOVE THE TAPE SUPPLY REEL, PRESS RUN	

Table 4-2. Error Information Messages and Halt Codes (continued)

HALT CODE	SECTION	MESSAGE	COMMENTS
103020	Test 14	H120 TAPE LOW INDICATOR SHOULD BE ILLUMINATED. REPLACE SUPPLY REEL-PRESS RUN	
103021	Test 14	H121 MOVE THE TAPE TENSION ARM TO MAXIMUM RIGHT AND LEFT. THE ERROR INDICATOR SHOULD ILLUMINATE AT THE TWO MAXIMUM POSITIONS, AND BE EXTINGUISHED IN THE CENTER-PRESS RUN	
None	Test 14	H122 MANUAL FUNCTIONS TEST COMPLETE	
106077	Test Control	None	Halt stored in location 2-77 ₈ to trap interrupts which may occur unexpectedly because of hardware malfunctions. M-register contains the I/O slot which interrupted. Diagnostic may be partially destroyed if halt occurs. The program may have to be reloaded; the problem should be corrected before proceeding.
None	Test Control	PAPER TAPE READER AND PUNCH DIAGNOSTIC DSN xxxxxx	Header message. Output at initial start of diagnostic with current diagnostic serial number listed.
None	Test Control	Test XX	Information message before error messages (XX - test number). Message occurs only once within a test and is suppressed for any subsequent messages within the same test.



HEWLETT-PACKARD COMPANY
11000 WOLFE ROAD, CUPERTINO, CALIFORNIA, 95014

MANUAL PART NO. 12597-90031
MICROFICHE PART NO. 12597-90032

Printed: JUN 1977
Printed in U.S.A.