

ABSOLUTE BINARY PROGRAM NO. 12531-16001
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**HP 2752A/2754A/B TELEPRINTERS
AND
12531B/C INTERFACE DIAGNOSTIC
reference manual**

For HP 2100 Series Computers.



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SAFETY CONSIDERATIONS

GENERAL - This product and relation documentation must be reviewed for familiarization with safety markings and instructions before operation.

SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the product against damage.



Indicates hazardous voltages.



Indicates earth (ground) terminal (sometimes used in manual to indicate circuit common connected to grounded chassis).

WARNING

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a **CAUTION** sign until the indicated conditions are fully understood and met.

CAUTION

STATIC SENSITIVE DEVICES

When any two materials make contact, their surfaces are crushed on the atomic level and electrons pass back and forth between the objects. On separation, one surface comes away with excess electrons (negatively charged) while the other is electron deficient (positively charged). The level of charge that is developed depends upon the type of material. Insulators can easily build up static charges in excess of 20,000 volts. A person working at a bench or walking across a

floor can build up a charge of many thousands of volts. The amount of static voltage developed depends on the rate of generation of the charge and the capacitance of the body holding the charge. If the discharge happens to go through a semiconductor device and the transient current pulse is not effectively diverted by protection circuitry, the resulting current flow through the device can raise the temperature of internal junctions to their melting points. MOS structures are also susceptible to dielectric damage due to high fields. *The resulting damage can range from complete destruction to latent degradation.* Small geometry semiconductor devices are especially susceptible to damage by static discharge.

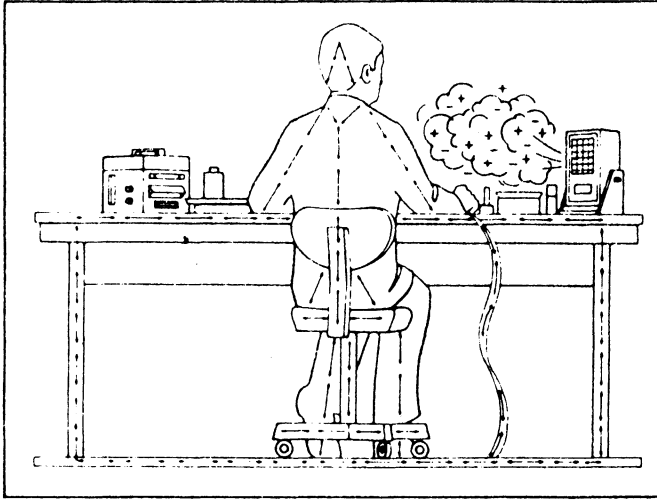
The basic concept of static protection for electronic components is the prevention of static build-up where possible and the quick removal of already existing charges. The means by which these charges are removed depend on whether the charged object is a conductor or an insulator. If the charged object is a conductor such as a metal tray or a person's body, grounding it will dissipate the charge. However, if the item to be discharged is an insulator such as a plastic box/tray or a person's clothing, ionized air must be used.

Effective anti-static systems must offer start-to-finish protection for the products that are intended to be protected. This means protection during initial production, in-plant transfer, packaging, shipment, unpacking and *ultimate use*. Methods and materials are in use today that provide this type of protection. The following procedures are recommended:

1. All semiconductor devices should be kept in "antistatic" plastic carriers. Made of transparent plastics coated with a special "antistatic" material which might wear off with excessive use, these inexpensive carriers are designed for short term service and should be discarded after a period of usage. *They should be checked periodically to see if they hold a static charge greater than 500 volts in which case they are rejected or recoated.* A 3M Model 703 static meter or equivalent can be used to measure static voltage, and if needed, carriers (and other non-conductive surfaces) can be recoated with "Staticide" (from Analytical Chemical Laboratory of Elk Grove Village, Ill.) to make them "antistatic."
2. Antistatic carriers holding finished devices are stored in transparent static shielding bags made by 3M Company. Made of a special three-layer material (nickle/polyester/polyethylene) that is "antistatic" inside and highly conductive outside, they provide a Faraday cage-like shielding which protects devices inside. "Antistatic" carriers which contain semiconductor devices should be kept in these shielding bags during storage or in transit.

Individual devices should only be handled in a static safeguarded work station.

3. A typical static safeguarded work station is shown below including grounded conductive table top, wrist strap, and floor mat to discharge conductors as well as ionized air blowers to remove charge from nonconductors (clothes). Chairs should be metallic or made of conductive materials with a grounding strap or conductive rollers.



SAFETY EARTH GROUND - This is a safety class I product and is provided with a protective earthing terminal. An uninteruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and be secured against any unintended operation.

BEFORE APPLYING POWER - Verify that the product is configured to match the available main power source per the input power configuration instructions provided in this manual.

If this product is to be energized via an auto-transformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the main power source.

SERVICING

WARNING

Any servicing, adjustment, maintenance, or repair of this product must be performed only by qualified personnel.

Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside this product may still be charged even when disconnected from its power source.

To avoid a fire hazard, only fuses with the required current rating and of the specified type (normal blow, time delay, etc.) are to be used for replacement.

WARNING

EYE HAZARD

Eye protection must be worn when removing or inserting integrated circuits held in place with retaining clips.

Section I
INTRODUCTION

1-1. GENERAL

This diagnostic checks and exercises the HP 12531B or C Buffered Teleprinter Interface and the HP 2752A or 2754A or B Teleprinters. The diagnostic aids the operator in detecting any component that has failed. The teleprinters and interfaces may be used with any of the HP 2100 Series Computers. The diagnostic is run in conjunction with the 2100 Diagnostic Configurator. Software part numbers for this product appear in paragraph 1-3. The Diagnostic Serial Number (DSN) for the teleprinter diagnostic resides in memory location 126 (octal). The DSN is 104003 (octal).

1-2. REQUIRED HARDWARE

The following hardware is required:

An HP 2100 Series Computer with at least 4K of memory.

An HP 12531B or C Buffered Teleprinter Interface with an HP 2752A or HP 2754A or B Teleprinter.

A paper tape reading device (for loading only).

A console device for message reporting is recommended but not required. The teleprinter under test may be used as a console device but it should be kept in mind that errors in messages may occur or it may hang up the configurator driver.

1-3. REQUIRED SOFTWARE

The following software is required:

The Diagnostic Configurator (part numbers listed below) is used for equipment configuration and as a console device driver.

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

Teleprinter diagnostic binary object tape
Part No. 12531-16001.

Section II

PROGRAM ORGANIZATION

2-1. ORGANIZATION

This diagnostic program consists of nine tests plus an Initialization and Control section. Tests 0 through 7 (octal) are the standard test sequence. Test 10 (octal) must be user selected to be executed. The Initialization and Control sections accept the select code and options required by the tests. The tests are called into execution by the Control section as sequential or selectable subroutines. The tests are named as follows:

Basic I/O (Flag and Interrupt logic) - Test 00 (octal).

Punch - Test 01 (octal).

Read - Test 02 (octal).

Print - Test 03 (octal).

Full Keyboard - Test 04 (octal).

Free Input - Test 05 (octal).

Keyboard Echo - Test 06 (octal).

Oscillator Tolerance - Test 07 (octal).

Alignment Routines - Test 10 (octal).

2-2. TEST CONTROL AND EXECUTION

The diagnostic outputs a title message to the console device for operator information and then executes the tests according to the options selected on the Switch Register. The Control section primarily checks Switch Register bits 15, 13, and 12.

The diagnostic 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 diagnostic is restarted.

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

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2-3. TEST SELECTION

The operator has the capability of selecting his own tests or sequences of tests with the help of bit 9 in the Switch Register. Test selections are made after the diagnostic has been configured and one pass has been made through the standard sequence of tests. Paragraph 3-5 outlines test selections.

2-4. MESSAGE REPORTING

There are two types of messages output for diagnostics: error and information. Error messages are used to inform the operator when the subsystem 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 operation related to a function of the equipment. In the latter 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 an 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: (Specific meanings are listed in section IV.)

Example - Error with halt

Message: E021 PRESET (INT) DID NOT DISABLE INTS
Halt Code: 102021 (octal) (T-register or Memory
Data Register)

Example - Information with halt

Message: H024 PRESS PRESET (EXT & INT), RUN
Halt Code: 102024 (octal)

Example - Information only

Message: H025 BI-0 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.

Information messages are suppressed by setting Switch Register bit 10.

Operator intervention is suppressed by setting Switch Register bit 8 (i.e., Preset Test in BI-0). When Switch Register bit 12 is set the tests that are selected will be repeated, and all operator intervention will be suppressed.

2-5. DIAGNOSTIC LIMITATIONS

Interface capability for receiving, passing, and denying priority (priority string logic) is not completely checked by this diagnostic. If the interface does not receive priority (i.e., PRH from the next lower select code) an error E014 NO INT will occur. To check this, remove an interface of a lower select code and run the Basic I/O test. The above mentioned error should occur. Checking the interface's ability to pass or deny priority is beyond the scope of this diagnostic. Also, the Direct Memory Access (DMA) or Dual Channel Port Controller (DCPC), as it is referred to in 21MX Series Computers, portion of the interface is not tested by this diagnostic.

Section III

OPERATING PROCEDURE

3-1. LOADING AND CONFIGURING

First the Diagnostic Configurator is loaded and configured, then this diagnostic is loaded. The Configuration section of this diagnostic must be completed according to instructions that follow, prior to execution. The operator is required to input the channel (I/O select code) of the interface. All related I/O instructions in the diagnostic are then configured to the specified channel select code.

3-2. LOADING BINARY TAPES

Load the Diagnostic Configurator binary object tape. If it is a configured version, proceed with paragraph 3-3; otherwise, configure the program according to the HP 2000 Computer Systems Diagnostic Configurator Reference Manual, part no. 02100-90157.

The operator may dump a configured Diagnostic Configurator binary object tape at this point using the Configurator Dump routine.

Load this diagnostic's binary object tape. At this point, a binary tape of the combined configurator and diagnostic may be dumped using the Configurator Dump routine, otherwise a dump may be accomplished after this diagnostic is configured.

3-3. CONFIGURING THE DIAGNOSTIC

If a preconfigured diagnostic binary tape was loaded, proceed with paragraph 3-4; otherwise, load the P-register with starting address 100 (octal).

Load the Switch Register with the select code of the interface under test, (bits 0 through 5). Press PRESET (INT/EXT) and press RUN. The computer will run and then halt with 102074 (octal) in the Memory Data Register (MDR). If halt 102073 (octal) occurs the select code input was less than or equal to 7 (octal). Correct the select code and press RUN.

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At this point the operator may dump a copy of the configured diagnostic to paper tape. The Configurator Reference Manual has Configurator Dump routine operating instructions. If this is done, the operator must set the P-register equal to 2000 (octal) before continuing to the next section.

3-4. RUNNING THE DIAGNOSTIC

If a preconfigured tape was loaded or the dump routine was used, set the P-register equal to 2000 (octal) if not, do not modify the P-register.

Make a selection of Switch Register options according to table 3-1. If bit 12 is set it causes the diagnostic to loop. Bit 13, when set, is used to loop on a given test running at the time. Bit 15, if set, will halt the computer at the completion of a test. After making a selection press PRESET (INT/EXT) and press RUN. The program will then execute the diagnostic according to the Switch Register options. At the completion of each pass of the diagnostic the pass count is output to the console for operator information. If Switch Register bit 12 was not selected the computer will halt with 102077 (octal) in the Memory Data Register. At this point, the A-register contains the pass count. The operator can press RUN to execute another pass.

3-5. OPERATOR TEST SELECTION

The Control portion of the program provides the operator with a method to select a single test, or sequence of tests to be run. The operator sets Switch Register bit 9 to indicate that a selection is desired. If the computer is halted press RUN. The computer will come to a halt 102075 (octal) to indicate - ready for selection. If the diagnostic is running, the test in progress will be completed, then the program will halt. After the halt, the operator may load the A-register with the test selections. Bit 0 of the A-register represents Test 00, bit 1 represents Test 01, and so on through bit 8, which represents Test 10 (octal). (Refer to table 3-2.) If the operator clears all bits of the A-register, the standard sequence will be run. The operator must then clear Switch Register bit 9 and press RUN. The operator-selected test(s) will then be run.

Table 3-1. Switch Register Options

BIT	MEANING IF SET
0	Reserved
1	Abort Sections
2	Print *U
3	Print '(
4	Print ?C
5	Punch ALL 1s - ALL 0s
6	Read ALL 1s - ALL 0s
7	Reserved
8	Suppress tests requiring operator intervention.
9	Abort current diagnostic execution and halt (102075); the user may specify a new group of tests in the A-register. Then clear bit 9 and press RUN.
10	Suppress non-error messages.
11	Suppress error messages.
12	Repeat all selected tests after diagnostic run has completed without halting. Message "PASS XXXXXX" will be output before looping unless bit 10 is set or a 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 3-2. Test Selection Summary

A-REGISTER BIT	IF SET WILL EXECUTE
0	Test 0 - Basic I/O
1	Test 1 - Punch
2	Test 2 - Read
3	Test 3 - Print
4	Test 4 - Full Keyboard
5	Test 5 - Free Input
6	Test 6 - Keyboard Echo
7	Test 7 - Oscillator Tolerance
8	Test 10 - Alignment Routines*
9 thru 15	Reserved

If user selection is not requested (Switch Register bit 9 is not set) the program will execute all standard tests (Tests 0 through 7. Test 10 is not regarded as a standard test.)

If user selection is requested (Switch Register bit 9 is set) and bits 0 through 8 of the A-register are cleared, all standard tests will be executed. If one or several bits of the A-register (not including bits 9 through 15) are selected only the appropriate tests will be executed. Bits 9 thru 15 are disregarded. If any of these are selected the program defaults to run the standard sequence (Tests 0 thru 7).

* The Alignment Routines test is not included in the default tests and must be user selected to have the test run.

3-6. RESTARTING

The diagnostic may be restarted by setting the P-register to 2000 (octal) and proceeding from paragraph 3-4. To restart and reconfigure, proceed from paragraph 3-3.

If a trap cell halt occurs (106077 octal) the user must determine the cause of the interrupt or the transfer of control to the location in the M-register. The program may need to be reloaded to continue.

Section IV
DIAGNOSTIC PERFORMANCE

4-1. TEST DESCRIPTION

Tests 0 through 10 (octal) are described below. Refer to table 4-2 (comments on halt codes) for additional details on the content of each test. Test 10 (octal), the Alignment Routines, is not in the standard test sequence and must be user selected to be executed.

4-2. BASIC I/O TEST 0

Note that there are seven subtests in Test 0, as follows.

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 through E003 as shown in table 4-2.

Subtest 2 - Checks the ability to clear, set and test the interface flag. 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 through 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 interface 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 from the interface. Error message E004 occurs if CLF 0 fails.

- Subtest 4 - Checks that the flag of the interface 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 interface to interrupt. With the flag and control set and the interrupt system on, the interface should interrupt. If the interrupt is missing 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 hold off operation:

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

Error messages E012 and/or E015 will occur if the hold off failed. If a second interrupt is encountered after the interrupt system has been turned back on error message E013 will occur.

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 Ø
CLC CH
```

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

Checks that the CLC Ø 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 Ø
CLC Ø
```

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

- Subtest 7 - Checks that the PRESET (EXTERNAL and INTERNAL as applicable) switch(es) on the operator panel performs the following actions:

Sets the interface flag (EXTERNAL).

Clears interface control (EXTERNAL).

Turns off the interrupt system (INTERNAL).

Clears the I/O data lines (EXTERNAL).

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4-3. PUNCH TEST 1

This section will punch a given format tape which will be used in test 2 to verify the tape through the reader input. The format is as follows:

Output message H030 TURN ON PUNCH PRESS RUN.

Halt and wait for operator response.

(HP 2752 - Press ON button on tape punch. HP 2754 - put mode control in KT position. Press RUN.)

Output leader.

Output pattern:

```
11111.111
11111.111
11111.110
01111.111
11111.101
10111.111
11111.100
00111.111
```



```
11000.000
00000.011
01000.000
00000.010
10000.000
00000.001
```

Output trailer.

Output message E045 TURN PUNCH OFF.

4-4. READ TEST 2

This section verifies the previously punched tape (punched in test 1). The sequence is as follows:

Output message H031 LOAD PUNCHED TAPE IN READER PRESS RUN.

Halt and wait for operator response.

(Operator must load previously punched tape in reader, start reader, and press RUN.)

Read in leader (if greater than 60 spaces report error).

Verify data pattern (report any differences between expected data and data read).

Read in trailer (if any data occurs during trailer report as error).

Output message E046 TURN READER OFF.

Input may be aborted by selection of Switch Register bit 1.

4-5. PRINT TEST 3

This section will output 10 lines of 64 characters. The first character being a space and the rest as follows:

```
!'"$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`~
```

Note: The brackets and backslash (three characters before the arrows shown above) are achieved with SHIFT K, SHIFT L, and SHIFT M keys.

4-6. FULL KEYBOARD TEST 4

The program will print a given sequence of keys that the operator must enter. (Use CTRL K for VT request and CTRL L for FORM request even though some keyboard K and L keys are labeled I and \FF, respectively.) If the input does not agree with the requested key, the octal equivalent is printed under the requested key. The program then moves on to the next key. This is repeated until all requested keys have been entered. The program will then proceed to the next test. To abort the input cycle set Switch Register bit 1, then clear it. The program will then exit to the next test.

4-7. FREE INPUT TEST 5

The diagnostic outputs the message INPUT ANY KEY. The operator can check any keys that showed an error during the Print test (see paragraph 4-5) and input any combination of keys. The program allows 10 inputs then moves to a new line. If the character that is input is not in the printable range, the octal equivalent is printed. To continue to the next test, set Switch Register bit 1 then clear it.

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4-8. KEYBOARD ECHO TEST 6

In this section no checks are made. The only thing that is enabled is the echo capability of the interface so any input is echoed back to the printer. The program only starts the interface with an STC instruction to enable the continuous echo of each keyboard input. To continue to the next test, set Switch Register bit 1, then clear it.

Here the operator should enter several combinations of characters to insure that the echo function is working properly.

4-9. OSCILLATOR AND CLOCK ENABLE BIT TEST 7

This section of the diagnostic tests that the oscillator is in tolerance and the busy bit is functioning. Ten null characters are output during each pass. The time and busy bit (bit 15) are checked in the following manner:

Is the busy bit low? (NO = E035 BUSY STATUS.)

Output a null character. (OTA STC TTY, C.)

Did the busy bit go high? (NO = E036 NO BUSY STATUS.)

Wait 96 milliseconds. (If card interrupts E034 OSC FAST.)

Wait 7 milliseconds. (If card interrupts time okay.)

Did busy bit go low? (Yes - E037 BUSY BIT WENT LOW BUT NO INT.)

Wait 96 milliseconds. (If card interrupts E041 OSC SLOW.)

Did busy go low? (YES - E037 BUSY WENT LOW BUT NO INT.)

Assume no interrupt. (E042 CLOCK DID NOT TIME OUT.)

4-10. ALIGNMENT ROUTINES TEST 10

This section will be executed only if selected by the operator. It is not included in the standard (default) set of tests and therefore must be selected (refer to paragraph 3-5) to have it run.

When the routine is entered the program scans the Switch Register for the functions the operator has chosen. The description of each follows:

Switch Register bit 2 - Print the ASCII characters *U on the teleprinter. These characters have opposite bit patterns (* = 242 (octal) and U = 125 (octal)) which is useful in checking data lines and teleprinter mechanics. Also on the HP 2752 these characters are on opposite sides of the print drum.

Switch Register bit 3 - Print the ASCII characters '[on the teleprinter. These characters are on opposite corners of the print block of the HP 2754 teleprinter. '[' is on the upper left corner and the] is on the lower right looking at the print block when it is in place.

Switch Register bit 4 - Print the ASCII characters ?C on the teleprinter. These characters are on opposite corners of the print block of the HP 2754 teleprinter and are also opposite the characters '[. ? is in the lower left corner and the C is on the upper right looking at the print block when it is in place.

Switch Register bit 5 - Punch all ones (eight holes) then all zeros (no holes) on the punch. This is useful when aligning the tape punch.

Switch Register bit 6 - Read all ones then all zeros. This routine is used to make the punch section a continuous check of tape punch and reader. The operator should take care that the all ones is the first data read. This will keep things in step. Error E033 is used to report any errors.

After a scan is complete and all selected sections are executed, Switch Register bit 1 is checked to exit the routine.

Also, when 72 printed characters have been output a carriage return line feed will be output.

4-11. ERROR INFORMATION MESSAGE/HALT CODES

A halt code summary appears in table 4-1. Error information messages and halt code meanings appear in table 4-2.

Table 4-1. Halt Code Summary

HALT	MEANING
TESTS 0 (OCTAL) THRU 10 (OCTAL)	
102000 thru 102046	Error (E) or information (H) messages 00 thru 46 (octal).
CONTROL	
102073	Select code input error.
102074	Select code accepted.
102075	User selection request.
102076	End of Test (A-register contains test number).
102077	End of diagnostic run.
106077	Trap cell halt in locations 2 thru 77 (octal).

Table 4-2. Error and Information Messages and Halt Codes

HALT CODE	PROGRAM SECTION	MESSAGE	COMMENTS
None	Test Control	START TTY DIAGNOSTIC	Introductory message.
None	Test Control	TEST XX	Information message before error message (XX equals test number). Message occurs only once within a test and is suppressed for any subsequent messages within the same test.
102000	Test 0	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	E001 CLF 0 -SFS 0 ERROR	CLF/SFS 0 combination failed. CLF did not clear flag or SFS caused skip with flag clear.
102002	Test 0	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	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	E004 CLF 0 DID NOT INHIBIT INT	With card flag and control set, CLF 0 did not turn off interrupt system.
102005	Test 0	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	E006 CLF CH -SFS CH ERROR	CLF/SFS CH combination failed. CLF did not clear flag or SFS caused skip with flag clear.

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

HALT CODE	PROGRAM SECTION	MESSAGE	COMMENTS
102007	Test 0	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	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	E011 STF XX SET CARD FLAG	Select code screen test failed. A-register contains XX (octal) where XX equals select code that caused card flag to set.
102012	Test 0	E012 INT DURING HOLD OFF INSTR	Interrupt occurred during an I/O instruction or a JMP/JSB indirect instruction.
102013	Test 0	E013 SECOND INT OCCURED	Card interrupted a second time after initial interrupt was processed.
102014	Test 0	E014 NO INT	No interrupt occurred with card flag and control set and the interrupt system on.
102015	Test 0	E015 INT RTN ADDR ERROR	Interrupt did not occur at the correct location in memory.
102016	Test 0	E016 CLC CH ERROR	CLC CH did not clear card control with the interrupt system on.
102017	Test 0	E017 CLC 0 ERROR	CLC 0 did not clear the card control with the interrupt system on.
102020	Test 0	E020 PRESET (EXT) DID NOT SET FLAG	PRESET (EXT) did not set the card flag.

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

HALT CODE	PROGRAM SECTION	MESSAGE	COMMENTS
102021	Test 0	E021 PRESET (INT) DID NOT DISABLE INTS	PRESET (INT) did not disable the interrupt system.
102022	Test 0	E022 PRESET (EXT) DID NOT CLEAR CONTROL	PRESET (EXT) did not clear control.
102023	Test 0	E023 PRESET (EXT) DID NOT CLEAR I/O LINES	PRESET (EXT) did not clear I/O data lines.
102024	Test 0	H024 PRESS PRESET (EXT & INT), RUN	Press PRESET (EXTERNAL/INTERNAL) then RUN.
None	Test 0	H025 BI-0 COMP	Basic I/O tests completed.
102026	Test 0	E026 INT EXECUTION ERROR	Interrupt was not processed correctly.
102030	Test 1	H030 TURN ON PUNCH PRESS RUN.	HP 2752 - press the ON button on the punch. HP 2754 - put the mode control in the KT position, then press RUN.
102031	Test 2	H031 LOAD PUNCHED TAPE IN READER PRESS RUN	Place previously punched tape in reader and start the reader, then press RUN.
102032	Test 2	E032 NO DATA DETECTED	No data was detected during read operation for 60 reads.
102033	Test 2 and 8	E033 DATA ERROR EXPECTED XXX.XXXXX ACTUAL XXX.XXXXX	Data read was incorrect. XX.XXX is the hole pattern with the period as the feed hole (X=0 or 1).

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

HALT CODE	PROGRAM SECTION	MESSAGE	COMMENTS
102034	Test 2	E034 DATA DETECTED IN TRAILER	When reading the trail tape data was found before 30 null characters were read.
102035	Test 7	E035 BUSY STATUS	Clock enable bit was up when the card was idle.
102036	Test 7	E036 NO BUSY STATUS	The clock enable bit did not come up when the clock was started.
102037	Test 7	E037 BUSY WENT LOW BUT NO INT	Clock enable bit went low signaling completion but did not set the flag.
102040	Test 7	E040 OSC FAST	Oscillator frequency is too high.
102041	Test 7	E041 OSC SLOW	Oscillator frequency is too low.
102042	Test 7	E042 CLOCK DID NOT TIME OUT	Clock enable is still up and no interrupt has occurred.
102043	Tests 1 thru, 5 and 7	E043 FLAG TIME OUT	Card did not respond to an output command.
102044	Tests 2, 4, 5 and 6	E044 INPUT TERMINATED	Input was aborted by selection of Switch Register bit 1.
102045	Test 1	E045 TURN PUNCH OFF	Used for HP 2752 - press the OFF button on the punch.
102046	Test 2	E046 TURN READER OFF	None.

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

HALT CODE	PROGRAM SECTION	MESSAGE	COMMENTS
102073	Configuration	None	I/O select code entered at configuration is invalid. Must be greater than 7 (octal). Re-enter 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 the desired group of tests to be executed in the A-register then press RUN.
102076	Test Control	None	End of test halt resulting from Switch Register bit 15 being set (A-register equals test number). To continue press RUN.
102077	Test Control	PASS XXXXXX	Diagnostic run complete. (A-register value equals pass count.) Switch Register options may be changed. To continue, press RUN.
106077	Test Control	None	Halt stored in locations 2 through 77 (octal) to trap interrupts which may occur unexpectedly because of hardware malfunctions. M-register contains the I/O slot number of interrupt. Diagnostic may be partially destroyed if halt occurs. The program may have to be reloaded; the problem should be corrected before proceeding.
NOTE: Test numbers and error halt codes are in octal.			

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Cable: BLUESTAR
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PUNE 411 011
Tel: 22775
Cable: BLUE STAR
A

Blue Star Ltd.
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Blue Star Ltd.
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E

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P

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Cable: FEMUS Rawalpindi
A,E,M

Mushko & Company Ltd.
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Telex: 2894 MUSKO PK
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Calle Samuel Lewis, Ed. Alta
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Foto Internacional, S.A.
Colon Free Zone
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Telex: 8626 IMPORT PG
P

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Los Flamencos 145, San Isidro
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Metro MANILA
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Proponents Inc.
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Telex: 40018, 42000 ITT GLOBE
MACKAY BOOTH
P

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Intercambio Mundial de Comércio
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Telex: 16691 munter p
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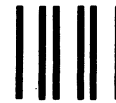
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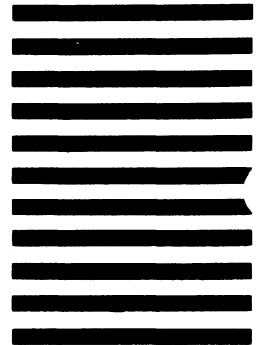


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