



HP 2100 FLOATING POINT DIAGNOSTIC

HP Product No. HP 24251



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Cupertino, California 95014

Manual of Diagnostics
Diagnostic Program Procedure
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HP 2100 FLOATING POINT DIAGNOSTIC

This diagnostic tests the HP 12901A Floating Point Option for the HP 2100 computer. It is a GO-NOGO test, exercising the Floating Point Option by comparing actual results with software-derived expected results. The diagnostic does not perform fault isolation; it does determine whether the Floating Point Option is working properly.

The information obtained by executing this diagnostic is not reliable if the following HP 2100 Diagnostics cannot successfully be executed prior to running this test.

<u>Diagnostic</u>	<u>Product No.</u>	<u>Document No.</u>
HP 2100 ALTER-SKIP INSTRUCTION TEST	HP 24208	02100-90019
HP 2100 MEMORY REF. INSTRUCTION TEST	HP 24209	02100-90018
HP 2100 SHIFT-ROTATE INSTRUCTION TEST	HP 24210	02100-90017
HP 2100 TTY TEST	HP 24201	5951-1365
HP 2100 MEMORY PROTECT TEST	HP 24222	02100-90006
HP 2100 EXTENDED ARITH. UNIT TEST	HP 24214	02100-90007

HARDWARE CONFIGURATION

This diagnostic runs on a 2100 computer with the HP 12901A option and a teleprinter.

SOFTWARE REQUIREMENTS

A SIO teleprinter driver is required in addition to the binary object tape containing the diagnostic.

OPERATIONAL CHARACTERISTICS

The diagnostic consists of the following seven tests.

Test

1. Fence and Indirect Test
2. FAD - Floating Add
3. FSB - Floating Subtract
4. FMP - Floating Multiply
5. FDV - Floating Divide
6. FIX - Floating to Fixed Point Number Conversion
7. FLT - Fixed to Floating Point Number Conversion

Normally the tests are run in the sequence: FAD, FSB, FMP, FDV, FIX and FLT. At the beginning of each 100 cycles, the Fence (memory protect boundary) and Indirect (indirect ADD) Test is executed. The diagnostic is controlled through the switch register and any of the tests except Fence and Indirect can be included or excluded in any particular cycle of the diagnostic. Switch register settings are shown in Table FPD-1.

At the start of each test, new arguments are produced by an internal random number generator (unless the generator is turned off via the switch register). The arguments are used to produce actual results and expected results (via software). The results are compared and any difference constitutes an error. Also, at the start of each test, the overflow register is cleared. The expected OV result is compared with the actual OV result and any difference is considered an error.

On the first test and at the beginning of each 100 cycles a multi-level indirect ADD test is executed. Successful execution of this test ensures that indirects are being handled properly and the fence value is properly restored.

Table FPD-1
Switch Register Settings

<u>Switch</u>	<u>Meaning If Set (or on)</u>
0	Add test will be executed.
1	Subtract test will be executed.
2	Multiply test will be executed.
3	Divide test will be executed.
4	Fix test will be executed.
5	Float test will be executed.
6	New random number will not be generated.
7	Not used
8	Not used
9	Display number of cycles and errors.
10	Terminate program.
11	Supress error messages.
12	Halt at end of 100 cycles.
13	Loop back to last executed test.
14	Halt on each error.
15	Halt after each test.

NOTE: If switches 0 through 5 are not set, all tests are executed in the normal sequence.

OPERATING INSTRUCTIONS

The diagnostic can be run in either of two ways: under control of the switch register or under control of an "internal switch register." To use the "internal switch register," the diagnostic must first be configured. Note that after configuration is complete, all switch register switches must be off for the "internal switch register" to be effective. If one or more switches of the switch register are set when the diagnostic is executed, the contents of the "internal switch register" are gnored and the diagnostic executes under control of the switch register.

At any time during the execution of a configured diagnostic, the run can be halted (by pushing HALT) and the diagnostic can be re-configured. When the diagnostic is run under control of the switch register, the user need not halt execution to select a different set of tests and/or options. In this case, the user need only set the switch register to the desired setting and the diagnostic executes those tests and/or options.

Configure And Execute

- a. Using BBL or BBDL, load and configure the appropriate SIO Teleprinter Driver.
- b. Load the diagnostic.
- c. Set starting address 2_8 .
- d. Consult Table FPD-1 to determine which tests and options are desired. Set the switch register accordingly.
- e. Push RUN.
 - (1) If the computer halts with 107001_8 displayed, the switch register is not properly set.
 - (2) If the computer halts with 107077_8 displayed, the "internal switch register" is set and the diagnostic is configured.
- f. Set all switch register switches off, if the diagnostic is to be run as configured. Prior to running the configured diagnostic, however, the user can set the switch register to any desired setting and run under control of the switch register by pushing RUN. Afterward, all the switch register switches can be set off and the diagnostic can be executed as it was configured.

Execute Non-configured Diagnostic

- a. Using BBL or BBDL, load and configure the appropriate SIO Teleprinter Driver.
- b. Load the diagnostic.
- c. Set starting address 100_8 .
- d. Consult Table FPD-1 to determine which tests and options are desired. Set the switch register accordingly.
- e. Push RUN.



NOTE: The SIO System Dump program can be used to make a binary tape of the configured SIO Teleprinter Driver and the diagnostic if desired.

MESSAGES

The program provides two types of messages; diagnostic and error description. Message data, except for cycle and error counts, is in octal; cycle and error counts are in decimal.

Diagnostic Messages

Except for the cycle and error messages, the diagnostic messages are switch-independent. To obtain the cycle and error messages, switch 11 must be on.

<u>Message</u>	<u>Remarks</u>
H1 2100 FLOATING PC IT DIAGNOSTIC	Printed at start of diagnostic

Table FPD-2

Halt Codes

HALT	MEANING
107001B	Error in switch setting during configuration
107077B	End of configuration section
102002B	Memory protect did not interrupt on an illegal store operation
102003B	Memory protect interrupted on a store in the fence boundary
102004B	Memory protect did not interrupt on an illegal store operation
102010B	End of first test
102011B	End of floating addition test
102012B	End of floating subtraction test
102013B	End of floating multiplication test
102014B	End of floating division test
102015B	End of FIX test
102016B	End of Float test
102020B	Indirect floating addition error
102021B	Floating add error
102022B	Floating subtract error
102023B	Floating multiply error
102024B	Floating divide error
102025B	Fix error
102026B	Float error
102076B	End of 100 cycles
102077B	End of test