HP 2100
PROCESSOR INTERCONNECT CABLE TEST

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HP 2100 PROCESSOR INTERCONNECT CABLE TEST

This diagnostic Program tests only the cable connector assemblies of the HP 12875 Processor Interconnect Kit for Hewlett-Packard computers. The assemblies are tested for open lines and for shorts between lines. It assumes that both computers and all microcircuit interface boards have been tested.

HARDWARE CONFIGURATION

The HP 12875 Processor Interconnect Kit, which consists of four 12566-6001 microcircuit interface boards and two 12875-60001 interconnecting cables, is used to connect any two Hewlett-Packard 2100 , 2116, 2115, or 2114 computers together.

To run this diagnostic test, connect one of the cable assemblies between the two microcircuit boards in the same computer, forming a loop. Check that jumpers are installed on both microcircuit boards according to Table PRO-1. Run the diagnostic test with one cable installed; then remove the cable just tested, replace it with the other cable, and repeat the test.

A teleprinter should be used to report errors and messages to the operator. If a teleprinter is not available, errors and messages are reported by specially coded halt displays in MEMORY DATA.

FUNCTIONAL AND OPERATIONAL CHARACTERISTICS

If a teleprinter is used, the SIO teleprinter driver is loaded and configured first. Then the diagnostic program is loaded and configured in two phases:

1. *Program configuration* is accomplished by the switch register settings listed in Table PRO-2.
2. *Program options* for a normal run of the diagnostic are selected by setting the switch register as listed in Table PRO-3, then pressing RUN. These settings become an internal switch register.

If an option has to be changed during the run, the internal switch register is overridden by setting switch register bit 0 and other appropriate bit(s) according to Table PRO-3.

After the configuration procedures are complete, use the SIO System Dump program to make a permanent copy of the configured diagnostic. This eliminates configuring when the diagnostic is used again.

If an error is detected, the program prints a message on the teleprinter, then halts with a value displayed in MEMORY DATA. If a teleprinter is not available, after the diagnostic halts, check MEMORY DATA content against Table PRO-4. If a teleprinter is not available, data is contained in the A- (and B-) register. All halt messages are summarized in Table PRO-4.

PROGRAM ORGANIZATION

The diagnostic routine consists of the routines shown in Figure PRO-1 and described below:

CFGR — This routine configures select codes (I/O channels), for the presence or absence of a teleprinter, and sets the internal switch register for the options selected.

START — The START routine prints the start-of-diagnostic message on the teleprinter.

TG1 — Test Group 1 checks the Device Command lines of both HP 12566-01 boards for continuity and shorts. Errors detected in this group must be corrected before TG2 (Test Group 2) is run.

TG2 — Test Group 2 checks the Data Lines of both HP 12566-01 boards for continuity and shorts. The output lines from Channel A (see Table PRO-2) are checked first, then Channel B. The test consists of three steps:

1. Issuing a "1" state on one data line while issuing a "0" state on all the other data lines.

2. Issuing a "0" state on one data line while issuing a "1" state on all the other data lines.

3. Repeating the first pattern.

These three steps are repeated successively for each data line starting at bit 0 and continuing through bit 15.

END — This routine prints the end-of-diagnostic message on the teleprinter, then tests option bit 12 for a request to halt at the end of the complete diagnostic cycle.

NOTE: This END routine has provisions for return of execution control to a suitable executive program, if present.

MESSAGE ANALYSIS

All diagnostic messages printed on the teleprinter are prefixed by an alphanumeric code. An H prefix indicates an operating instruction, while an E prefix signals an error message.

All halts display a value in MEMORY DATA. Refer to Table PRO-4 to analyze the halt conditions, then press RUN to continue the diagnostic program.

OPERATING INSTRUCTIONS

To Configure the Diagnostic

a. Make sure jumpers on both HP 12566-6001 boards are installed according to Table PRO-1, then install both boards in the computer.

b. Connect the HP 12875-60001 cable assembly between the two HP 12566-6001 boards.

c. If available, load the SIO teleprinter driver with the Basic Binary Loader and configure the driver.

d. Load the HP 2100 Processor Interconnect Cable Test tape with the Basic Binary Loader.

e. Set Starting Address 2_8.

f. Specify program configuration by setting the switch register (see Table PRO-2) then press RUN. If the settings are correct, the computer halts with 107076_8 displayed in MEMORY DATA.

g. Select the internal switch register options by setting the switch register as listed in Table PRO-3, then press RUN. The computer halts with 107077_8 displayed in MEMORY DATA.

To Make A Tape Of The Configured Diagnostic

a. If a High Speed Tape Punch is available, load the SIO Tape Punch driver with the Basic Binary Loader and configure the driver.

b. If a High Speed Tape Punch is not available, turn on the teleprinter tape punch.

c. Load SIO System Dump.

d. Set Starting Address 2_8.

e. Set switch register bit 15.

f. Press RUN.

g. A configured HP 2100 Processor Interconnect Cable Test Tape is punched. The computer halts with 102077_8 displayed in MEMORY DATA. To make additional copies of the configured HP 2100 Processor Interconnect Cable Test Tape, press RUN.

To Load And Execute The Diagnostic

NOTE: Eliminate step a. if continuing from configuration.

a. Load the configured HP 2100 Processor Interconnect Cable Test with the Basic Binary Loader.

b. Set Starting Address 100_8.

c. If options other than those in the internal switch register are to be used (see step f, to configure the diagnostic), set switch register bit 0 on, then select the desired options by setting the switch register as listed in Table PRO-3.

d. Press INTERNAL and EXTERNAL PRESET, then RUN. The diagnostic routine executes according to the options selected.

e. After all routines are completed, a printed message signals that the program has finished. Then, if option bit 12 is set (see Table PRO-3), the computer halts with 102077_8 displayed in MEMORY DATA.

If an error is detected by Test Group 2, compare the output pattern with the input pattern. For example, if Channel A output is 001000_8 and Channel B input is 000000_8, check bit 9 lines for continuity or for shorts.

Table PRO-1

HP 12566-01 Board Jumper Installations

Jumper	Position
W1	A
W2	B
W3	B
W4	B
W5 through W8	connected
W9	A

Table PRO-2

Program Configuration--Switch Register Settings

SWITCH REGISTER

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Function
0-5	Set to the Select Code of the HP 12566-01 board in the lower-numbered I/O channel. This board is treated as Channel A by the diagnostic.
6-11	Set to the Select Code of the HP 12566-01 board in the higher-numbered I/O channel. This board is treated as Channel B by the diagnostic.
12	Spare.
13	Set on if a teleprinter is not available.
14-15	Spares.

Table PRO-3

Program Options--Switch Register Settings

SWITCH REGISTER

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Function
0	Must be set on (may be done at any time) to override the internal switch register to change an option. This bit has no effect when set in the internal switch register.
1-9	Spares.
10	Set to suppress start and stop messages.
11	Set to suppress all teleprinter messages.
12	Set to halt at the end of a complete diagnostic cycle.
13	Set to repeat the routine just ended rather than advance to the next routine.
14	Set to suppress all error halts
15	Set on halt at the end of each routine to allow the option to repeat the routine. See bits 0 and 13.

Table PRO-4

Diagnostic Messages

MEMORY DATA	Routine	Message	Comments
102001	TG1	E1. CHECK FOR DEV. COMM. LINES SHORTED TO EACH OTHER	
102002	TG1	E2. CH-A DEV. COMM. LINE NOT WORKING	Check for Channel A Device command line open, grounded, or shorted to another line.
102003	TG1	E3. CH-B DEV. COMM. LINE NOT WORKING	Check for Channel B Device command line open, grounded, or shorted to another line.
102004	TG2	E4. CH-A OUTPUT NOT EQ. TO CH-B INPUT. OUT = *xxxxxx* IN = *xxxxxx*	One or more Channel A output lines are not functioning properly. Compare patterns to help determine problem. A-register contains Channel A output data. B-register contains Channel B input data.
102010	TG2	E10. CH-B OUTPUT NOT EQ. TO CH-A INPUT. OUT = *xxxxxx* IN = *xxxxxx*	One or more Channel B output lines are not functioning properly. Compare patterns to help determine problem. A-register contains Channel B output data. B-register contains Channel A input data.
102014	START	H14. START 12875 CABLE DIAGNOSTIC	Halt occurs if option bit 15 is set.
102077	END	H77. END 12875 CABLE DIAGNOSTIC	End of diagnostic. To repeat, set options (see Table PRO-3) and press RUN.
107001	TG1	(none)	To repeat test for E1, set option bits 0 and 13 and press RUN.
107002	TG1	(none)	To repeat test for E2, set option bits 0 and 13 and press RUN.
107003	TG1	(none)	To repeat test for E3, set option bits 0 and 13 and press RUN.

Table PRO-4. Diagnostic Messages (cont.)

MEMORY DATA	Routine	Message	Comments
107004	TG2	(none)	To repeat Channel A output pattern, set option bit 0 and 13 and press RUN.
107010	TG2	(none)	To repeat Channel B output pattern, set option bits 0 and 13 and press RUN.
107073	CFGR	(none)	Configuration error, Channel A and Channel B select codes specified are the same; respecify and press RUN.
107074	CFGR	(none)	Configuration error, Channel A select code specified incorrect; respecify and press RUN.
107075	CFGR	(none)	Configuration error, Channel B select code specified incorrect; respecify and press RUN.
107076	CFGR	(none)	Set internal switch register options (see Table PRO-3) and press RUN.
107077	CFGR	(none)	Configuration complete. Use SIO System Dump or set Starting Address 100_8 and press RUN.