Online Diagnostics Subsystem Manual, Volume II: Device Adapters

HP 3000 Series 900 Computers
HP 9000 Series 800 Computers

HEWLETT PACKARD

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The software code printed alongside the date indicates the version level of the software product at the time the manual or update was issued. Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correspondence between product updates and manual updates.

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Safety and Regulatory Information

For your protection this product has been tested to various national and international regulations and standards. The scope of this regulatory testing includes electrical/mechanical safety, radio frequency interference, ergonomics, acoustics, and hazardous materials. Where required, approvals obtained from third-party test agencies are shown on the product label. In addition, various regulatory bodies require some of the information under the following headings.

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The United States Federal Communications Commission (in 47CFR Subpart J, of Part 15) has specified that the following notice be brought to the attention of the users of this product:

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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取扱説明書に従って正しい取り扱いをして下さい。

Japanese Radio Frequency Notice

Safety Considerations

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation. The following figure shows some of the safety symbols used on the product to indicate various safety considerations.

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 done correctly 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 done correctly or adhered to, could damage or destroy part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

Preface

This manual contains information about the Online Diagnostics Subsystem Device Adapter Diagnostics for the HP 3000 Series 900 and HP 9000 Series 800 computer systems. It is intended to be used as technical support hardware documentation for Hewlett-Packard CEs, CEC Engineers, SEs, and other qualified support personnel. The procedures and software described are focused primarily on the hardware troubleshooting environment and require specific training for correct and safe usage. Specifically, this manual describes the Online Diagnostics Subsystem Device Adapter diagnostic programs currently supported, and descriptions of the subsystem under MPE XL and HP-UX.

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AFI Device Adapter Diagnostic

Introduction

The AFI Device Adapter Diagnostic (Asynchronous FIFO Interface Device Adapter Diagnostic, **AFIDAD**) will test the HP 27114A AFI. This diagnostic runs on any HP 9000 Series 800 computer system. **AFIDAD** is part of the Online Diagnostic Subsystem and will:

- Identify the product type and the hardware revision code number.
- Report the status of the AFI card.
- Reset the AFI card.
- Test the majority of the circuits on the AFI card.
- Perform a loopback test of AFI circuits, including the frontplane interface circuitry. This test requires the use of the loopback test hood.
- Allow the user to directly control the state machine on the AFI card.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10014.

Minimum Configuration

The hardware required to run **AFIDAD** consists of an HP 9000 Series 800 computer, an AFI card, and a loopback test hood. Required software includes an HP-UX operating system, the AFI driver, and the Online Diagnostic subsystem, of which **AFIDAD** is a part. All of this software is contained on the Fundamental Operating System (FOS) tape, and is automatically installed when the tape is first read on your computer system. Contact your system manager if the appropriate software is not present on your system.

Operating Instructions

Sections 2, 4, 5, and 7 of **AFIDAD** are destructive and require security 1. Refer to the section on the DUI for information on the available security levels and test modes, and how each are determined.

Default Tests

If you do not specify sections to be run, the single default section, Section 3, will be executed.

Run Command

To bring up the On-Line Diagnostic subsystem, enter the following command to the HP-UX system prompt:

```
% sysdiag
```

The Diagnostic subsystem responds with the following prompt indicating that diagnostic system access has been granted to the user:

```
DUI >
```

Typing HELP causes a summary of the DUI and its commands to be printed. Refer to the DUI Section of this manual for details.

Note

The device to be tested must be powered up and on line. Device physical locations (pdev) shown in the RUN commands are those of the devices on the "typical A1002A" system configuration described in the chapter on DUI. The pdev value entered must be correct for the system being tested.

For example, to run the diagnostic, you might enter:

```
DUI >     run afidad pdev=4.5 <RUN Command Options>
                      |          |
                      |     none required for
                      |     default test suite
                      |
                insert physical location of
                device adapter to be tested here,
                or type the devfile name
```

The user must specify either a physical device number PDEV or a logical device number LDEV as part of the run command string. The LDEV or the diagnostic device file for the respective AFI card must be present if the AFI card is specified via a diagnostic device file name. Diagnostic device file name for the AFI is usually called gpio0, gpio1, ...etc., and can be found in /dev/diag as are other diagnostic device file names on the HP-UX OS.

Test Execution

If the system is unable to grant access to the AFI, the Online Diagnostic subsystem prints an error message. (The AFIDAD diagnostic will not output an error message, and will terminate.) When the system is able to grant access to the AFI, the welcome message will be displayed.

```
*************************************************************
*****                                                   ***
*****       AFIDAD AFI Device Adapter Diagnostic        ***
*****                                                   ***
*****     (C) Copyright Hewlett Packard Co. 1987        ***
*****               All Rights Reserved.                ***
*****                 Version A.00.00                   ***
*****                                                   ***
*************************************************************

  Welcome, Today is MON, August 10, 1987 at 12:30 PM
```

Any possible errors are reported when they are detected. The section stops as soon as an error is detected. Most errors in AFIDAD are descriptive such that they can be used to trace to a specific failure. If a section executes without error, it is so reported.

If you enter HELP, a general description of the AFIDAD diagnostic will be displayed. If you enter the More Help section, AFIDAD will display a description of the specified section.

Test Descriptions

There are seven diagnostic sections available in AFIDAD. There are no steps in any section of AFIDAD. There is only one default section: Section 3, Identify. You may select any of the other sections to execute when you run AFIDAD.

Section 1	More Help
Section 2	Reset
Section 3	Identify
Section 4	Hardware Test
Section 5	Loopback Test
Section 6	Status
Section 7	Register Level Input/Output Transactions

Section 1—MORE HELP

The More Help Section prompts you for the section which needs more description. A Return terminates this section. If you specify a wrong section number, it will be rejected and you will be prompted for another section number.

Section 1 is normal and is not in the default set.

Section 1 will output the following message:

```
Section 1 -- More Help

   This Section allows you to get more information on any of the
   sections [1..7] of this diagnostic.  Please indicate the number
   of the section for which you require more information.
   Entering a lone <CR> to the prompt exits this section.

   More Help (1..7, <CR>) :

End of Section 1 -- More Help
```

Section 2—RESET

The Reset Section is used to perform a complete reset of the AFI card. It has the same effect on the AFI card as a power on of the host computer (i.e., the card is reset and the self-test is downloaded from the host computer and executed).

Section 2 is destructive and is not in the default set.

If no errors are generated, section 2 will output the following message:

```
Section 2 -- Reset

   NO ERRORS DETECTED while resetting the device adapter.

End of Section 2 -- Reset
```

Section 3—IDENTIFY

The Identify Section is the default section executed whenever AFIDAD is run and is used to identify the card under test. The test is aborted if the identified card is not an AFI card. Other information reported includes the device adapter manager revision number and hardware code revision code number.

Section 3 is normal and is the only section in the default set.

If no errors are generated, section 3 will output the following message:

```
Section 3 -- Identify

   CIO card ID byte  = 32
   Hardware Revcode  = ?
   DAM available for hardware revision ?

End of Section 3 -- Identify
```

Section 4—HARDWARE TEST

The Hardware Test Section exercises the majority of circuits on the AFI card. The only circuits not covered are the frontplane interface circuits (these circuits are exercised by Section 5).

Section 4 is destructive and is not in the default set.

If no errors are generated, section 4 will output the following message:

```
Section 4 -- Hardware Test

   CIO card ID byte         = 32
   Hardware Revcode         = ?
   DAM available for hardware revision ?

   No hardware errors found.

End of Section 4 -- Hardware Test
```

Section 5—LOOPBACK TEST

The Loopback Test Section exercises all testable circuits on the AFI card, including the fronplane interface circuits. It checks all line drivers and receivers. This section requires the use of the AFI card loopback test hood.

Section 5 is destructive and is not in the default set.

If no errors are generated, section 5 will output the following message:

```
Section 5 -- Hardware test with test hood

   CIO card ID byte      = 32
   Hardware Revcode      = ?
   DAM available for hardware revision ?
```

```
No hardware errors found.

End of Section 5 -- Hardware test
```

Section 6—STATUS

The Status section reports the current conditions of the AFI card. This information includes the:

- condition of the ARQ and ARQ Enable flip-flops
- condition of parity enable
- conditions of FIFO
- states of frontplane handshake signals PFLAG and PCTL
- presence or absence of test hood
- states of the peripheral status lines

Section 6 is normal and is not in the default set.

If no errors are generated, Section 6 will output the following message:

```
Section 6 -- Status

  ARQ interrupt is pending/clear.

  ARQ interrupt is enabled/disabled.

  CEND is asserted/de-asserted.

  FIFO has room for data/is full.

  FIFO has data in it/no data in it.

  PFLG is asserted/de-asserted.

  PCTL is asserted/de-asserted.

  Transfer counter equals zero/is not equal to zero.

  Transfer counter value is ?

  ATTN is reset/set.

  DEND is reset/set.

  FIFO contains approximately
 0 - 8  words
 9 - 31 words
32 - 55 words
56 - 64 words

  State of status lines STS0 through STS5 (in that order):
      Asserted
      De-asserted

End of Section 6 -- Status
```

Section 7—REGISTER LEVEL INPUT/OUTPUT TRANSACTIONS

The Control Section allows you to directly control the state machine on the AFI card. You are prompted for a new control value to be output to the card. Illegal values (such as out of range, etc.) are rejected and you are prompted for another value. Once a value is accepted and output to the card, the current status of the AFI card is also reported in an abbreviated form. You should have a good working knowledge of the AFI card to get any worthwhile results from using this section.

Section 7 is destructive and is not in the default set.

If no errors are generated, section 7 will output the following message:

```
Section 7 -- Register Level Input/Output Transactions

   Enter register selection , read/write and output data (if applicable)
   User register 2 for poll function.  Last entered value for same
   question is repeated if carriage return is entered.

   Register number (0, 1, 2 [POLL], 3, 7, 9, 10, 11, exit) =

   Input 0 for read, 1 for write:

End of Section 7 -- Register Level Input/Output Transactions
```

Error Messages

The following is a list of error messages which may appear when using AFIDAD. Other error messages may occur which do not have the AFIDAD # trailer; these messages are generated by the Online Diagnostic Subsystem or the operating system. Consult the DUI section of this manual and the operating system manuals for these errors. The "!" indicates that a parameter of some sort will replace the exclamation point when the message is displayed.

99	**THE MAXIMUM NUMBER OF ERROR MESSAGES HAS BEEN EXCEEDED. (AFIDADERR 99)**
CAUSE	
ACTION	

202	**AN ERROR OCCURRED DURING RESET. (AFIDADERR 202) AFI_DAR STATUS RETURNED = !**
CAUSE	
ACTION	

1XXYY	**THE FOLLOWING ERROR IS NUMBERED AS 1XXYY WHERE XX IS STEP AND YY IS SUB-STEP HARDWARE ERROR DETECTED (AFIDADERR !)**
CAUSE	
ACTION	

-1	**RESOURCE ALLOCATION ERROR IN SYSTEM. (AFIDADERR -1) TEST IS TERMINATED**
CAUSE	
ACTION	

Contents

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PSI Device Adapter Diagnostic

Introduction

PSIDAD tests Programmable Serial Interface cards on an HP Precision Architecture RISC computer system which supports the Online Diagnostic subsystem.

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing Product Number 30600-10027.

Minimum Configuration

The minimum configuration required to run this diagnostic consists of an HP Precision Architecture RISC computer system up and running on either the MPE XL or HP-UX operating system.

Operating Instructions

The PSIDAD Diagnostic is accessed by the user via the Diagnostic User Interface.

Default Tests

If you do not specify sections and steps to be run, the following default sections and steps will be executed depending on the current mode of the system:

Section 3	Identify
Section 5	Selftest
Section 6	Status

RUN Command

To bring up the Online Diagnostic subsystem, enter the following command to the system prompt:

```
sysdiag
```

The diagnostic subsystem responds with the following prompt indicating that access has been granted to the user:

```
DUI >
```

Typing **HELP** causes a summary of the DUI function and its commands to appear on the screen.

Note

The device to be tested must be powered up and on line. The physical device location (pdev) shown below is only an example. The pdev value entered must be correct for the system being tested.

For example, to run the diagnostic in an MPE XL environment, you might enter:

```
DUI > RUN PSIDAD pdev=24 <RUN Command Options>
                         |          |
                         |   none required for
                         |   default test suite
                         |
                  insert physical location of
                  device adapter to be tested here;
                  alternatively, for MPE XL,
                  type the ldev number;
                  for HP-UX, type the devfile name
                  (e.g., dev = /dev/diag/psi0)
```

All parameters available in the **RUN** command are acceptable as parameters when running this diagnostic.

Note

For the 2.0 release, the manner in which steps are designated for execution with the run command has changed; for example, from `section = 9 step = 92` to `section = 9(92)`.

Test Execution

When PSIDAD is run, the following header will be displayed:

```
**********************************************************
*****                                                *****
*****        PSIDAD PSI Device Adapter Diagnostic    *****
*****                                                *****
*****     (c) Copyright Hewlett-Packard Co. 1988     *****
*****                  Version A.00.04               *****
*****                                                *****
**********************************************************

Welcome, Today is MON FEB 22 17:31:53 1988
```

Test Section Descriptions

The following test sections are available with PSIDAD:

Section 1	More Help
Section 2	Reset
Section 3	Identify
Section 5	Selftest
Section 6	Status
Section 8	Internal Hardware
Section 9	External Hardware
Section 10	Manufacturing Utilities
Section 15	EEPROM Failure History (HP-PB only)

Note

For the 2.0 release version of this diagnostic, there is no **More Help** section. Help is obtained by entering **help psidad** at the DUI prompt.

Section 1 - More Help

This section allows the user to obtain more information about a particular section or step in PSIDAD. The security level is normal. This is an interactive section which asks for the number of the section for which more information is desired. To exit this section, simply enter Return to the More Help prompt.

Note

For the 2.0 release version of this diagnostic, there is no **More Help** section. Help is obtained by entering **help psidad** at the DUI prompt.

Output:

```
      Section 1 -- More Help

   This section allows you to get more information on all of
   the sections [1..10] of this diagnostic.  Please indicate the
   number of the section for which you need more information.
   Entering a <return> to the prompt exits this section.

   More Help >>

      End of Section 1 -- More Help
```

Section 2 - Reset

Section 2 brings the PSI Device Adapter into an operational (power-on) state, clearing any residual error conditions. The security level is destructive.

Output:

```
Section 2 -- Reset

PSI card and driver successfully reset.

End of Section 2 -- Reset
```

Section 3 - Identify

Section 3 conveys static information about the hardware, firmware, driver, and DAR. The security level is normal.

Output:

```
Section 3 -- Identify

Hardware version:
  Hardware model = $4
  Hardware revision  = $0
Software version:
  Software model = $20
  Software revision = $0
  Software option = $20
IO_DC revision = $0
First EPROM part number = 1818-xxxx; date code = 2808
Second EPROM part number = 1818-xxxx; date code = 2808
RAM starting address = $FFFC0000; size = $4000
DAR version = A.00.00; driver ID = 77

End of Section 3 -- Identify
```

Section 5 - Selftest

Section 5 verifies that the board hardware is generally operational. The security level is destructive.

Output:

For Midbus, the following output is typical:

```
Section 5 -- Selftest

Selftest passed.

End of Section 5 -- Selftest
```

For HP-PB, the following output is typical:

```
Section 5 -- Selftest

Performing a reset_HT...

Performing a reset...

Performing reads and writes to PSI card...

Performing a selftest...

Selftest passed.

End of Section 5 -- Selftest
```

Section 6 - Status

Section 6 conveys information about the current dynamic state of the board. The security level is normal.

Output:

The following numbers are not real and are used only as examples.

```
Section 6 -- Status

ROM firmware currently running.
Current firmware part number = 1818-xxxx; date code = 2808
Current firmware version: model = $6; revision = $0; option = $2
Cable type connected: No cable or hood connected

End of Section 6 -- Status
```

Instead of the first message, you could see:

```
Downloaded firmware currently running.
```

Instead of the last message you could see any one of the following:

```
Cable type connected: X.21 for X.27 male termination

Cable type connected: RS-232C/V.28 modem eliminator female termination

Cable type connected: V.35 male termination

Cable type connected: RS-366 with RS-232C male terminations

Cable type connected: RS-449 for RS-422/V.11 male termination (37 pin only)

Cable type connected: RS-232C/V.28 male termination

Cable type connected: Diagnostic hood
```

The HP-PB card provides additional information, as in the following example:

```
Max TRS registers = 1; Active TRS registers = 1

Firmware version number =

Card state: Selftest has completed.
```

Section 8 - Extended Hardware Test

Section 8 isolates those hardware errors that can be detected without requiring the user to manipulate the hardware. The security level is destructive.

Step 81 — Register Access Test: Exercises the card's slave circuitry and verifies that the hardware can write to and read from all 256 TRSs.

Step 82 — Memory test (Midbus = 13.5 sec.; HP-PB = 3.5 min.): Consists of a ROM checksum followed by a RAM test, exercising ROM and RAM bits and addressing. All of RAM is tested, so the TRS and most card state variables are overwritten when this command is executed. If this test completes, the card is left in something similar to the reset state.

Step 83 — Master circuitry test - Read16: Exercises the card master circuitry's Read16 capability.

Step 84 — Midbus master circuitry test - Chain execution: Tests the hardware required for normal chain execution and exercises the completion list and interrupt mechanism.

Quix test - tests the Quix's operation (this is step 84 for HP-PB cards).

Step 85 — (SRS CMD_STOP test): Checks the effects of a command stop on the 68000 microprocessor and the register save mechanism. This test uses downloaded test firmware to put the 68000 microprocessor into an infinite loop at non-maskable interrupt level 7 (i.e., nothing but a CMD_STOP or CMD_RESET can get it out of the loop).

Step 86 — Frontplane test: Checks the SCC chip, partially by looping 100 data bytes internally through the SCC at 64000 baud. Downloading firmware is required for this test also.

Step 87 — Selftest: This is the same test that Section 5 of the diagnostic consists of. It is included because it is the next logical test in this sequence.

Output:

```
Section 8 -- Internal Hardware

   Step 81 - Register Access Test

   Dots represent a successful write transaction to a TRS (slave)
   register set between 0 and 255.  If there was an error, an
   asterisk and an error message is displayed.
   ................................................................
   ................................................................
   ................................................................
   ................................................................
```

```
      Dots represent a successful read transaction to a TRS (slave)
      register set between 0 and 255.  If there was an error, an
      asterisk and an error message is displayed.
      ..............................................................
      ..............................................................
      ..............................................................

      Register access test passed.

      End of Step 81 - Register Access Test

   End of Section 8 -- Internal Hardware

   Section 8 -- Internal Hardware

      Step 82 - Card Memory Test

      Memory test passed.

      End of Step 82 - Card Memory Test

   End of Section 8 -- Internal Hardware

   Section 8 -- Internal Hardware

      Step 83 - Master Test: Read16

      Read16 test passed.

      End of Step 83 - Master Test: Read16

   End of Section 8 -- Internal Hardware

   Section 8 -- Internal Hardware

      Step 84 - Master Test: Chain Execution

      Chain execution test passed.
```

Note

At this point, if you have an HP-PB system, the message displayed will be "Quix test passed" instead of "Chain execution test passed."

```
      End of Step 84 - Master Test: Chain Execution

   End of Section 8 -- Internal Hardware

   Section 8 -- Internal Hardware

      Step 85 - CMD_STOP Test
```

```
Downloaded firmware currently running.
Current firmware part number = 1818-xxxx; date code = 2808
Current firmware version: model = $6; revision = $0; option = $2
Cable type connected: X.21 for X.27 male termination

   CMD_STOP test passed.

   End of Step 85 - CMD_STOP Test

End of Section 8 -- Internal Hardware

Section 8 -- Internal Hardware

   Step 86 - Frontplane Test

Downloaded firmware currently running.
Current firmware part number = 1818-xxxx; date code = 2808
Current firmware version: model = $6; revision = $0; option = $2
Cable type connected: X.21 for X.27 male termination

   Frontplane test passed.

   End of Step 86 - Frontplane Test

End of Section 8 -- Internal Hardware

Section 8 -- Internal Hardware

   Step 87 - Selftest

   Selftest passed.

   End of Step 87 - Selftest

End of Section 8 -- Internal Hardware
```


Note

For HP-PB systems, Step 87 (Selftest) generates additional text. This HP-PB version follows immediately.

```
Section 8 -- Internal Hardware

   Step 87 - Selftest

   Performing a reset_HT...

   Performing a reset...

   Performing reads and writes to PSI card...
```

```
   Performing a selftest...

   Selftest passed.

   End of Step 87 - Selftest

End of Section 8 -- Internal Hardware
```

Section 9 - External Loopback

Section 9 tests the frontplane transceivers, cable and modem. The security level is destructive. Before executing the test, the user should attach an appropriate cable(s), test hoods, and modem if desired. The modem is set to loopback mode by hand, because the various configurations of modems make this difficult to do programmatically.

Step 91 — Data Loopback - Non-interactive is the default step for Section 9. Uses the following loopback test parameters: 100 data bytes, baud rate 64000, cable type depends on what the firmware sees, 100 loopback.

Step 92 — Data Loopback - Interactive prompts the user for byte count, baud rate, cable type to simulate, and repeat count. If the user enters (Return) to the prompts, the default values from Step 91 are used.

Output:

The numbers are for example only. Cable type will vary. If the user presses (Return) to the "Cable type to simulate" prompt, the default cable type is selected for him.

```
Section 9 -- External Loopback

Downloaded firmware currently running.
Current firmware part number = 1818-xxxx; date code = 2808
Current firmware model = $45; revision = $0; option = $2
Cable type connected: X.21 for X.27 male termination

   Step 91 - Data Loopback - Non-interactive

   Data loopback test passed.

   End of Step 91 - Data Loopback - Non-interactive

End of Section 9 -- External Loopback

Section 9 -- External Loopback

Downloaded firmware currently running.
Current firmware part number = 1818-xxxx; date code = 2808
Current firmware model = $45; revision = $0; option = $2
Cable type connected: X.21 for X.27 male termination
```

```
Step 92 - Data Loopback - Interactive

   Byte count (dec 2..4016, use '$' if hex) [4] =>26


   Legal baud rates
   ----------------
   300           2400          19200
   600           3600          38400
   1200          4800          56000
   1800          7200          64000
   2000          9600          120000

   Minimum baud rate = 300, maximum baud rate = 120000
   Type in an integer baud rate [64000] =>0

   LEGAL cable types to simulate
   -----------------------------
   0   No cable or hood connected - internal loopback
   1   X.21 for X.27 male termination
   2   RS-232C/V.28 modem eliminator female termination
   3   V.35 male termination
   4   RS-366 with RS-232C male terminations
   5   RS-449 for RS-422/V.11 male termination (37 pin only)
   6   RS-232C/V.28 male termination
   7   Diagnostic hood

   The default cable type is 1.

   Cable type to simulate =>0
   Repeat count (a 32 bit number, use '$' if hex) [1] =>2

   Dots represent a successful data loopback.  If there was
   an error, an asterisk and an error message is displayed.
   ..

   Data loopback test passed.

   End of Step 92 - Data Loopback - User Interactive

End of Section 9 -- External Loopback
```

Section 10 - Manufacturing Utilities

Section 10 provides the user with various tools for firmware and hardware testing. It is meant for manufacturing and should be very cautiously approached, as it can be executed while the data communication link is up. The security level is normal.

Step 101 CMD_STOP: This will result in the firmware saving the current contents of its processor registers, and possibly some other state information, into a reserved area of RAM, and then returning to ROM control.

Step 102 Peek: This step allows the user to look at RAM and ROM locations on the board. The user is prompted for an address or an I/O register number.

Step 103 Poke: This step allows the user to poke (insert new values into) RAM locations. The user is prompted for an address or an I/O register number.

Step 104 Start Microprocessor: This step allows the user to specify an address in the 68000 address space which contains the next instruction to be executed.

Step 105 Download: The user is prompted for the name of the file to be downloaded.

Step 106 Dump: RAM dump into a preallocated file.

Step 107 Card Status: Reads and displays card status information to verify firmware currently running on the card.

Step 108 Diagnostic Test Program (DTP)

Output:

The following output includes examples of selecting different steps from the PSIDAD menu.

```
Section 10 -- Manufacturing Utilities

   End of Step 101 - CMD_STOP

   101 - CMD_STOP    104 - START MICRO    107 - CARD STATUS
   102 - PEEK        105 - DOWNLOAD       108 - DIAGNOSTIC TEST PROGRAM
   103 - POKE        106 - DUMP           e,exit,<return> - EXIT
   Step number => 101

   Step 101 - CMD_STOP

   End of Step 101 - CMD_STOP
```

```
       101 - CMD_STOP   104 - START MICRO   107 - CARD STATUS
       102 - PEEK       105 - DOWNLOAD      108 - DIAGNOSTIC TEST PROGRAM
       103 - POKE       106 - DUMP          e,exit,<return> - EXIT
       Step number => 102

       Step 102 - Peek

       Hex starting address (no '$') =>FFFC0000
       Byte count (a 32 bit number - use '$' if hex) [2] =>40

ADDRESS    DATA                                      ASCII

$FFFC0000  2222 2222 2222 2222  2222 2222 2222 2222
$FFFC0010  2222 2222 2222 2222  2222 2222 2222 2222
$FFFC0020  2222 2222 2222 2222

       End of Step 102 - Peek

       Step 102 - Peek

       Hex starting address (no '$') =>FFFFFFFF
       Byte count (a 32 bit number - use '$' if hex) [2] =>3

ADDRESS    DATA                                      ASCII

$FFFFFFFE  3333 3333                                 3333

       End of Step 102 - Peek
       Step 103 - Poke

       Byte or word poke (0,1) [0] =>
       Hex starting address (no '$') =>fffffc00
       Hex byte =>12
       Hex byte =>

       End of Step 103 - Poke
```

```
101 - CMD_STOP   104 - START MICRO   107 - CARD STATUS
102 - PEEK       105 - DOWNLOAD      108 - DIAGNOSTIC TEST PROGRAM
103 - POKE       106 - DUMP          e,exit,<return> - EXIT
Step number =>103

Step 103 - Poke

Byte or word poke (0,1) [0] =>1
Even starting address (no '$') =>03
This is not a legal address.  Please try again.
Even starting address (no '$') =>04
Hex word =>34
Hex word =>

End of Step 103 - Poke

101 - CMD_STOP   104 - START MICRO   107 - CARD STATUS
102 - PEEK       105 - DOWNLOAD      108 - DIAGNOSTIC TEST PROGRAM
103 - POKE       106 - DUMP          e,exit,<return> - EXIT
Step number =>104

Step 104 - Start Microprocessor

Even starting address (no '$') =>FFFFFC15
Hex PSW (no '$') [2000] =>

End of Step 104 - Start Microprocessor
```

```
101 - CMD_STOP   104 - START MICRO   107 - CARD STATUS
102 - PEEK       105 - DOWNLOAD      108 - DIAGNOSTIC TEST PROGRAM
103 - POKE       106 - DUMP          e,exit,<return> - EXIT
Step number =>105

Step 105 - Download

The download filename must be no more than 8 characters long.
Filename =>dnldfile

End of Step 105 - Download

101 - CMD_STOP   104 - START MICRO   107 - CARD STATUS
102 - PEEK       105 - DOWNLOAD      108 - DIAGNOSTIC TEST PROGRAM
103 - POKE       106 - DUMP          e,exit,<return> - EXIT
Step number =>106

Step 106 - Dump

End of Step 106 - Dump
```

```
   101 - CMD_STOP    104 - START MICRO    107 - CARD STATUS
   102 - PEEK        105 - DOWNLOAD       108 - DIAGNOSTIC TEST PROGRAM
   103 - POKE        106 - DUMP           e,exit,<return> - EXIT
   Step number =>107


   Step 107 - Card Status

ROM firmware currently running.
Current firmware part number = 1818-xxxx; date code = 2808
Current firmware model = $20; revision = $1; option = $1
Cable type connected: X.21 for X.27 male termination

   End of Step 107 - Card Status

   101 - CMD_STOP    104 - START MICRO    107 - CARD STATUS
   102 - PEEK        105 - DOWNLOAD       108 - DIAGNOSTIC TEST PROGRAM
   103 - POKE        106 - DUMP           e,exit,<return> - EXIT
   Step number =>Return
End of Section 10 -- Manufacturing Utilities
```

Section 15 - EEPROM Failure History (HP-PB only)

This section makes a call to the PSI card to read EEPROM and retrieve selftest failure history. The failure history information is static (the data remains in EEPROM even though power to the system is turned off) so it is important to note that the information displayed is from the LAST selftest failure. This information is never cleared out, only overwritten by the next failure.

Output:

```
*************************************************************
****                                                     ******
****        PSIDAD PSI Device Adapter Diagnostic         ******
****                                                     ******
****       (C) Copyright Hewlett-Packard Co. 1988        ******
****                All Rights Reserved                  ******
****                  Version  A.01.01                   ******
****     Message File Version  A.01.01                   ******
****                                                     ******
*************************************************************

Welcome, Today is Wed, Apr 05, 1989 04:13:18 PM

    Section 15 -- EEPROM failure history

Section 15 - Failure History
     This section reads and displays the LAST selftest failure information
     that was stored in the EEPROM's.  Important: The failure has no date
     associated with it, therefore the reason for the selftest failure
     may not still exist.

**** ERROR - This is where selftest failure information will be displayed.

    End of Section 15 -- EEPROM failure history
```

Error Messages

This section gives a list of the error messages that are generated by PSIDAD. The general action associated with any PSIDAD error message is to replace the PSI Device Adapter Card, unless otherwise stated in the error message. The "!" will be replaced by a parameter when the message is actually displayed.

809	*** ERROR -- TRS ILLEGAL CMD TEST FAILED. (PSIDADERR 809) ***Read of the TRS IO_COMMAND register does not match the illegal ***test command written to TRS IO_COMMAND.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

810	*** ERROR -- ILLEGAL WRITE TO TRS IO_COMMAND UNDETECTED. (PSIDADERR 810) ***The illegal test command written to the TRS IO_COMMAND register ***was not detected - no errors reported in TRS IO_STATUS.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

811	*** ERROR -- UNEXPECTED IO_DMA_LINK CONTENTS. (PSIDADERR 811) ***The hardware did not latch bus address bit in the slave status ***register. TRS IO_COMMAND write and read of the illegal test ***command changed the contents of IO_DMA_LINK.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

812	*** ERROR -- TRS IO_COMMAND WRITE/READ FAILED. (PSIDADERR 812) ***Write of CMD_CLEAR to TRS IO_COMMAND does not match read.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

813	*** ERROR -- CMD_CLEAR FAILURE. (PSIDADERR 813)
	***CMD_CLEAR did not clear the *hard error command* caused by writing
	***an illegal test command to the TRS IO_COMMAND register.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

816	*** ERROR -- TRS TEST FAILURE. (PSIDADERR 816)
	***IO_DMA_LINK read does not match write for TRS !.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

840	*** ERROR -- CMD_STOP DID NOT SAVE STACK POINTER. (PSIDADERR 840)
	***The stack pointer was not saved into the *save byte* in RAM upon
	***writing a cmd_stop to the card.
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

919 *** ERROR -- DATA LOOPBACK ERROR. (PSIDADERR 919)

```
***During repeat #!, byte #! in the received data buffer does
***not match the corresponding byte in the sent data buffer.  The
***sent byte contains the value !, and the received byte the value
***!.  If nothing is connected to the card's front edge, then
***replace the card.  Otherwise, replace the most recent card front
***edge addition (cable or hood, modem ... ).

    ***SCC channel A:   WR0  = !   WR1  = !   WR2  = !   WR3  = !
    ***                 WR4  = !   WR5  = !   WR6  = !   WR7  = !
    ***                 WR8  = !   WR9  = !   WR10 = !   WR11 = !
    ***                 WR12 = !   WR13 = !   WR14 = !   WR15 = !
    ***
    ***                 RR0  = !   RR1  = !   RR2  = !   RR3  = !
    ***                 RR10 = !   RR12 = !   RR13 = !   RR15 = !
    ***
    ***SCC channel B:   WR0  = !   WR1  = !   WR2  = !   WR3  = !
    ***                 WR4  = !   WR5  = !   WR6  = !   WR7  = !
    ***                 WR8  = !   WR9  = !   WR10 = !   WR11 = !
    ***                 WR12 = !   WR13 = !   WR14 = !   WR15 = !
    ***
    ***                 RR0  = !   RR1  = !   RR2  = !   RR3  = !
    ***                 RR10 = !   RR12 = !   RR13 = !   RR15 = !
    ***
    ***DMA0 WRITE
    ***     status = !;  DMA0 error = !;  DMA0 transfer count = !;
    ***     device control = !;           operation control = !;
    ***     sequence control = !;         channel control = !;
    ***     mem addr register = !;  dev addr register = !;
    ***
    ***DMA0 READ
    ***     status = !;  DMA0 error = !;  DMA0 transfer count = !;
    ***     device control = !;           operation control = !;
    ***     sequence control = !;         channel control = !;
    ***     mem addr register = !;  dev addr register = !;
```

CAUSE Probable PSI Card or cable failure

ACTION Further loopback testing needed to determine PSI Card or cable failure.

5000	••• ERROR -- PSI ALREADY IN USE BY DIAGNOSTIC SYSTEM. (PSIDADERR 5000) •••Someone is already diagnosing the PSI that you requested. •••It is illegal to have two copies of PSIDAD diagnosing the •••same PSI at the same time.
CAUSE	PSI Card already in use
ACTION	Make sure PSI Card is not already in use and reexecute PSIDAD

5011	••• ERROR -- PROGRAM SERVICE CALL FAILED. (PSIDADERR 5011) •••Program Service ! failed.
CAUSE	Probable PSIDAD internal error
ACTION	Contact HP Support Personnel

5044	••• ERROR -- ! IO_STATUS READY BIT NOT SET. (PSIDADERR 5044)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

Error Message Headers

The messages listed in the following section are always displayed with either one or two more messages that tell you more about the error. Even though two or three error messages are displayed, only one error has been encountered by PSIDAD. The general action associated with any PSIDAD error message is to replace the PSI Device Adapter Card, unless otherwise stated in the succeeding error messages. The "!" will be replaced by a parameter when the message is actually displayed.

201	***** ERROR -- RESET CALL FAILED (PSIDADERR 201)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

202	***** ERROR -- RESET FAILED (PSIDADERR 202)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

315	***** ERROR -- GET ID_DC CALL FAILED. (PSIDADERR 315)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

316	***** ERROR -- DAR VERSION CALL FAILED. (PSIDADERR 316)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

501	***** ERROR -- SELFTEST CALL FAILED. (PSIDADERR 501)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

502	*** ERROR -- SELFTEST FAILED. (PSIDADERR 502)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

615	*** ERROR -- READ CARD STATUS CALL FAILED. (PSIDADERR 615)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

616	*** ERROR -- READ CARD STATUS FAILED. (PSIDADERR 616)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

804	*** ERROR -- WRITE TO TRS IO_DMA_LINK REGISTER CALL FAILED. (PSIDADERR 804)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

805	*** ERROR -- READ FROM TRS IO_DMA_LINK REGISTER CALL FAILED. (PSIDADERR 805)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

806	***** ERROR -- IO_DMA_LINK READ/WRITE FAILED. (PSIDADERR 806)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

807	***** ERROR -- TRS IO_COMMAND REGISTER WRITE CALL FAILED. (PSIDADERR 807)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

808	***** ERROR -- TRS IO_COMMAND REGISTER READ CALL FAILED. (PSIDADERR 808)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

811	***** ERROR -- ILLEGAL WRITE TO TRS IO_COMMAND UNDETECTED. (PSIDADERR 811) ***The illegal test command written to the TRS IO_COMMAND register ***was not detected. Instead, the following error was reported.**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

820	***** ERROR -- MEMORY TEST CALL FAILED. (PSIDADERR 820)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

821	***** ERROR -- MEMORY TEST FAILED. (PSIDADERR 321)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

824	***** ERROR -- TRS IO_DMA_LINK WRITE FAILED. (PSIDADERR 824)** *****Write physical address to TRS IO_DMA_LINK failed.**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

825	***** ERROR -- CMD_RD16 FAILED. (PSIDADERR 825)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

826	***** ERROR -- READ16 FAILED. (PSIDADERR 826)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

827	***** ERROR -- READ FROM TRS IO_DMA_COMMAND REGISTER CALL FAILED. (PSIDADERR 827)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

828	*** ERROR -- READ FROM TRS IO_DMA_ADDRESS REGISTER CALL FAILED. (PSIDADERR 828)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

829	*** ERROR -- READ FROM TRS IO_DMA_COUNT REGISTER CALL FAILED. (PSIDADERR 829)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

836	*** ERROR -- CCMD_IN_MASTERTEST CALL FAILED. (PSIDADERR 836)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

837	*** ERROR -- CCMD_IN_MASTERTEST FAILED. (PSIDADERR 837)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

841	*** ERROR -- CMD_STOPTEST CALL FAILED. (PSIDADERR 841)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1006	*** ERROR -- CMD_STOP WRITE FAILED. (PSIDADERR 1006)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1007	*** ERROR -- CMD_STOP FAILED. (PSIDADERR 1007).
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1015	*** ERROR -- CCMD_CTRL_PEEKADDR CALL FAILED. (PSIDADERR 1015)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1016	*** ERROR -- CCMD_CTRL_PEEKADDR FAILED. (PSIDADERR 1016)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1017	*** ERROR -- PEEK CALL FAILED. (PSIDADERR 1017)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1018	*** ERROR -- PEEK FAILED. (PSIDADERR 1018)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1026	*** ERROR -- POKE CALL FAILED. (PSIDADERR 1026)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1027	*** ERROR -- POKE FAILED. (PSIDADERR 1027)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1032	*** ERROR -- START MICROPROCESSOR CALL FAILED. (PSIDADERR 1032)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1033	*** ERROR -- START MICROPROCESSOR FAILED. (PSIDADERR 1033)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1036	***** ERROR -- DOWNLOAD CALL FAILED. (PSIDADERR 1036)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

1048	***** ERROR -- DUMP CALL FAILED. (PSIDADERR 1048)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

5001	***** ERROR -- PSI_DAR INITIALIZATION #1 FAILED. (PSIDADERR 5001)**
CAUSE	Probable PSIDAD internal error
ACTION	Contact HP Support Personnel

5002	***** ERROR -- PSI_DAR INITIALIZATION #2 FAILED. (PSIDADERR 5002)**
CAUSE	Probable PSIDAD internal error
ACTION	Contact HP Support Personnel

5012	***** ERROR -- IO_STATUS CALL FAILED. (PSIDADERR 5012)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

5013	***** ERROR -- TRANSMIT CALL FAILED. (PSIDADERR 5013)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute **PSIDAD**

5014	***** ERROR -- TRANSMIT FAILED. (PSIDADERR 5014)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute **PSIDAD**

5015	***** ERROR -- RECEIVE CALL FAILED. (PSIDADERR 5015)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute **PSIDAD**

5016	***** ERROR -- RECEIVE FAILED. (PSIDADERR 5016)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute **PSIDAD**

5017	***** ERROR -- ERROR REPORTED IN TRS IO_STATUS. (PSIDADERR 5017)**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute **PSIDAD**

5018	*** ERROR -- ERROR REPORTED IN SRS IO_STATUS. (PSIDADERR 5018)
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

Contents

11

HP-FL Adapter Diagnostic

Introduction

The HP-FL Diagnostic (HPFLDIAG) tests the HP-FL Adapter card on any HP Precision Architecture RISC computer system which supports the Online Diagnostic subsystem. HPFLDIAG will:

- Verify the integrity of the data path through the HP-FL subsystem (via loopback operations)
- Identify the product types of the various hardware modules
- Clear the subsystem hardware and run internal diagnostics (selftest)
- Obtain and decode status from the HP-FL interface card
- Determine whether the HP-FL subsystem is fully functional and, if not, suggest the cause and action to correct the problem.

Minimum Configuration

HPFLDIAG is designed to test and verify the HP-FL Adapter card configured and installed on any PA-RISC computer with zero or more peripherals (currently HP793XFL disk drives) connected across the HP-FL interface. In addition, LLIO manager diagnostic support must be provided for the HP-FL subsystem.

Auto-Diagnostics

If the Low Level I/O system detects a catastrophic error related to the HP-FL subsystem, a request may be made to execute HPFLDIAG in auto-diagnostic mode. In this mode, section 11 will be executed to perform a comprehensive check-out of the subsystem. If all tests are successful, HPFLDIAG will inform the system that the hardware is ok to use. If not, it will instead inform the system that the hardware is unusable. If at all possible, HPFLDIAG will determine the suspected field replaceable unit(s) that is causing the problem and report it.

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing Product Number 30600-10008.

Operating Instructions

The HP-FL Diagnostic is accessed by the user via the Diagnostic User Interface.

Default Tests

If you do not specify sections and steps to be run, the following default sections and steps will be executed depending on the current mode of the system:

Section 10	All Modes
Section 11	Destructive Mode Only

RUN Command

To bring up the Online Diagnostic subsystem, enter the following command to the system prompt:

```
sysdiag
```

The diagnostic subsystem responds with the following prompt indicating that access has been granted to the user:

```
DUI >
```

Typing `HELP` causes a summary of the DUI function and its commands to appear on the screen.

Note

The device to be tested must be powered up and on line. The physical device location (pdev) shown below matches the same device shown on the "typical A1002A" system configuration, described in the chapter on DUI. The pdev value entered must be correct for the system being tested.

For example, to run the diagnostic in an MPE XL environment, you might enter:

```
DUI > RUN HPFLDIAG pdev=4.3 <RUN Command Options>
                           |          |
                           |   none required for
                           |   default test suite
                           |
              insert physical location of
              device adapter to be tested here;
              alternatively, for MPE XL,
              type the ldev number;
              or for HP-UX, type the devfile name;
              or for HP-UX in this example, type pdev=4.3.0
```

All parameters available in the RUN command are acceptable as parameters when running this diagnostic. However, the only required parameter is the physical path (pdev) of an HP-FL interface card to be tested, unless, the only section selected is 12, in which case no device is required.

When HPFLDIAG is run, the following header will be displayed:

```
*********************************************************
*****                                                ***
*****                  HPFL DIAGNOSTIC               ***
*****                                                ***
*****     (C) Copyright Hewlett Packard Co. 1987, 1990 ***
*****                 All Rights Reserved.           ***
*****                    Version A.02.01             ***
*****                                                ***
*********************************************************

Welcome, Today is MON, MAY 22, 1987, 9:00AM
```

The first operation that will be performed will be to verify that the I/O path to the selected device is functioning properly. This will be accomplished by calling the IO_PATH_TEST service which does a series of loopbacks to the modules on the I/O path that precede the selected HPFL interface card. If this service encounters any problems in the path, the following message will be displayed:

```
*** WARNING THE I/O PATH TO THE SELECTED CARD MAY NOT BE FUNCTIONING
    PROPERLY  (HPFLWARN ####).
```

If this occurs, the problem which prompted the user to execute this diagnostic is most likely in one of the modules (CIO card, cables, bus converter, etc.) that are in the path from the host to the HPFL interface card.

Whether or not IO_PATH_TEST reported an error, the diagnostic will continue.

Next, HPFLDIAG will perform a rollcall operation on the HPFL interface card to determine what peripherals are connected to the card. If the rollcall fails, the following warning will be displayed:

```
*** WARNING -- THE IDENTITY OF THE DRIVES CONNECTED TO THE LINK
    HPFL CONTROLLER COULD NOT BE OBTAINED. SECTIONS 10 AND/OR 11
    SHOULD BE RUN IN ORDER TO ISOLATE THE PROBLEM. (HPFLWARN 5027)
```

Note that this warning implies an actual failure on the rollcall operation as opposed to a successfull rollcall which determined that no drives are connected. If sections 10 or 11 were selected in this particular run, they will isolate the problem that is causing rollcall to fail. If either of those sections were not selected, the diagnostic should be run again if the user wishes to have the problem isolated.

If the rollcall was successful, HPFLDIAG will display the drives that were found to be connected to the HP-FL interface card:

The HP-FL Interface card indicates that the following flex drives are connected:

```
Drive (n)
Drive (n)
.
.
.
Drive (n)
```

If the rollcall was not successful, a message will be displayed indicating that fact.

Several of the tests available in HPFLDIAG can be directed to one or more HPFL controllers connected to the HPFL interface card (e.g., step 12, step 22, section 10, etc.). In order to determine which, if any, of the controllers should be tested, the user will be prompted to input the controller(s) to which these tests should be directed. In order to assist the user in this determination, The prompt that is displayed is as follows:

```
The following drive(s) may be selected for testing:


    DRIVE n - selects a single drive to test where n is the number of
              the drive ;

    LINK - selects the LINK drive (the drive which is physically
           connected to the HPFL interface card via the optical
           cable);

    ALL - selects ALL drives (the LINK drive and all others connected
          to it);

    NONE - selects no drive. Only the HP-FL Interface card will be
           tested;

    Please input your selection (<CR> for ALL drives) >>
```

If the user selects a particular drive to test (by entering "DRIVE n"), all tests which are directed at a target drive will be directed to that drive only, regardless of whether or not the result of the prior rollcall operation indicated that the drive is actually connected. The following message will be displayed:

```
Drive (n) will be tested as the target drive.
```

If the user selects the LINK drive, HPFLDIAG will determine which drive is the link drive via an identify command directed at the link controller. If the identification fails for some reason, the following warning will be displayed:

```
*** WARNING -- THE IDENTITY OF THE LINK HPFL CONTROLLER COULD
```

```
NOT BE OBTAINED. SECTIONS 10 AND/OR 11 SHOULD BE RUN IN ORDER
TO ISOLATE THE PROBLEM. MEANWHILE, ANY TESTS THAT REQUIRE A
TARGET DRIVE WILL NOT BE PERFORMED.
```

If this occurs, some tests, such as step 6, will not execute because they perform an operation on a specific target drive number. As for the trouble-tree sections (10 and 11), the portions of the trouble-trees that test the drive controller will not be executed.

If the identify command succeeds, the following message will be displayed to tell the user which target drive will be used:

```
The link drive (number n) will be tested.
```

The diagnostic will then proceed just as if the user had entered the link drive number at the prompt.

If the user selects ALL drives, HPFLDIAG will test all drives which were found to be connected via the rollcall command that was previously issued. If the rollcall command had failed or found no drives to be connected, no errors will be generated at this point but any tests that require a target drive will not execute. In either case, the following message will be displayed:

```
All drives will be tested.
```

Finally, if the user selects the NONE option, only HP-FL interface card tests will be executed. The following message will be displayed:

```
No target drives will be tested. Only HP-FL Interface card tests
will be performed.
```

If this occurs, some tests, such as step 6, will not execute because they perform an operation on a specific target drive number. As for the trouble-tree sections (10 and 11), the portions of the trouble-trees that test drive controllers will not be executed.

At this point, the sections and steps specified by the user will be executed and the results output. If the user did not specify sections and steps to be run, the default sections will be executed. If the diagnostic is running in Non-Exclusive/Non-Destructive or Excusive/Non-Destructive mode, the default section will be 10. Otherwise, for Exclusive/Destructive mode, sections 10 and 11 will be executed.

If, at any time, the number of errors generated exceeds the limit specified by the user in the ERRCOUNT parameter of the run command, the following message will be output:

```
THE MAXIMUM NUMBER OF ERROR  MESSAGES HAS BEEN REACHED (HPFLERR ####)
```

The diagnostic will then terminate execution. If the ERRPAUSE parameter of the RUN command was assigned a value of "on", then this diagnostic will stop after each error is generated and ask the user if the test should continue:

```
Do you wish to continue (Y/N)[ Y ]?
```

If the response is "Y" (or Return), the test will be resumed (if possible), and if the response is "N", this diagnostic will terminate. If the sections and steps specified by the user were executed the number of times specified in the LOOP parameter of the run command without the number of errors exceeding the ERRNUM value, the diagnostic will terminate normally and the following message output:

```
HP-FL Diagnostic Exiting . . .
```

Upon termination of this diagnostic, control will return to the Diagnostic system.

Test Section Descriptions

HPFLDIAG has the following sections and steps available:

Section 2	Clear
Step 6	Configure Clear Target Drive
Step 7	Reset Clear Target Drive
Step 8	Reset Interface
Section 3	Identify
Step 12	Target HP-FL Controller Identify
Step 13	Link Controller Identify
Step 14	HP-FL Interface Identify
Section 4	Loopback
Step 20	HPFL Interface Loopback
Step 21	Link Device Loopback
Step 22	Target Device Loopback
Step 23	HP-FL Interface Internal Loopback
Step 24	HP-FL Interface External Loopback
Section 6	HP-FL Interface Global Status
Section 10	Verification Trouble Tree
Section 11	Diagnostic Trouble Tree
Section 12	On-Site Trouble Tree

Section 2—CLEAR

This section provides the user with the means of performing several different types of clear operations on the HP-FL hardware. Destructive mode will be needed to execute this section.

Step 6 - Configure Clear	Issues a configure clear command to the target HPFL controller. If no target drive was selected for testing, this step will not execute and an error message will be displayed to the user. If all drives were selected for testing, the clear will be issued to each drive that is known to be connected. This is a soft clear which brings the device into a known state. No internal drive selftest will be run as a result of executing this command.
Step 7 - Reset Clear	Issues a reset clear command to the target HPFL controller. If no target drive was selected for testing, this step will not execute and an error message will be displayed to the user. If all drives were selected for testing, the clear will be issued to each drive that is known to be connected. This command will reset all device hardware and software just as if the power switch was cycled. Power-on selftest will be run on the drive and the results displayed if not successful.
Step 8 - Reset Interface	Issues a reset command to the selected HPFL interface card. Power-on selftest will be run on the HPFL interface card and the results displayed if not successful.

OUTPUT:

```
Section 2 -- Clear

   Clearing drive (n) ...
   .
   .
   .
   Clearing drive (n) ...


   Step 6 - Configure Clear Completed


   Resetting drive (n) ...
   .
   .
   .
   Resetting drive (n) ...


   Step 7 - Reset Clear Completed

   Step 8 - Reset Interface Completed


End of Section 2 -- Clear
```

ERROR MESSAGES:

*** THE SELECTED DEVICE FAILED ITS INTERNAL SELFTEST. (DSSERR 539)

*** WARNING -- A TARGET DRIVE MUST HAVE BEEN SELECTED IN ORDER
TO RUN THIS STEP. NO OPERATION WAS PERFORMED. (HPFLWARN 5024)

Section 3—IDENTIFY

This section provides the user with the means of identifying the various hardware modules in the HP-FL subsystem. This section will run in any mode.

Step 12 - HPFL Controller Identify	Issues an identify command to the target HPFL controller, and then decodes and displays the returned information. If no target drive was selected for testing, this step will not execute and an error message will be displayed to the user. If all drives were selected for testing, the identify will be issued to each drive that is known to be connected.
Step 13 - Link Controller Identify	Issues an identify command to the well-known virtual circuit of the link HPFL controller (i.e., the controller connected directly to the host via a fiber optic cable), and then decodes and displays the returned information. If no drives were selected for testing, this step will not execute and an error message will be displayed to the user.
Step 14 - HPFL Interface Identify	Issues an identify command to the selected HPFL interface card, decodes and displays the returned information.

OUTPUT:

```
Section 3 -- Identify

   Identifying drive (n) ...

   Identity class -- HPFL host SPU interface
                        or
                     HPFL multiplexer
   Device class   -- Pseudo device
                        or
                     CS/80
                        or
                     Class unknown
   Deadlock avoidance scheme -- None (full duplex device)
                                    or
                                Half duplex master device
                                    or
                                Half duplex slave device
                                    or
                                Not defined
   Protocol controller revision code -- nn


   Identifying drive (n)

   (identity data for this drive)
   .
   .
   .

   Identifying drive (n)
```

```
(identity data for this drive)


Step 12 - HPFL Controller Identify Completed

Identity class -- HPFL host SPU interface
                     or
                  HPFL multiplexer
Device class   -- Pseudo device
                     or
                  CS/80
                     or
                  Class unknown
Deadlock avoidance scheme -- None (full duplex device)
                                  or
                             Half duplex master device
                                  or
                             Half duplex slave device
                                  or
                             Not defined
Protocol controller revision code -- nn
Number of receive errors since last heartbeat -- nn
Controller number -- 0


Step 13 - Link Controller Identify Completed


Card ID - NN
Firmware ID - NN
Firmware revision date - NNNN
MPX - NN
Hardware revision - NN
Mode - NN
Number of active ports - NN
Number of requests per port - NN
Data blocking factor - NNNN

Step 14 - HPFL Interface Identify Completed


   End of Section 3 -- Identify
```

ERROR MESSAGES:

```
*** WARNING -- A TARGET DRIVE MUST HAVE BEEN SELECTED IN ORDER
    TO RUN THIS STEP. NO OPERATION WAS PERFORMED. (HPFLWARN 5024)

*** WARNING -- TESTING OF THE HP-FL CARD ONLY WAS SELECTED.
    AT LEAST ONE DRIVE MUST HAVE BEEN SELECTED FOR TESTING IN
    ORDER TO RUN THIS STEP. NO OPERATION WAS PERFORMED.
    (HPFLWARN 5028)
```

Section 4—LOOPBACK

This section provides the user with access to various forms of loopback. The data pattern that will be used in each loopback operation will follow the pattern:

0,1, . . . ,254,255.

This pattern will be repeated, if necessary, for the entire length of the loopback.

The pattern received from the device will be compared with the pattern sent to verify correct transmission. If the pattern was corrupted, the bytes in error will be displayed to the user.

Although a brief description of the paths covered by the loopback is given in each step, the HP-FL Diagnostics ERS should be consulted for more complete details. Refer to each step description for the test mode necessary to execute it.

Step 20 - HPFL Interface Loopback	Issues a CIO loopback to the selected HPFL interface card. This will verify that the data path across the backplane is working properly. The length of the loopback will be 256 bytes in length. This step will run in any mode.
Step 21 - Link Device Loopback	Issues a loopback command to the well known virtual circuit of the HPFL controller connected to the host (i.e. the link controller). This test will verify that the data path from the HPFL interface adapter RAM to the HPFL controller card on the link drive is working properly. The length of the loopback will be 256 bytes. This step will run in any mode.
Step 22 - Target Device Loopback	Issues a loopback command to the target HPFL controller. If no target drive was selected for testing, this step will not execute and an error message will be displayed to the user. If all drives were selected for testing, the loopback will be issued to each drive that is known to be connected. This test will verify that the data path from the HPFL Interface card RAM to the DMA on the specified HPFL controller card is working properly. The pattern for the loopback will be 32 K bytes in length. This step will run in any mode.
Step 23 - HPFL Interface Internal Loopback	Issues an internal loopback command to the selected HPFL interface card. This test is completely internal to the card. It verifies that the data path within the HPFL Interface card is working properly. This does not include the optical components of the card. The loopback pattern will be 256 bytes in length. Destructive mode is required to execute this test.

Step 24 - HPFL Interface External Loopback

Issues an external loopback command to the selected HPFL interface card. This test covers the same paths that step 23 does with the addition of the optical components of the HPFL controller card. This loopback will be 256 bytes in length and requires that a loopback fiber be installed on the HPFL interface card. The diagnostic will verify whether or not a loopback fiber has been installed on the card. If not, the following warning will be displayed to the user:

```
*** WARNING -- A LOOPBACK FIBER MUST BE INSTALLED ON THE
HPFL INTERFACE CARD IN ORDER FOR THIS TEST TO BE VALID. THIS
CAN BE DONE BY CONNECTING THE TRANSMIT AND RECEIVE PORTS WITH
A SNGLE FIBER. IF YOU STILL WISH TO EXECUTE THIS TEST, PLEASE
INSTALL A FIBER AND THEN ANSWER "Y" TO THE FOLLOWING PROMPT.
IF YOU DO NOT WISH TO CONTINUE, ANSWER "N" TO THE PROMPT. YOU
WILL NOT BE ALLOWED TO PROCEED WITH THIS TEST UNTIL A FIBER IS
PROPERLY INSTALLED.

Do you wish to continue (Y/N)[N]?
```

The user is then expected to either terminate the test by responding "N" to the prompt, or to install a loopback fiber and then reply "Y" to the prompt. If a "Y" response is given, the diagnostic will again verify whether or not a fiber has been installed. If so, the test will continue. If not, the warning and prompt wll be re-displayed. Destructive mode is required to execute this test.

OUTPUT:

```
Section 4 -- Loopback

   Step 20 - CIO Loobpack Completed


   Step 21 - Link Device Loopback Completed


   Initiating loopback to drive (n)
   .
   .
   .
   Initiating loopback to drive (n)


   Step 22 - Target Device Loopback Completed


   Step 23 - HPFL Interface Internal Loopback Completed


   Step 24 - HPFL Interface External Loopback Completed
```

End of Section 4 -- Loopback

ERROR MESSAGES:

*** ERROR IN TRANSMISSION DETECTED DURING LOOPBACK. (HPFLERR 5009)

Byte #	Hex Value Transmitted	Hex Value Received	Bit Positions In Error 01234567
12	2E	2C	00000010
33	57	33	01100100
.			
.			
.			
241	3C	3A	00000110

Note -- entries in the preceeding table will be printed for as many errors as were detected, unless the ERRNUM value is exceeded.

*** WARNING -- A TARGET DRIVE MUST HAVE BEEN SELECTED IN ORDER TO RUN THIS STEP. NO OPERATION WAS PERFORMED. (HPFLWARN 5024)

*** WARNING -- TESTING OF THE HP-FL CARD ONLY WAS SELECTED. AT LEAST ONE DRIVE MUST HAVE BEEN SELECTED FOR TESTING IN ORDER TO RUN THIS STEP. NO OPERATION WAS PERFORMED. (HPFLWARN 5028)

Section 6—STATUS

This section obtains and decodes hardware status from the selected HP-FL interface card.

Output:

```
Section 6 -- Status
   HPFL Global Status:

      Out of Lock  -- (true or false)
      Optical state -- (active or not active)
      More Equal -- (true or false)
      Link State -- (up or down)
      Jupiter Loopback Mode - (true or false)
      Raw Mode -- (true or false)
      Non-Maskable Interrupt -- (set or not set)
      Link (is or is not) dead or dying
      Activity -- (true or false)
      More Equal jumpers are correctly configured
                  or
      More Equal jumpers are mis-configured
      Link (is or is not) performing at normal expectation
      Link (is or is not) responding to requests
      Last Self-Test (passed or failed)
         {if last selftest failed:}
         Failure code -- nn
      Number of Cumulative Link Errors -- nn
      Elapsed Time since last reset -- nn seconds
      nn errors have been detected in the last hour

End of Section 6 -- Status
```

Section 10—VERIFICATION TROUBLE TREE

This section is designed to verify that the communication path from the host to the drive cluster is functioning properly. If not, the suspected causes of the problem will be reported. Several possible output scenarios from this section are given below. Note that this is not an exhaustive set of possibilities but is provided to give the user an idea of the type of output this section will produce. This section can be run in any mode.

Output:

```
Section 10 -- Verification Trouble Tree

Scenario 1:

   CIO loopback to the HPFL interface card failed.
      Suspected failing FRU(s) are (in order of probability):
         HPFL interface card.
         CIO channel adapter.


Scenario 2:

   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) passed.
   Loopback to HPFL controller (n) failed.
      Suspected failing FRU(s) are (in order of probability):
         HPFL controller (n).

   Identification of HPFL controller (n) passed.
   .
   .
   .


Scenario 3:

   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) passed.
   Loopback to HPFL controller (n) passed.

   No problems have been detected in the sub-system from the host
   to the HPFL controller(n). If you suspect that there may be
   problems with this drive, run FLEXDIAG on the drive.

   Identification of HPFL controller (n) passed.
   .
   .
   .
```

```
Scenario 4:

   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) failed.
      Suspected failing FRU(s) are (in order of probability):
         Target drive (n) may be powered down.
         Optical cable may be damaged or disconnected.
         Target drive (n) may be at the wrong address.
         Pbus cables may be damaged or connections are bad.

   More information, and perhaps further isolation of the problem,
   may be obtained by following the recommended further action
   given below.

      Recommended Further Action
         Run On-Site section (12) on the link drive

   Identification of HPFL controller (n) passed.
   .
   .
   .


Scenario 5:

   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller failed.
      Suspected failing FRU(s) are (in order of probability):
         Optical cable may be damaged or disconnected.
         Link HPFL controller.
         HPFL interface card.

   More information, and perhaps further isolation of the problem,
   may be obtained by following the recommended further action
   given below.

      Recommended Further Action
         Run On-Site section (12) on the link drive


End of Section 10 -- Verification Trouble Tree
```

Section 11—DIAGNOSTIC TROUBLE TREE

This section is designed to verify that the HP-FL subsystem is functioning correctly. This section is more exhaustive than section 10 due to the fact that this section runs in Destructive mode. Several possible output scenarios from this section are given below. Note that this is not an exhaustive set of possibilities but is provided to give the user an idea of the type of output this section will produce.

Output:

```
Section 11 -- Diagnostic Trouble Tree

Scenario 1:

   Reset of the HPFL interface card failed.
      Suspected failing FRU(s) are (in order of probability):
         HPFL interface card
         CIO channel adapter.


Scenario 2:

   Reset of the HPFL interface card passed.
   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) passed.
   Reset clear of HPFL controller (n) passed.
   Configure clear of HPFL controller (n) passed.
   Loopback to HPFL controller (n) failed.
      Suspected failing FRU(s) are (in order of probability):
         HPFL controller (n).

   Identification of HPFL controller (n) passed.
   .
   .
   .



Scenario 3:

   Reset of the HPFL interface card passed.
   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) passed.
   Reset clear of HPFL controller (n) failed.

      Suspected failing FRU(s) are (in order of probability):
         HPFL controller (n).

   Identification of HPFL controller (n) passed.
```

```
   .
   .
   .

Scenario 4:
   Reset of the HPFL interface card passed.
   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) failed.
      Suspected failing FRU(s) are (in order of probability):
         Target drive (n) may be powered down.
         Optical cable may be damaged or disconnected.
         Target drive (n) may be at the wrong address.
         Pbus cables may be damaged or connections are bad.

   More information, and perhaps further isolation of the problem,
   may be obtained by following the recommended further action
   given below.

      Recommended Further Action
         Run On-Site section (12) on the link drive

   Identification of HPFL controller (n) passed.
   .
   .
   .

Scenario 5:

   Reset of the HPFL interface card passed.
   CIO loopback to the HPFL interface card passed.
   Loopback to the link HPFL controller passed.
   Identification of HPFL controller (n) passed.
   Reset clear of HPFL controller (n) passed.
   Configure clear of HPFL controller (n) failed.
      Suspected failing FRU(s) are (in order of probability):
         HPFL controller (n).

   Identification of HPFL controller (n) passed.
   .
   .
   .

End of Section 11 -- Diagnostic Trouble Tree
```

Section 12—ON-SITE TROUBLE TREE

This section provides the user with specific instructions and aid in decision making when attempting to diagnose problems in the HP-FL subsystem on-site. No interaction between the diagnostic and subsystem hardware will occur as a result of running this section—it is merely designed to guide the diagnostician according to the trouble trees. Only a few examples will be provided here of the interaction that will take place.

Output:

```
Section 12 -- On-Site Trouble Tree

The following tests are available:
   Controller -- HPFL Controller Card LED Check
   Hp793Xfl   -- HP793XFL Front Panel LED Check
   Interface  -- HPFL Interface Card LED Check
   Flux       -- HPFL Flux Check
   Quit       -- Quit this Section

If you wish to perform a complete check-out, perform each test
in order until a failure is isolated or all tests have been
completed.

Enter the desired test(C/H/I/F/Q) >>ff

   Begin HP793XFL front panel led check
   ------------------------------------

   The leds on the HP793XFL front panel are configured as follows:

      ..............................

      .   RED   . YELLOW . GREEN   .

      ..............................

   Please enter the state of these leds:
      (If led is blinking, consider it on):

      Red (on/off)>>on
      Yellow (on/off)>>off
      Green (on/off)>>on

      Suspected failing FRU(s) are (in order of probability):
         Read/write board.

   End HP793XFL front panel led check
   ----------------------------------
```

```
Enter the desired test >>H

   Begin HP793XFL front panel led check
   ------------------------------------

   The leds on the HP793XFL front panel are configured as follows:

      ..............................

      .   RED   . YELLOW . GREEN   .

      ..............................

   Please enter the state of these leds:
      (If led is blinking, consider it on):

      Red (on/off)>>off
      Yellow (on/off)>>off
      Green (on/off)>>on

      No errors are indicated by the HP793XFL front pane leds.

   End HP793XFL front panel led check
   ----------------------------------

Enter the desired test >>I

   Begin HPFL interface card led check
   -----------------------------------

   The leds on the HPFL interface card are configured as follows:

         0 -- Failed (red)

      o -- Config   (red)
      o -- Signal   (red)
      o -- Remote   (red)
      o -- Passed   (green)
      o -- Activity (green)
```

```
  Please enter the state of these leds:
     (If led is blinking, consider it on):

       F(ailed) (on/off)>>off
       C(onfig) (on/off)>>off
       S(ignal) (on/off)>>off
       R(emote) (on/off)>>off
       P(assed) (on/off)>>on
       A(ctivity) (on/off)>>on

       No errors are indicated by the HPFL interface card leds.

     End HPFL Interface Card LED Check
     ---------------------------------
Enter the desired test >>C

     Begin HPFL Controller Card LED Check
     ------------------------------------

     The HPFL controller card is located in the back of the disk
     drive, inside the cabinet. The leds on this card are configured
     as follows:

        o -- Pbus error #1   (yellow)
        o -- Pbus error #2   (red)

        o -- Activity        (green)
        o -- Optical Status  (red)

     Please enter the state of the Pbus error leds:

        Pbus error led #1 (on/off)>>off
        Pbus error led #2 (on/off)>>off

     Please enter the state of the optical status led on the link
     drive (the drive connected to the host via an optical fiber):

        O(ptical status) (on/off)>>on

     The HPFL controller card leds indicate that there is a problem
     with the optical cable. Check the optical cable connections and if
     no problem is found, go on to the FLUX check.

     End HPFL controller card led check
     ----------------------------------

Enter the desired test >>F
```

```
Begin HPFL flux check
---------------------

Connect flux source to RX fiber at the Interface Card end,
remove optical cable from HPFL Controller Card and measure
the flux on both fibers.

Enter the result of the flux measurement:

RX fiber  (passed/failed)>>passed
TX fiber  (passed/failed)>>failed

In order to complete the flux check, connect flux source to
the TX fiber at the interface end, and measure the flux on the
TX fiber at th HPFL controller end of the cable. If the
measurement is not within specifications, replace the optical
cable. If it is within specifications, replace the HPFL interface
card.

End HPFL flux check
-------------------

End of Section 12 -- On-Site Trouble Tree
```

Error Messages

This section gives a complete list of the error messages that may be generated by **HPFLDIAG** along with brief explanations of the meaning of the messages. The messages will be listed in numerical order and are exactly as they appear in the message catalog. The "!" indicates that a parameter of some sort will replace the exclamation point when the message is displayed.

5000	***** WARNING -- THE I/O PATH TO THE SELECTED CARD MAY NOT BE FUNCTIONING PROPERLY (HPFLWARN 5000)**
CAUSE	An error was detected by the Io_Path_Test service while testing the modules on the i/o path preceding the selected device.
ACTION	Execute the appropriate diagnostics on the modules preceding the selected device on the i/o path, especially on those that may have been reported as faulty in error messages immediately preceding this message. Note that the results of the execution of this instance of **HPFLDIAG** may be invalid.
5001	***** DEVICE FAILED TO RESPOND TO ! COMMAND (HPFLERR 5001)**
CAUSE	No response to an i/o was received prior to the expiration of the allotted time.
ACTION	Verify that the selected device is actually connected to the system. Run SYSMAP, if available, to confirm the presence of the device.
5002	***** HPFL DIAGNOSTIC TERMINATING (HPFLERR 5002)**
CAUSE	A fatal error has been encountered.
ACTION	The specific error that was encountered should have been reported immediately prior to this message. Follow the action instructions for that error message.
5003	***** ! COMMAND IS NOT IMPLEMENTED ON THIS DRIVE/SYSTEM (HPFLERR 5003)**
CAUSE	The selected operation is either not implemented on the selected device or the system does not provide access to it.
ACTION	This operation is unavailable.
5004	***** DEVICE ENCOUNTERED AN ERROR WHILE EXECUTING AN ! COMMAND (HPFLERR 5004)**
CAUSE	The device reported an error as a result of executing the selected operation.
ACTION	Most likely, a hardware problem exists in the sub-system. Run the trouble-tree sections of this diagnostic to isolate the failing FRU.

5005 *** THE MAXIMUM NUMBER OF ERRORS HAS BEEN EXCEEDED (HPFLERR 5005)

CAUSE The user specified error limit has been reached.

ACTION If more errors are desired, rerun the diagnostic assigning a larger value to the ERRCOUNT parameter of the run command.

5006 *** AN UNRECOGNIZED REPLY WAS FOUND (HPFLERR 5006)

CAUSE The reply that was entered in response to a prompt by the diagnostic is not valid.

ACTION Refer to the prompt that was displayed and enter a response that is within the specified list of valid responses.

5007 *** A NUMERICAL INPUT WAS EXPECTED BUT NOT RECEIVED (HPFLERR 5007)

CAUSE The reply that was entered in response to a prompt by the diagnostic is not a valid number.

ACTION Reenter number using only numeric characters and valid special characters (e.g. +, -, , etc.).

5008 *** AN UNEXPECTED ERROR OCCURRED WHILE ATTEMPTING TO COMMUNICATE WITH THE DEVICE. (HPFLERR 5008)

CAUSE A call to the HPFL device access routine resulted in an unexpected status return.

ACTION The specific status generated by the DAR should have been displayed immediately prior to this error message - refer to the cause-action text for that message for more information. This is possibly caused by a mis-match of the driver and diagnostic system software. Ensure that the diagnostic system currently installed is the correct one and, if so, report this problem via an SR.

5009 *** ERROR IN TRANSMISSION DETECTED DURING& READ LOOPBACK TEST: (HPFLERR 5009)

Byte #	Octal Value Transmitted	Octal Value Received	Bit Positions In Error 01234567
======	==========	==========	==========

CAUSE One or more bytes of data that were received in a loopback operation did not contain the expected value(s). Data is being corrupted along the data path either between the host and the HPFL interface card or within the HPFL sub-system itself.

ACTION If this error is generated within a trouble-tree section, follow the directions specified to isolate the most suspect failing FRU(s). If not, execute the trouble-tree sections of this diagnostic to isolate the failing FRU(s).

5010	**! ! ! !**
CAUSE	This message is generated in conjunction with one or more other error messages and is used for data formatting.
ACTION	Refer to the accompanying message(s) for appropriate cause-action text.

5011	***** ERROR -- EXPECTED ! BYTES FROM THE DEVICE AND RECEIVED ! BYTES (HPFLERR 5011)**
CAUSE	The number of bytes in the reply from the device was not what was expected. This is most likely a result of executing the diagnostic on a drive which is not supported by it.
ACTION	Verify that the selected device is in the list of supported devices for the diagnostic (LIST ALL from the DUI). If it is, execute the trouble-tree sections of this diagnostic and follow the directions to isolate the failing FRU(s).

5013	***** NO OPERATION WAS PERFORMED (HPFLERR 5013)**
CAUSE	Due to a previous error, which has already been reported, no operation was performed.
ACTION	Refer to action instructions for previously reported error.

5014	***** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO SEND/RECEIVE INFORMATION FROM THE USER (HPFLERR 5014)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to communicate with the user interface process.
ACTION	Refer to action instructions for previously reported error.

5015	***** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO RETRIEVE A MESSAGE FROM THE CATALOG (HPFLERR 5015)**
CAUSE	An error was returned while attempting to obtain a message from the catalog. The actual error will have been displayed prior to this message.
ACTION	This is a software error. Most likely, the message catalog and the diagnostic code are mis-matched. If possible, obtain the correct diagnostic and catalog source and re-install it. This problem should be reported via an SR.

5016	***** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO CONVERT A NUMBER TO A STRING (HPFLERR 5016)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to convert a number to a string.
ACTION	Refer to action instructions for previously reported error.
5017	***** AN ERROR WAS ENCOUNTERED IN ATTEMPTING A BIT EXTRACTION OPERATION (HPFLERR 5017)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to extract one or more bits from a number.
ACTION	Refer to action instructions for previously reported error.
5018	***** THE SELECTED DEVICE COULD NOT BE OBTAINED FOR TESTING (HPFLERR 5018)**
CAUSE	Access to the selected device was not granted by the diagnostic system. The particular reasons for this should have been displayed prior to this error message.
ACTION	Refer to instructions for previously reported errors.
5019	***** YOUR RESPONSE WAS INVALID (HPFLERR 5019)**
CAUSE	The data entered in response to a prompt was not valid.
ACTION	Refer to the prompt to determine the valid responses for the particular situation and enter one of the specified valid responses.
5020	***** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN DATA FROM AN I/O BUFFER (HPFLERR 5020)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to get data from its i/o buffer and, therefore cannot obtain data from the device.
ACTION	Refer to action instructions for previously reported error.

5021	***** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO PLACE DATA INTO AN I/O BUFFER (HPFLERR 5021)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable place data into its i/o buffer and, therefore, cannot send data to the device.
ACTION	Refer to action instructions for previously reported error.

5022	***** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN AN I/O BUFFER (HPFLERR 5022)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable obtain an i/o buffer and therefore, cannot send/receive data to/from the device.
ACTION	Refer to action instructions for previously reported error.

5023	***** AN ERROR OCCURRED WHILE ATTEMPTING TO INFORM THE SYSTEM, THAT THE DEVICE IS BROKEN. (HPFLERR 5023)**
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable inform the diagnostic system that the selected device is broken.
ACTION	Refer to action instructions for previously reported error. Also, if this error was not generated within a trouble-tree section, execute the trouble-tree sections to isolate the failing FRU(s).

5024	***** WARNING -- A TARGET DRIVE MUST HAVE BEEN SELECTED IN ORDER TO RUN THIS STEP. NO OPERATION WAS PERFORMED. (HPFLWARN 5024)**
CAUSE	A step was selected that requires a target drive number in order to execute.
ACTION	Rerun the step, this time selecting a target drive when the target drive prompt is given during initialization.

5025	***** THE SELECTED TARGET DRIVE IS NOT VALID. (HPFLERR 5025)**
CAUSE	The target drive number specified by the user in response to the prompt at initialization time does not correspond to a valid drive on the system.
ACTION	Check the target drive number that was selected and make sure that there is a drive connected to the system that corresponds to that address. If so, ensure that the drive is powered up.

5026 ***** WARNING -- THE IDENTITY OF THE LINK HPFL CONTROLLER COULD NOT BE OBTAINED. SECTIONS 10 AND/OR 11 SHOULD BE RUN IN ORDER ISOLATE THE PROBLEM. MEANWHILE, ANY TESTS THAT REQUIRE A TARGET DRIVE WILL NOT BE PERFORMED. (HPFLWARN 5026)**

CAUSE An attempt was made to identify the link drive controller via a well-known VC identify operation which failed. This operation is attempted at initialization time and the failure is only actually reported if the user selects LINK in response to the prompt asking for a drive to test.

ACTION The directions given in the text of the message should be followed which basically directs the user to run the trouble-tree sections for more information.

5027 ***** WARNING -- THE IDENTITY OF THE DRIVES CONNECTED TO THE LINK HPFL CONTROLLER COULD NOT BE OBTAINED. SECTIONS 10 AND/OR 11 SHOULD BE RUN IN ORDER TO ISOLATE THE PROBLEM. (HPFLWARN 5027)**

CAUSE An attempt was made to identify the drive controllers connected to the HPFL Interface card via a rollcall operation which failed. This operation is attempted at initialization time.

ACTION The directions given in the text of the message should be followed which basically directs the user to run the trouble-tree sections for more information.

5028 ***** WARNING -- TESTING OF THE HP-FL CARD ONLY WAS SELECTED. AT LEAST ONE DRIVE MUST HAVE BEEN SELECTED FOR TESTING IN ORDER TO RUN THIS STEP. NO OPERATION WAS PERFORMED. (HPFLWARN 5028)**

CAUSE A step was selected that performs an well-known vc operation. However, the user specifically requested that no drive tests be performed by selecting the NONE option to the initialization prompt asking which drives should be tested.

ACTION Since the cause was simply selecting no drives to test, re-run the diagnostic and select a drive to test during initialization (via any option other than NONE).

5029 ***** SPECIFIED DRIVE NUMBER IS INVALID. A VALID DRIVE NUMBER MUST BE IN THE RANGE OF 0 TO 7. (HPFLERR 5029)**

CAUSE The user input "drive n" in response to the prompt asking which drive to test and "n" was a valid number but not in the range of 0 to 7.

ACTION Input a valid drive number in the range 0 to 7.

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HP-IB Device Adapter Diagnostic

Introduction

The HP-IB Device Adapter Diagnostic (`HPIBDIAG`) is a diagnostic system program that provides the user or the HP-IB Device Adapter Manager (DAM) with the ability to test the functionality of the HP-IB Device Adapter. The diagnostic runs under MPE XL or HP-UX on any HP Precision Architecture computer system from any system terminal. The diagnostic has no interactive commands, but the user can specify which sections and steps are to be run. The user can also set test parameters to control the handling of error messages and to select the number of test executions to be run. The HP-IB Device Adapter Diagnostic can also be invoked by the I/O subsystem during catastrophic errors for auto-diagnostic purposes (MPE XL Only). HP-IB Device Adapter functionality is restored by replacing the HP-IB Device Adapter PCA which is itself a Field Replaceable Unit (FRU).

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing product number 30600-10011.

Minimum Configuration

The hardware required to run the diagnostic consists of an HP Precision Architecture RISC computer system which is up and running on either the HP-UX or MPE XL operating system.

Auto-Diagnostics

The HP-IB device adapter diagnostic program can be invoked (by the MPE XL I/O system on catastrophic errors) for auto-diagnostic purposes. In auto-diagnostic mode, the HP-IB diagnostic program will execute the following sections and steps:

Section 3	Identify
Section 4	Loopback
Section 5	Selftest

Operating Instructions

There is no security level checking mechanism within HPIBDIAG. The DUI checks the user's security level before initiating HPIBDIAG. Refer to the Security section on DUI for a detailed description of user capabilities.

Default Tests

If the user does not specify the sections and steps to be run, the default sections will be executed:

Section 3	Identify
Section 4	Loopback
Section 5	Selftest

RUN Command

To bring up the Online Diagnostic subsystem, enter the following command to the system prompt:

```
sysdiag
```

The system responds with the following prompt indicating that access has been gained to the Online Diagnostic Subsystem:

```
DUI >
```

Note

The device to be tested must be powered up and on line. The physical device location (pdev) shown below matches the same device shown on the "typical A1002A" system configuration, described in the chapter on DUI. The pdev value entered must be correct for the system being tested.

For example, to run the diagnostic in an MPE XL environment, you might enter:

```
DUI > RUN HPIBDIAG pdev=4.2.3 <RUN Command Options>
                          |            |
                          |      none required for
                          |      default test suite
                          |
                  insert physical location of
                  device adapter to be tested here;
                  alternatively, for MPE XL,
                  type the ldev number;
                  for HP-UX, type the devfile name
```

Typing HELP causes a summary of the DUI and its commands to be printed. Refer to the DUI Section for details.

Test Execution

The diagnostic displays the following header and welcome message:

```
*********************************************************
*****                                                ***
*****        HPIB DEVICE ADAPTER DIAGNOSTIC          ***
*****                                                ***
*****    (C) Copyright Hewlett Packard Co. 1987      ***
*****                All Rights Reserved.            ***
*****                    Version A.00.00             ***
*****                                                ***
*********************************************************

Welcome, Today is MON, May 22, 1987, 9:00 AM
```

Following the header, HPIBDIAG will call a program service routine to test the I/O path between the SPU and the device adapter. This helps the user locate a critical failure or a corrupt data path between the host system and the device adapter. If the status returned from this procedure call is "fail", an error message will be output:

```
There is a problem in the path to the device adapter.
```

HPIBDIAG will continue if possible. The user should then troubleshoot all hardware between the device adapter and CPU/MEMORY. This would include all buses, bus converters, and channel adapters along with their power supplies.

If the path between the SPU and the device adapter is functional, the test sections and steps specified by the user will be executed and the results will be output. If the user has not specified any sections or steps to be run, the default sections will be run by HPIBDIAG. They are Sections 3, 4, and 5 (IDENTIFY, LOOPBACK and SELFTEST). These test sections are described in the "Test Section Descriptions".

If the ERRORCOUNT option of the RUN command is specified to a limit by the user and the number of errors generated by the HP-IB device adapter diagnostic reach that limit, the following message will be output:

```
More errors encountered than specified in the errcount.
```

The diagnostic will terminate execution immediately upon displaying the above message.

If the ERRONLY option of the RUN command is set, only error messages will be displayed to the user. If the ERRPAUSE option of the RUN command was set "on", then the diagnostic will stop after each error is generated and ask the user if the test should continue:

```
CONTINUE (YES/NO)?
```

If the response is "Y" then the test will be resumed (if possible), and if the response is "N", the diagnostic will terminate. If the section and steps specified by the user were executed the number of times specified in the LOOP option of the RUN command without the number of errors exceeding the ERRNUM value, the diagnostic will terminate normally and the following message will appear:

```
HPIBDIAG Exiting . . .
```

Control will then return to the Online Diagnostic System.

```
DUI >
```

Test Section Descriptions

HPIBDIAG consists of five diagnostic program sections:

```
Section 3          Identify
Section 4          Loopback
Section 5          Selftest
Section 6          Status
   Step 10            Request Status
   Step 11            Decode Status
Section 12            Rollcall
```

A description of each section and step will be given, along with the expected output from that section and step.

Section 3—IDENTIFY

This section of the diagnostic issues an IDY (Identify) command to the HP-IB device adapter. The response from hardware will be decoded into various pieces of information such as device adapter identification code, firmware identification, and firmware revision level. HPIBDIAG will report the firmware identification and hardware date code.

```
Section 3 - IDENTIFY

   The Identify was successful
   The device adapter; identifier number is nnn.
   The device adapter firmware ID is nnn.
   The device adapter date code is nnn.
   The device adapter hardware revision number is nnn.

End of Section 3 - IDENTIFY
```

Section 4—LOOPBACK

This section tests the data path to the HP-IB device adapter. The test is performed by sending patterns of 1's and 0's to the device adapter card's buffer and back again. The following is executed:

```
Section 4 - LOOPBACK
   External loopback of the DEVICE ADAPTER completed.
End of Section 4 - LOOPBACK
```

Section 5—SELFTEST

This section reports the results of the selftest as a GO/NO-GO status. If the HP-IB device adapter selftest fails then the device adapter itself must be replaced. The following message is displayed if the test is successful.

```
Section 5 - SELFTEST
   Selftest of HPIB DEVICE ADAPTER completed successfully.
End of Section 5 - SELFTEST
```

Section 6—STATUS

This diagnostic section obtains and decodes the status of the HP-IB device adapter hardware. Two steps are available:

Step 10 **Request Status:** HPIBDIAG will attempt to read the HP-IB device adapter card status, if successfully done, HPIBDIAG will return the value without decoding it.

Step 11 **Decode Status:** HPIBDIAG will decode the format of the HP-IB device adapter card status bits, determine the meaning of the hardware status, then return the messages according to the decoded results.

The following is executed:

```
Section 6 -- DEVICE STATUS

   Step 10 -- Read Status
      Device Adapter status has been read successfully.
   End of step 10 - Read Status

   Step 11 -- Read Status
      The current hardware status for the HPIB DEVICE ADAPTER is:
      ------------------------------------------------------------
      << status message >>
   End of Step 11 -- DECODE STATUS

End of Section 6 - DEVICE STATUS
```

Section 12—ROLLCALL

This section returns the information about the connection profile of the HP-IB device adapter being tested. The user is recommended to run all other diagnostics before running rollcall. If there is any malfunction of the HP-IB device adapter hardware, the information returned from this section may not be valid. The following is executed:

```
Section 12 - ROLLCALL
      Device Address
      0  1  2  3  4  5  6  7
      ----------------------
      << Rollcall array >>
```

A '1' under an address number means that a device was found at that address. A '0' means that no device was found at that address.

```
End of Section 12 - ROLLCALL
```

To decode the device array identifier use the SYSMAP utility.

Error Messages

The following are error messages which may be encountered during the execution of HPIBDIAG. System dependent error messages may also be displayed by the diagnostic system; error messages without the trailer (HDIAGERR #) are, in general, generated by the diagnostic system. However, please note that three HPIBDIAG informational messages (101, 402, and 403) will only appear when there has been an error and so are included below. These three messages do not have the error trailer. The "!" indicates that a parameter of some sort replaces the exclamation point when the message is displayed.

101 **There may be a problem in the path to the device adapter.**
CAUSE The call to the program service io_path_test was not successful.
ACTION io_path_test will have printed its own error stating the particular test which failed and the PDEV of the device which failed. That device should be tested further before continuing.

---

402 **ERROR IN TRANSMISSION DETECTED DURING READ LOOPBACK TEST:**

	Byte #	Octal Value Transmitted	Octal Value Received	Bit Positions In Error 01234567
	======	==========	========	==========
403	!	!	!	!

CAUSE Either writing to or reading back from the HP-IB failed.
ACTION The bit positions in error should give some indication of where the problem exits; run selftest and check the cabling.

5501 **UNABLE TO SELECT THE DEVICE (HDIAGERR 5501)**
CAUSE The diagnostic could not obtain access to the HP-IB; the reason will be stated in a preceding error message.
ACTION Refer to the action to be taken which is associated with the preceding error.

5502 **UNABLE TO GET INPUT BUFFER (HDIAGERR 5502)**
CAUSE A software error has occurred.
ACTION Please report the error to support personnel.

5503	**UNABLE TO GET OUTPUT BUFFER (HDIAGERR 5503)**
CAUSE	A software error has occurred.
ACTION	Please report the error to support personnel.

5504	**UNABLE TO GET HARDWARE STATUS BUFFER (HDIAGERR 5504)**
CAUSE	A software error has occurred.
ACTION	Please report the error to support personnel.

5505	**FAILED TO RETRIEVE THE HARDWARE REVISION NUMBER (HDIAGERR 5505)**
CAUSE	A software error has occurred.
ACTION	Please report the error to support personnel.

5601	**UNABLE TO MAKE STRING FROM NUMBER (HDIAGERR 5601)**
CAUSE	A software error has occurred.
ACTION	Please report the error to support personnel.

5602	**UNABLE TO PULL BITS FROM A 32 BIT INTEGER (HDIAGERR 5602)**
CAUSE	A software error has occurred.
ACTION	Please report the error to support personnel.

6001	**AN UNEXPECTED STATUS WAS RECEIVED (HDIAGERR 6001)**
CAUSE	A completely unanticipated failure occurred somewhere. The actual non-successful status which triggered this error message will be printed.
ACTION	Refer to the action associated with the message which will be printed immediately after this one.

6201	**ROLLCALL FUNCTION TO DEVICE ADAPTER FAILED (HDIAGERR 6201)**
CAUSE	Unknown. The reason for the failure will be indicated by the message immediately succeeding this one.
ACTION	Refer to the action associated with the succeeding message.

6301	**IDENTIFY FUNCTION TO DEVICE ADAPTER FAILED (HDIAGERR 6301)**
CAUSE	Unknown. The reason for the failure will be indicated by the message immediately succeeding this one.
ACTION	Refer to the action associated with the succeeding message.

6401	**LOOPBACK FUNCTION TO DEVICE ADAPTER FAILED (HDIAGERR 6401)**
CAUSE	Unknown. The reason for the failure will be indicated by the message immediately succeeding this one. Please note that whatever the problem is it precluded writing data to the hpib, reading it back and comparing it. If the loopback 'fails' because the data read from it is not identical to the data written to it a different message will be given.
ACTION	Refer to the action associated with the succeeding message.

6501	**SELFTEST FUNCTION TO DEVICE ADAPTER FAILED (HDIAGERR 6501)**
CAUSE	Unknown. The reason for the failure will be indicated by the message immediately succeeding this one.
ACTION	Refer to the action associated with the succeeding message.

6601	**REQUEST STATUS FUNCTION TO DEVICE ADAPTER FAILED (HDIAGERR 6601)**
CAUSE	Unknown. The reason for the failure will be indicated by the message immediately succeeding this one.
ACTION	Refer to the action associated with the succeeding message.

6603	**UNABLE TO MOVE DATA FROM OUT_DATA_BUFFER (HDIAGERR 6603)**
CAUSE	A software error has occurred.
ACTION	Please report the error to support personnel.

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HP-IB Device Adapter Diagnostic

Introduction

The HP-IB Device Adapter Diagnostic (`HPIBDAD`) is part of the online diagnostic package. It is designed to provide its user with a means of determining if the specified HP-IB Device Adapter (DA) and its related hardware are operating properly, and if not, which FRU should be replaced. There are a variety of tests which the user can run to determine the source of a problem. Some of the tests require writing and reading data to and from (respectively) an external device (e.g., a disk drive). Tests that require such action need only be run during exceptional situations and are included so that the diagnostic can help in determining the source of a problem. However, these tests may not be appropriate to run in all environments. For example, if the HP-IB DA to be tested is connected to a boot device, executing the write/read tests on that device could write over the operating system code. The result of such an action could be a system crash.

Note

Any interaction with a device on the HP-IB is administered by the diagnostic user, NOT the diagnostic. Therefore, extreme caution should be taken by the user before such tasks are undertaken.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10028.

Minimum Configuration

The hardware required to run HPIBDAD consists of a Hewlett-Packard Precision Bus (PB) HP-IB Device Adapter (part number 28650A), as well as an HP 815 computer system with all the necessary equipment to bring the operating system (HP-UX) up and running.

However, in order to fully test the HP-IB Device Adapter, an HP-IB Talker/Listener/Controller device is required to be connected to the HP-IB. More specifically, there must be a device connected to the HP-IB which has the ability to Talk, and whose output data can be verified (e.g., a digital multimeter which outputs a known voltage); there must be a device connected to the HP-IB which has the ability to Listen, and whose input data (command) can be verified (e.g., a plotter which is given the "command" to lift its pen); and there must be a device that can take control of the HP-IB. It doesn't matter whether or not all of this functionality is implemented in a single device or in more than one device.

In order to run HPIBDAD, the online diagnostic system must be present, along with the portability interface routines. Also, the diagnostic must guarantee that regardless of what condition the HP-IB Device Adapter (DA) to be tested is in, the system will not "crash" by running the diagnostic on it.

Other software that must be present in the system to execute HPIBDAD is the following: 1) the HP-IB Device Access Routines (DAR) which act as an interface between the diagnostic and the Logical Device Manager (LDM), 2) the LDM which is the interface between the DAR and low-level driver, and 3) the HP-IB Device Adapter Manager (DAM) which is the low-level driver to the HP-IB DA. Note that the DAR is technically part of the portability interface, as far as online module structure is concerned. Also note that in this document, references to the DAM imply the LDM as well, unless otherwise noted.

Operating Instructions

HPIBDAD is accessed by the user via the Diagnostic User Interface (DUI).

Default Tests

The default sections and steps for this diagnostic are:

```
Section 3    Identify

Section 6    Status

  Step 61      Preliminary Internal State Diagnosis

  Step 62      Read HP-IB Interface Chip STATUS Register

  Step 63      Read HP-IB Interface Chip CONTROL Register

  Step 64      Read HP-IB Interface Chip ADDRESS Register

  Step 65      Read HP-IB Interface Chip PP/ID_BYTE Registers

  Step 66      Read HPIB_STATUS Register

  Step 67      Read BUS_STATUS Register
```

RUN Command

To bring up the Online Diagnostic subsystem, enter the following command to the HP-UX system prompt:

```
% sysdiag
```

The diagnostic subsystem responds with the following prompt indicating that access has been granted to the user:

```
DUI >
```

Typing HELP causes a summary of the DUI function and its commands to appear on the screen.

Note

The device to be tested must be powered up and on line. The physical device location (pdev) shown below matches the same device shown on the "typical A1002A" system configuration, described in the chapter on DUI. The pdev value entered must be correct for the system being tested.

After the online diagnostics system has been started, this diagnostic can be executed using the command:

```
RUN HPIBDAD
```

All online diagnostics RUN string parameters are acceptable when executing this diagnostic. All parameters available in the run command are acceptable as parameters when executing this diagnostic.

Note

All of the sections in this diagnostic can be executed from any terminal, even if a specific test requires the user to have the capability to run destructive tests. This implementation therefore allows the diagnostic to be run from a remote terminal; however, there may be system limitations that would not allow the use of a remote terminal.

Test Execution

When HPIBDAD is invoked, the following header and welcome messages will be displayed:

```
**************************************************************
******                                                  ******
******      HPIBDAD : HP-IB Device Adapter Diagnostic   ******
******                                                  ******
******      (c) Copyright Hewlett-Packard Company 1987  ******
******                 All Rights Reserved              ******
******                                                  ******
******                   Version V.UU.FF                ******
******                                                  ******
**************************************************************

Welcome, Today is day, date, time
```

After the header and welcome messages are displayed via a program services call, the diagnostic will call another program services routine in order to obtain access to the device that was selected for testing (in addition to setting up the sections and steps to be run).

This routine will exit with its *status* parameter (passed by reference) being any one of three possible values. The first of which is *successful*. This indicates that all sections and steps have been validated and that the system granted access to the device.

The second possible value is *dssd_device_in_use*. If this value is returned, it indicates that the system did not grant access to the device. If this happens, the following error message will be issued by the diagnostic:

```
*** ERROR -- HP-IB DEVICE ADAPTER ALREADY IN USE BY THE
***          DIAGNOSTIC SYSTEM.                          (HDADERR 5000)
***
***          Someone has already gained exclusive rights to the
***          HP-IB Device Adapter that you requested, and it is illegal
***          to have two copies of the HPIBDAD diagnosing the same HP-IB
***          Device Adapter simultaneously.
```

The diagnostic will terminate execution after outputting this error message.

The third possible status value is *dssd_internal_error*. When this value is active upon exiting the subroutine, it indicates that an error such as no device adapter at the specified LDEV was found. The online diagnostics themselves will output the error message for this situation, *not* HPIBDAD. The diagnostic will terminate upon regaining control.

If all went well up to this point, the sections and steps specified by the user will be executed and the results displayed. If the user did not specify any sections/steps to be run, the default sections and steps will be executed (Sections 3 and 6). If at any time, the number of errors generated exceeds the limit specified by the user in the *errcount* parameter (of the DUI *run* command), the following message will be output:

```
*** WARNING -- The maximum specified number of error occurrences has
***            been exceeded.                           (HDADWARN 6000)
```

The diagnostic will then terminate its execution. If the *errpause* parameter of the **run** command was assigned to "on", then the diagnostic will stop after each error is generated and ask the user if the testing should continue. The prompt that will be displayed is as follows:

```
Do you wish to continue? (Y/N) [Y] :
```

If the response is "Y", then the testing will resume (if possible), and if the response is "N", the diagnostic will terminate its execution. If the sections and steps specified by the user were executed the number of times specified in the *loop* parameter of the **run** command without the number of errors exceeding the *errcount* value, the diagnostic will terminate normally.

At any time that the diagnostic is prompting the user for information, the user may enter "exit" to terminate its execution, or enter "suspend" to temporarily suspend its execution. Either the entire word or any number of characters which uniquely identify the respective language localized command may be entered. Moreover, the letters entered may be in any combination of upper and lower case characters. If the user exits in this fashion, the following message is displayed:

```
... Exiting HPIBDAD per your request.
```

If the user temporarily suspends execution in this manner, the message that will be displayed is as follows:

```
... HPIBDAD suspended per your request.
```

The user can then perform tasks through the Diagnostic User Interface (DUI) and subsequently resume execution of **HPIBDAD**, or he/she can abort the **HPIBDAD** entirely.

Note

In situations such as timeouts, this diagnostic will inform the user which operation was taking place when the timeout occurred; moreover, the user will be given a list of commands which executed successfully (if any). It is believed that the value of this information outweighs the risk of inundating the user with output.

Detailed Test Descriptions

The remainder of this section discusses each section and step in detail. As a quick reference, the following table was included to list all of the sections and steps available for use in HPIBDAD.

Section No.	Diagnostic Function
1	More Help
2	Reset
3	Identify
4	Local Loopback Step 42 - Loopback from PB Interface Chip Step 43 - Loopback from HP-IB Interface Chip
5	Hardware Test
6	Status Step 61 - Preliminary Internal State Diagnosis Step 62 - Read HP-IB Interface Chip STATUS Register Step 63 - Read HP-IB Interface Chip CONTROL Register Step 64 - Read HP-IB Interface Chip ADDRESS Register Step 65 - Read HP-IB Interface Chip PP/ID_BYTE Registers Step 66 - Read HPIB_STATUS Register Step 67 - Read BUS_STATUS Register
10	Register Level Input/Output Transactions
11	Data/Command Transaction on HP-IB

Section 1—More Help

```
Minimum Mode Required        : Normal

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

More Help is an interactive section which allows the user to obtain more information about a particular section than is given when typing **help hpibdad** at the DUI prompt. This is needed because it is not desirable to spew large help screens at the user when he/she is looking for general help, but it is desirable to give more information about certain sections when requested.

This section allows all users from any terminal to obtain the additional information that they request.

Possible Output Messages:

```
Section 1 -- More Help

   This Section allows you to get more information on any of the Sections
   [1..6, 10, 11] of this diagnostic.  Please indicate the number of the
   section for which you require more information.  Entering a lone <CR> to
   the prompt exits this section.

   More Help (1..6, 10, 11, <CR>) : [Return]

End of Section 1 -- More Help
```

If the user enters a section number in response to the prompt, the pertinent information would be displayed for the user to read. The numbering scheme used for the help messages is as follows: the number of the message is equal to *(section_number) * 100 + 10000*. This allows for 100 messages per section. Note that when multiple messages exist for a given section, all of the corresponding messages are displayed.

Note

Informational messages are indented four spaces from the left margin and implement standard capitalization rules. This is done in order to make the error/warning messages more obvious to the user (which are not indented from the left margin, and are preceded by three asterisks).

Possible Error/Warning Messages:

If the user inputs a number of a section that is not implemented (i.e. not in the set {1,2,3,4,5,6,10,11}), then the following message is output:

```
*** WARNING -- Invalid response.  Please answer the question with one
***            of the choices given.                          (HDADWARN 6001)

More Help (1..6, 10, 11, <CR>) :
```

Note that the user is prompted again for input.

HP-IB DAR Operations Used:

None specified by the diagnostic.

Section 2—Reset

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : No

In Auto-diagnostic Set?     : No
```

This section informs the Device Adapter Manager (DAM)—via the Device Access Routines—to reset the HP-IB Device Adapter (DA) and DAM to its power-on state. The DAM will then configure the card with information it maintains internally.

Possible Output Messages:

```
Section 2 -- Reset

   NO ERRORS DETECTED while resetting the device adapter.

End of Section 2 -- Reset
```

Possible Error/Warning Messages:

None specified by the diagnostic.

HP-IB DAR Operations Used:

HPIB_LOCK
HPIB_RESET
HPIB_UNLOCK

Section 3—Identify

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : Yes

In Auto-diagnostic Set?     : No
```

Identify issues an HPIB_IDENTIFY command to the HP-IB DAR, which acquires the requested information from the HP-IB DAM, which in turn acquires most of the information from the HP-IB DA's IODC (the only information not retrieved from the IODC is the DAM, LDM, and DAR version codes). The diagnostic then decodes the information obtained and displays it in a manner that is informative to the user. This section can be used to determine the HP-IB DA's hardware and software versions, as well as the version of the DAM, LDM, and DAR being used. Moreover, a checksum is calculated by the system on the appropriate IODC information when this section is executed. If the checksum test fails, an error message will be displayed. This section has an added benefit in that if it executes successfully, the path from the diagnostic to the HP-IB DA is known to be at least partially functional.

Possible Output Messages:

```
Section 3 -- Identify


   Hardware Version                : 0x?

   Soft Physical Address Capability : 0x80

   Type of Module                  : 4 (Type A DMA I/O Adapter)

   Software Version                : 0x?

   IODC Revision                   : ?

   ... Checksum Verified.

   Device Adapter Manager Version  : ?

   Logical Device Manager Version  : ?

   Device Access Routine Version   : ?

   Note: The "0x" prefix is used to specify that the respective number
         is in hexadecimal format.  Also note that version numbers
         depicted by '---' implies that the actual version number was not
         accessible.


End of Section 3 -- Identify
```

Note

The Hardware Version, Software Version, IODC Revision, Device Adapter Manager Version, Logical Device Manager Version, and Device Access Routine Version fields may vary in time, therefore cannot be explicitly specified within this document.

Possible Error/Warning Messages:

If the Soft Physical Address Capability is not 0, the following message is displayed:

```
*** WARNING -- Soft Physical Address Capability = 0x!,
***            I expected  0x80.                          (HDADWARN 6010)
```

If the module type value returned is not that of a Type A DMA I/O Adapter, the following message is displayed:

```
*** WARNING -- Type of Module = ! (UNKNOWN PRODUCT),
***            I expected a 4 (TP_A_DMA).                 (HDADWARN 6011)
```

If the checksum does not equal zero, the following error message is displayed:

```
 *** ERROR -- IODC CHECKSUM FAILED.                       (HDADERR 5005)
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_IDENTIFY
HPIB_UNLOCK
```

Section 4—Local Loopback

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : No

In Auto-diagnostic Set?     : No
```

The local loopback tests will determine the operational status of the backplane and midplane of the HP-IB Device Adapter. This will be accomplished by writing and reading data to and from (respectively) the HP-IB DA via HPIBDAD—in an "onion skin" fashion. For this reason, the local loopback tests are divided into two steps according to how "deeply" they interact with the HP-IB DA.

If this section is run without the desired steps being explicitly specified, Steps 42 and 43 will both be run by default.

Note

Since the HP-IB requires bidirectional drivers on the frontplane, the frontplane cannot be tested via local loopback. The only way to test the frontplane would be with either an active loopback hood, or by transmitting data to and from an external device. Since the former option is not very practical, the latter option was chosen for this diagnostic. However, this functionality is NOT controlled by HPIBDAD, but rather is controlled by the user. For more information, please see Section 11, "Data/Command Transaction on HP-IB".

Step 42—Loopback from PB Interface Chip

In this step, data will be written to the PB Interface Chip and read back, testing the hardware layer "just below" the backplane (recall that the "onion skin" approach to diagnostics is implemented).

Note The chip is used to interface the PB backplane to the midplane of the HP-IB DA.

HPIBDAD will compare the data read with the data written, and display the appropriate messages.

Possible Output Messages:

```
Section 4 -- Local Loopback

   Step 42 - Loopback from PB Interface Chip

      NO ERRORS DETECTED while executing loopback from the PB
      Interface Chip.

   End of Step 42 - Loopback from PB Interface Chip

End of Section 4 -- Local Loopback
```

Possible Error/Warning Messages:

```
*** ERROR -- PB INTERFACE CHIP (PBIC) LOOPBACK FAILED.          (HDADERR 5010)
***
***          Data written to PBIC (in hex)        Data read from PBIC (in hex)
***          -----------------------------        ----------------------------
***                    !                                  !
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_WRITE_REG
HPIB_READ_REG
HPIB_RESET
HPIB_UNLOCK
```

Step 43—Loopback from HP-IB Interface Chip

In this step, data will be written to the HP-IB Interface Chip and read back, testing the hardware up to but not including the frontplane transceivers.

Note The chip is an HP-IB Talker/Listener/Controller.

HPIBDAD will compare the data read with the data written, and display the appropriate messages.

Possible Output Messages:

```
Section 4 -- Local Loopback

   Step 43 - Loopback from HP-IB Interface Chip

      NO ERRORS DETECTED while executing loopback from the HP-IB
      Interface Chip.

   End of Step 43 - Loopback from HP-IB Interface Chip

End of Section 4 -- Local Loopback
```

Possible Error/Warning Messages:

```
*** ERROR -- HP-IB INTERFACE CHIP (HIC) LOOPBACK FAILED.        (HDADERR 5020)
***
***          Data written to HIC (in hex)         Data read from HIC (in hex)
***          ----------------------------         ---------------------------
***                   !                                   !
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_WRITE_REG
HPIB_READ_REG
HPIB_RESET
HPIB_UNLOCK
```

Section 5—Hardware Test

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : No

In Auto-diagnostic Set?     : No
```

Executing this section will perform a thorough hardware test on the HP-IB DA. Not only will the PB Interface and the frontplane interface chips be tested, but the glue logic and backplane transceivers will also be tested. The only components that will be untested after this section is executed is the glue logic that is inaccessible to **HPIBDAD** (obviously), and the frontplane transceivers. The reason why the frontplane transceivers will remain untested is because there is no straightforward way to test them. The only way they can be tested is by going off the card, and since this functionality would be impractical to include in **HPIBDAD**, it was chosen not to test the frontplane transceivers. However, the user does have the capability to do I/O with devices connected to the HP-IB; therefore, it is not impossible to test the frontplane transceivers with this diagnostic software.

The user will be given the capability to go onto the HP-IB since he/she should know what devices are "out there" and should also know their respective command sets; whereas to include the capability for **HPIBDAD** to be able to identify a particular device (if possible) and be able to communicate with it would be a supererogatory effort on the part of the diagnostic writer.

Since this hardware testing brings the card off-line, it should only be done when absolutely necessary.

Possible Output Messages:

```
Section 5 -- Hardware Test

   NO ERRORS DETECTED while testing the PB Interface Chip's
        IO_EIM register.

   NO ERRORS DETECTED while testing the PB Interface Chip's
        IO_DMA_LINK register.

   NO ERRORS DETECTED while testing the PB Interface Chip's
        IO_DMA_COUNT register.

   NO ERRORS DETECTED while testing the HP-IB Interface Chip's
        INTERRUPTING_MASK register.

   NO ERRORS DETECTED while testing the HP-IB Interface Chip's
        HP-IB Interface Chip CONTROL register.

   NO ERRORS DETECTED while testing the HP-IB Interface Chip's
        ADDRESS register.

   NO ERRORS DETECTED while testing the HP-IB Interface Chip's
        PARALLEL_POLL_MASK/FIRST_ID_BYTE register.
   NO ERRORS DETECTED while testing the HP-IB Interface Chip's
        PARALLEL_POLL_SENSE/SECOND_ID_BYTE register.

   NO ERRORS DETECTED during the "HPIB_STATUS Register" Test
   NO ERRORS DETECTED during the "IFC" Test
   NO ERRORS DETECTED during the "Talk/Listen" Test
   NO ERRORS DETECTED during the "REN" Test
   NO ERRORS DETECTED during the "FIFO" Test
   NO ERRORS DETECTED during the "SRQ" Test
   NO ERRORS DETECTED during the "Parallel Poll" Test
   NO ERRORS DETECTED during the "Secondary Address" Test
   NO ERRORS DETECTED during the "CRC" Test
   NO ERRORS DETECTED "DMA Test Number 1"
   NO ERRORS DETECTED "DMA Test Number 2"
   NO ERRORS DETECTED "DMA Test Number 3"
   NO ERRORS DETECTED "DMA Test Number 4"
   NO ERRORS DETECTED "DMA Test Number 5"
   NO ERRORS DETECTED "DMA Test Number 6"
   NO ERRORS DETECTED "DMA Test Number 7"
   NO ERRORS DETECTED "DMA Test Number 8"
   NO ERRORS DETECTED the "GET/HP-IB Interface Chip Interrupt Test"
   NO ERRORS DETECTED the "On-Line" Test
   NO ERRORS DETECTED the "IFC Interrupt" Test

End of Section 5 -- Hardware Test
```

Possible Error/Warning Messages:

```
*** WARNING -- The device adapter under test is NOT the System
***            Controller, therefore the "On-Line Test" cannot be
***            executed.                                    (HDADWARN 6015)

*** WARNING -- The device adapter under test is NOT the System
***            Controller, therefore the "IFC Interrupt Test" cannot
***            be executed.                                 (HDADWARN 6016)

*** ERROR -- PB INTERFACE CHIP (PBIC) TEST FAILED.           (HDADERR 5030)
***          ! register failed the "Register Verification" test.
***
***          Data written to PBIC (in hex)        Data read from PBIC (in hex)
***          ----------------------------         ----------------------------

*** ERROR -- HP-IB INTERFACE CHIP (HIC) TEST FAILED.         (HDADERR 5031)
***          ! register failed the
***          "Register Verification" test.
***
***          Data written to HIC (in hex)        Data read from HIC (in hex)
***          ----------------------------        ---------------------------

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5035)
***          The interface chip "IFC" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5036)
***          The interface chip "Talk/Listen" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5037)
***          The interface chip "REN" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5038)
***          The interface chip "FIFO" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5039)
***          The interface chip "SRQ" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5040)
***          The interface chip "Parallel Poll" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5041)
***          The interface chip "Secondary Address" test failed.

*** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.               (HDADERR 5042)
***          The interface chip "CRC" test failed.

*** ERROR -- HPIB_CONTROL/STATUS REGISTER SET VERIFICATION
***          TEST FAILED.                                   (HDADERR 5045)

*** ERROR -- GROUP EXECUTE TRIGGER OR HP-IB INTERFACE CHIP'S INTERRUPT
```

```
***          CIRCUITRY FAILED TEST.                                (HDADERR 5046)

*** ERROR -- ON-LINE TEST FAILED.                                  (HDADERR 5047)
***
***          This test is targeted to check the frontplane's General Interface
***          Management Lines (control transceiver), and BUS_STATUS register.

*** ERROR -- IFC INTERRUPT TEST FAILED.                            (HDADERR 5048)
***
***          This test is targeted to check the frontplane's IFC
***          interrupt circuitry.

*** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5049)
***          Data was corrupted.

*** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5050)
***          DMA termination condition incorrect.

*** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5051)
***          Incorrect residue value in the IO_DMA_COUNT register.

*** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5052)
***          Internal Software Error.

*** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5053)
***          Inconsistency within PB Interface Chip with respect to
***          reporting "DMA length conflict" status.
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_WRITE_REG
HPIB_READ_REG
HPIB_OUTPUT
HPIB_INPUT
HPIB_RESET
HPIB_UNLOCK
```

Section 6—Status

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : Yes

In Auto-diagnostic Set?      : No
```

This section is broken down into seven steps so that the diagnostician can convey to HPIBDAD precisely what status information he/she wishes to examine. Moreover, the diagnostician can have a very thorough status report of the HP-IB Device Adapter if he/she desires it by executing all seven steps. In order to make this ample supply of status information easier for the diagnostician to assimilate, it is fully decoded and transformed into user-friendly messages by HPIBDAD before being displayed to the diagnostic user.

If this section is run without the desired steps being explicitly specified, Steps 61, 66, and 67 will run by default.

Step 61—Preliminary Internal Status Diagnosis

Executing this step instructs the diagnostic to gather and interpret the necessary data in order to report a preliminary device adapter internal state diagnosis. The information gathering portion of this step consists of Device Access Routine (DAR) calls—register reads—which return the contents of the following registers:

- PB Interface Chip IO_STATUS Register
- PB Interface Chip DIAGNOSTIC_STATUS Register
- HP-IB Interface Chip INTERRUPTING_CONDITIONS Register
- HP-IB Interface Chip INTERRUPT_MASK Register

The interpretation phase of this data is considerably more complex and consists primarily of the following functions:

- Decode and report (in a user-friendly fashion) the information maintained by the various registers.
- If more than one register reports the same status condition (e.g. an interrupt is requested), HPIBDAD will compare the respective bits of those registers to check status consistency within the device adapter. Any inconsistency will be reported to the user as an error condition.
- If an interrupt is requested by the frontplane interface chip, the diagnostic will determine the interrupt condition and report it. However, if HPIBDAD discovers that the particular interrupt should have been masked because the INTERRUPT_MASK register contains a "0" at the respective bit position, an error message will be issued.
- If an interrupt is not requested, but the contents of INTERRUPTING_CONDITIONS and INTERRUPT_MASK indicate an interrupt request should have been issued, an error message will be displayed to the user.

Possible Output Messages:

```
Section 6 -- Status

   Step 61 - Preliminary Internal Status Diagnosis

      PB Interface Chip IO_STATUS Register Data:

         An interrupt has NOT occurred since the last write to
         IO_COMMAND.                                          (Bit  0 = 0)

         An interrupt message HAS been sent since the last write
         to the IO_COMMAND register.                          (Bit  0 = 1)

         An interrupt message was NOT issued due to circuitry external
         to the PB Interface Chip.                            (Bit  2 = 0)

         An interrupt HAS been issued due to circuitry external to
         the PB Interface Chip.                               (Bit  2 = 1)


         Transfer NOT completed.                              (Bit  3 = 0)

         Transfer completed.                                  (Bit  3 = 1)

         A soft error (length conflict) has NOT occurred since the
         last write to the IO_COMMAND register.               (Bit 22 = 0)

         A fatal error has NOT occurred since the last write to
         the IO_COMMAND register.                             (Bit 24 = 0)

         The device adapter is NOT ready for a new command.   (Bit 25 = 0)

         The device adapter IS ready for a new command.       (Bit 25 = 1)

         An interrupt message has NOT been sent since last
         ii_clear.                                            (Bit 26 = 0)

         An interrupt message HAS been sent since last
         ii_clear.                                            (Bit 26 = 1)

         The EOC bit of the IO_DMA_LINK register
         is NOT set.                                          (Bit 31 = 0)

         The EOC bit of the IO_DMA_LINK register IS set.      (Bit 31 = 1)


      PB Interface Chip DIAGNOSTIC_STATUS Register Data:

         Circuitry external to the PB Interface Chip HAS issued
           an interrupt request.                              (Bit  0 = 0)
```

```
   Circuitry external to the PB Interface Chip has NOT
     issued an interrupt request.                    (Bit  0 = 1)

   The PB Interface Chip did NOT generate a PB error since the
     last reset command.                             (Bit  1 = 1)

   DMA is DISABLED.                                  (Bit  4 = 0)
   DMA is ENABLED.                                   (Bit  4 = 1)

   Interrupt message transmission is DISABLED.       (Bit 19 = 0)
   Interrupt message transmission is ENABLED.        (Bit 19 = 1)

   The FIFO is NOT FULL.                             (Bit 20 = 0)
   The FIFO is FULL.                                 (Bit 20 = 1)

   The FIFO is NOT EMPTY.                            (Bit 21 = 0)
   The FIFO is EMPTY.                                (Bit 21 = 1)

   There is 1 byte in the FIFO.                      (Bits 23..27)
   There are ! bytes in the FIFO.                    (Bits 23..27)


HP-IB Interface Chip INTERRUPTING_CONDITIONS Register Data:

   An interrupt is NOT pending.                      (Bit  0 = 0)
   An interrupt IS pending.                          (Bit  0 = 1)

   "Parity Error" interrupt recorded.                (Bit  1 = 1)

   "Status Change" interrupt recorded.               (Bit  8 = 1)

   "Processor Handshake Abort" interrupt recorded.   (Bit  9 = 1)

   "Parallel Poll Response" interrupt recorded.      (Bit 10 = 1)

   "Service Request" interrupt recorded.             (Bit 11 = 1)

   "FIFO Room Available" interrupt recorded.         (Bit 12 = 1)

   "FIFO Byte Available" interrupt recorded.         (Bit 13 = 1)

   "FIFO Idle" interrupt recorded.                   (Bit 14 = 1)

   "Device Clear" interrupt recorded.                (Bit 15 = 1)


HP-IB Interface Chip INTERRUPT_MASK Register data:

   Interrupts are DISABLED.                          (Bit  0 = 0)
   Interrupts are ENABLED.                           (Bit  0 = 1)
```

```
"Parity Error" interrupt MASKED.                    (Bit  1 = 0)
"Parity Error" interrupt UNMASKED.                  (Bit  1 = 1)

"Status Change" interrupt MASKED.                   (Bit  8 = 0)
"Status Change" interrupt UNMASKED.                 (Bit  8 = 1)

"Processor Handshake Abort" interrupt MASKED.       (Bit  9 = 0)
"Processor Handshake Abort" interrupt UNMASKED.     (Bit  9 = 1)

"Parallel Poll Response" interrupt MASKED.          (Bit 10 = 0)
"Parallel Poll Response" interrupt UNMASKED.        (Bit 10 = 1)

"Service Request" interrupt MASKED.                 (Bit 11 = 0)
"Service Request" interrupt UNMASKED.               (Bit 11 = 1)

"FIFO Room Available" interrupt MASKED.             (Bit 12 = 0)
"FIFO Room Available" interrupt UNMASKED.           (Bit 12 = 1)

"FIFO Byte Available" interrupt MASKED.             (Bit 13 = 0)
"FIFO Byte Available" interrupt UNMASKED.           (Bit 13 = 1)

"FIFO Idle" interrupt MASKED.                       (Bit 14 = 0)
"FIFO Idle" interrupt UNMASKED.                     (Bit 14 = 1)

"Device Clear" interrupt MASKED.                    (Bit 15 = 0)
"Device Clear" interrupt UNMASKED.                  (Bit 15 = 1)


A binary representation of the respective registers follows:
NOTE: Dashes represent undefined bits.

   ------------------------------------------------------------
   IO_STATUS register's image:

   Bit #:     0     4     8    12    16    20    24    28

   Value:     ####  ####  ####  ####  ####  ####  ####  ####
   ------------------------------------------------------------
   DIAGNOSTIC_STATUS register's image:

   Bit #:     0     4     8    12    16    20    24    28

   Value:     ####  ####  ####  ####  ####  ####  ####  ####
   ------------------------------------------------------------
   INTERRUPTING_CONDITIONS register's image:

   Bit #:     0     4     8    12    16    20    24    28

   Value:     ####  ####  ####  ####  ####  ####  ####  ####
   ------------------------------------------------------------
```

```
            INTERRUPT_MASK register's image:

            Bit #:     0     4     8     12    16    20    24    28

            Value:     ####  ####  ####  ####  ####  ####  ####  ####
            ------------------------------------------------------------

        End of Step 61 - Preliminary Internal State Diagnosis

    End of Section 6 -- Status
```

Possible Error/Warning Messages:

```
*** WARNING -- The IO_STATUS register has one or more undefined bits
***            reading in as a 1 (I expected 0's).              (HDADWARN 6020)

*** WARNING -- A SOFT ERROR (length conflict) occurred since the last
***            write to the IO_COMMAND register.
***            (IO_STATUS Bit 22 = 1)                           (HDADWARN 6022)

*** WARNING -- A FATAL ERROR occurred since the last write to the
***            IO_COMMAND register.
***            (IO_STATUS Bit 24 = 1)                           (HDADWARN 6023)

*** WARNING -- PB Interface Chip HAS generated a PB bus error since
***            the last reset command.
***            (DIAGNOSTIC_STATUS Bit 1 = 0)                    (HDADWARN 6025)


*** ERROR -- PB INTERFACE CHIP FAILURE.                         (HDADERR 5060)
***
***          PB Interface Chip reported to have ! bytes in FIFO,
***          however only 24 bytes are available.

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (HDADERR 5061)
***
***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) is set
***          (implying FIFO CNT should = 24); however, the FIFO CNT field
***          (Bits 23..27) = ! (decimal).

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (HDADERR 5062)
***
***          DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) is set
***          (implying FIFO CNT should = 0); however, the FIFO CNT field
***          (Bits 23..27) = ! (decimal).

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (HDADERR 5063)
***
***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) and
***          FIFO EMPTY bit (Bit 21) are both set.
```

```
*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5064)
***
***          THE "INTERRUPT PENDING" BIT WAS INADVERTENTLY SET:
***            The INTERRUPT PENDING bit (Bit 0) of
***            INTERRUPTING_CONDITIONS = 1; however, interrupts are
***            disabled, depicted by the INTERRUPT ENABLE bit (Bit 0) of
***            INTERRUPT_MASK = 0.

*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5065)
***
***          AN INTERRUPTING CONDITION BIT WAS INADVERTENTLY SET:
***           One or more bits of INTERRUPTING_CONDITIONS = 1, even though the
***           interrupts have been masked, depicted by the respective bits of
***           INTERRUPT_MASK = 0.

*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5066)
***
***          THE "INTERRUPT PENDING" BIT FAILED TO BE SET:
***            One or more bits of INTERRUPTING_CONDITIONS and Bit 0 of
***            INTERRUPTING_MASK = 1; however, the INTERRUPT PENDING bit
***            (Bit 0) of INTERRUPTING_CONDITIONS = 0.

*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5067)
***
***          THE "INTERRUPT PENDING" BIT WAS INADVERTENTLY SET:
***            No interrupting condition bit is set, however the
***            INTERRUPT PENDING bit (Bit 0) of INTERRUPT_CONDITIONS = 1.

*** ERROR -- INCONSISTENCY IN INTERRUPT STATUS.               (HDADERR 5068)
***
***          The "INTERRUPT PENDING" bit (Bit 0) of
***          INTERRUPTING_CONDITIONS = 1;
***          however, the interrupt input bit of the DIAGNOSTIC_STATUS
***          register (Bit 0) = 1, which indicates that the PB Interface
***          Chip did not recognize the interrupt request.

*** ERROR -- PB INTERFACE CHIP FAILURE.                       (HDADERR 5069)
***
***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) = 0
***          (implying FIFO CNT should be less than 24); however, the
***          FIFO CNT field (Bits 23..27) = ! (decimal).

*** ERROR -- PB INTERFACE CHIP FAILURE.                       (HDADERR 5070)
***
***          DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) = 0
***          (implying FIFO CNT should be greater than 0); however, the
***          FIFO CNT field (Bits 23..27) = ! (decimal).
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK
```

Step 62—Read HP-IB Interface Chip STATUS Register

Executing this step will return to the user various status conditions of the HP-IB Interface Chip. Once the HP-IB Interface Chip's STATUS register contents have been decoded by **HPIBDAD**, user-friendly output illustrating the current status information will be displayed.

Note

CONTROL and ADDRESS registers will need to be accessed in order to fully decode the STATUS register. This is because the on-line/off-line status (within the ADDRESS register) is needed to decode the HP-IB SYSTEM CONTROLLER bit (Bit 12). Also, the TALK ALWAYS and LISTEN ALWAYS bits within the ADDRESS register are needed for error detection purposes. The status of the IFC VALUE bit within the CONTROL register is needed for error detection concerning the HP-IB CONTROLLER bit (Bit 11).

In addition to the frontplane interface chip's own registers required to fully decode this register, the Device Adapter STATUS register is required in order to detect faults within the the frontplane interface chip. Specifically, the SYSTEM CNTL bit of the Device Adapter STATUS register is required to determine whether or not the HP-IB SYSTEM CONTROLLER bit of this register should be set.

Possible Output Messages:

```
Section 6 -- Status

   Step 62 - Read HP-IB Interface Chip STATUS Register

      High order access field:                                (Bit  8 = !)
                                                              (Bit  9 = !)

      Device Adapter is NOT in the remote state.              (Bit 10 = 0)
      Device Adapter IS in the remote state.                  (Bit 10 = 1)

      Device Adapter is NOT the current HP-IB Controller.     (Bit 11 = 0)
      Device Adapter IS the current HP-IB Controller.         (Bit 11 = 1)

      Device Adapter is NOT the HP-IB System Controller.      (Bit 12 = 0)
      Device Adapter IS the HP-IB System Controller.          (Bit 12 = 1)
      Device Adapter IS the HP-IB System Controller, however
        it is also OFF-LINE.                                  (Bit 12 = 1)

      Device Adapter has NOT been addressed to Talk OR
        to Identify.                                          (Bit 13 = 0)
      Device Adapter HAS been addressed to Talk OR Identify.  (Bit 13 = 1)

      Device Adapter has NOT been addressed to Listen.        (Bit 14 = 0)
      Device Adapter HAS been addressed to Listen.            (Bit 14 = 1)

      Device Adapter's outbound data is NOT frozen.           (Bit 15 = 0)
      Device Adapter's outbound data IS frozen.               (Bit 15 = 1)

      A binary representation of the respective register follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         HP-IB Interface Chip STATUS register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ####  ####  ####  ####  ####  ####  ####  ####
         ---------------------------------------------------------

   End of Step 62 - Read HP-IB Interface Chip STATUS Register

End of Section 6 -- Status
```

Possible Error/Warning Messages:

```
*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5080)
***
***          HP-IB SYSTEM CONTROLLER bit (Bit 12) should be set because
***          the HP-IB Interface Chip is off-line; however, Bit 12 = 0.

*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5081)
***
***          HP-IB CONTROLLER bit (Bit 11) should be set because the device
***          adapter IS the System Controller and it has asserted the IFC line;
***          however, Bit 11 = 0.

*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5082)
***
***          ADDRESSED TO TALK OR IDENTIFY bit (Bit 13) should be set because
***          the TALK ALWAYS bit is set (within the ADDRESS register);
***          however, Bit 13 = 0.

*** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5083)
***
***          ADDRESSED TO LISTEN bit (Bit 14) should be set because the
***          LISTEN ALWAYS bit is set (within the ADDRESS register);
***          however, Bit 14 = 0.

*** ERROR -- INCONSISTENCY IN SYSTEM CONTROLLER STATUS.        (HDADERR 5084)
***
***          The SYSTEM CNTL bit within the HPIB_STATUS register
***          is reset, and the HP-IB Interface Chip is on-line;
***          however, Bit 12 = 1.


*** ERROR -- INCONSISTENCY IN SYSTEM CONTROLLER STATUS.        (HDADERR 5085)
***
***          The SYSTEM CNTL bit within the HPIB_STATUS register
***          is set; however, Bit 12 = 0.
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK
```

Step 63—Read HP-IB Interface Chip CONTROL Register

This step will retrieve the contents of the frontplane interface chip's CONTROL Register and decode the respective control bits in order to display user-friendly messages for the user.

Note

The frontplane interface chip's STATUS and ADDRESS registers will need to be accessed in order to fully decode the CONTROL register. This is because it must be known whether or not the device adapter is the System Controller (and whether the card is on-line or off-line) in order to decode the REN VALUE and IFC VALUE bits. The OUTBOUND DATA FREEZE bit in the STATUS register is needed to fully decode the implications of the RESPOND TO PARALLEL POLL bit.

Possible Output Messages:

```
Section 6 -- Status

   Step 63 - Read HP-IB Interface Chip CONTROL Register

      The OUTBOUND DATA FREEZE restriction is NOT in affect on the
        Parallel Poll response.                          (Bit  0 = 0)
      The OUTBOUND DATA FREEZE restriction IS in affect on the
        Parallel Poll response.                          (Bit  0 = 1)

      NDAC or NRFD signals are NOT delayed to the Source Handshake
        circuitry during DATA transfers.                 (Bit  1 = 0)
      NDAC or NRFD signals ARE delayed to the Source Handshake
        circuitry during DATA transfers.                 (Bit  1 = 1)

      Currently utilizing the standard 10-bit data path. (Bit  8 = 0)
      Currently utilizing the 8-bit data path.           (Bit  8 = 1)

      Even parity Interface Commands ARE accepted.       (Bit  9 = 0)
      Even parity Interface Commands are NOT accepted.   (Bit  9 = 1)

      The REN line is at a logic LOW state.              (Bit 10 = 0)
      The local REN line is at a logic LOW state (the HP-IB
        Interface Chip is off-line).                     (Bit 10 = 0)
      The REN line is at a logic HIGH state.             (Bit 10 = 1)
      The local REN line is at a logic HIGH state (the HP-IB
        Interface Chip is off-line).                     (Bit 10 = 1)
      Decoding the REN VALUE bit is noninformative because the
        device adapter is not the System Controller.     (Bit 10)

      The IFC line is at a logic LOW state.              (Bit 11 = 0)
      The local IFC line is at a logic LOW state (the HP-IB
        Interface Chip is off-line).                     (Bit 11 = 0)
      The IFC line is at a logic HIGH state.             (Bit 11 = 1)
      The local IFC line is at a logic HIGH state (the HP-IB
        Interface Chip is off-line).                     (Bit 11 = 1)
```

```
      Decoding the IFC VALUE bit is noninformative because the
        device adapter is not the System Controller.          (Bit 11)

      The RESPOND TO PARALLEL POLL bit = 0; therefore the HP-IB
        Interface Chip is not in need of service.             (Bit 12 = 0)
      The RESPOND TO PARALLEL POLL bit = 1; therefore the HP-IB
        Interface Chip will indicate the need for service during
        any Parallel Poll if it has the response capability. (Bit 12 = 1)
      The RESPOND TO PARALLEL POLL bit = 1; however, since both
        the OUTBOUND DATA FREEZE and POLL HOLDOFF bits are set,
        the HP-IB Interface Chip will NOT respond affirmatively
        to a Parallel Poll.                                   (Bit 12 = 1)

      The REQUEST SERVICE bit = 0; therefore the HP-IB
        Interface Chip will NOT request service during the
        next Serial Poll.                                     (Bit 13 = 0)
      The REQUEST SERVICE bit = 1; depicting that the HP-IB
        Interface Chip has asserted the SRQ line and during the
        next Serial Poll will request service from the
        HP-IB Controller.                                     (Bit 13 = 1)

      A DMA request will be issued when the Inbound FIFO is
        ready for a READ operation.                           (Bit 14 = 0)
      A DMA request will be issued when the Outbound FIFO is
        ready for a WRITE operation.                          (Bit 14 = 1)

      The INITIALIZE OUTBOUND FIFO bit is not architected to
        be read (0 is always returned).                       (Bit 15 = 0)

      A binary representation of the respective register follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         HP-IB Interface Chip CONTROL register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ####  ####  ####  ####  ####  ####  ####  ####
         ---------------------------------------------------------

   End of Step 63 - Read HP-IB Interface Chip CONTROL Register

End of Section 6 -- Status
```

Possible Error/Warning Messages:

```
*** WARNING -- The INITIALIZE OUTBOUND FIFO bit value was read in as
***            being 1, but should always be read as 0.          (HDADWARN 6030)
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK
```

Step 64—Read HP-IB Interface Chip ADDRESS Register

When this step is run, HPIBDAD will read, decode, and display the contents of the HP-IB Interface Chip's ADDRESS register. The information maintained by this register pertains to the HP-IB address of the device adapter, as well as related control information.

Note

In order to decode the full implications of the TALK ALWAYS and LISTEN ALWAYS bits, the frontplane interface chip's STATUS register must be accessed. Specifically, the ADDRESSED TO TALK and ADDRESSED TO LISTEN bits must be retrieved.

Possible Output Messages:

```
Section 6 -- Status

   Step 64 - Read HP-IB Interface Chip ADDRESS Register

      The CRC capabilities are DISABLED.                    (Bit  0 = 0)
      The CRC capabilities are ENABLED.                     (Bit  0 = 1)

      HP-IB commands originating from the Outbound FIFO will
        have ODD parity.                                    (Bit  1 = 0)
      HP-IB commands originating from the Outbound FIFO will
        have EVEN parity.                                   (Bit  1 = 1)

      The HP-IB Interface Chip is OFF-LINE.                 (Bit  8 = 0)
      The HP-IB Interface Chip is ON-LINE.                  (Bit  8 = 1)

      The TALK ALWAYS bit is RESET.                         (Bit  9 = 0)
      The TALK ALWAYS bit is reset; however, the device
        adapter IS addressed to Talk.                       (Bit  9 = 0)
      The TALK ALWAYS bit is SET.                           (Bit  9 = 1)

      The LISTEN ALWAYS bit is RESET.                       (Bit 10 = 0)
      The LISTEN ALWAYS bit is reset; however, the device
        adapter IS addressed to Listen.                     (Bit 10 = 0)
      The LISTEN ALWAYS bit is SET.                         (Bit 10 = 1)

      The HP-IB address for the device adapter
        is as follows (in decimal): !                       (Bits 11..15)
```

```
A binary representation of the respective register follows:
NOTE: Dashes represent undefined bits.

   ---------------------------------------------------------
   ADDRESS register's image:

   Bit #:     0     4     8     12    16    20    24    28

   Value:     ####  ####  ####  ####  ####  ####  ####  ####
   ---------------------------------------------------------

End of Step 64 - Read HP-IB Interface Chip ADDRESS Register

End of Section 6 -- Status
```

Possible Error/Warning Messages:

None specified by the diagnostic.

HP-IB DAR Operations Used:

HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK

Step 65—Read HP-IB Interface Chip PP/ID_BYTE Registers

Executing this step will result in HPIBDAD displaying the contents of the PARALLEL_POLL_MASK/FIRST_ID_BYTE and PARALLEL_POLL_SENSE/SECOND_ID_BYTE registers to the diagnostician. The respective register's contents will not be decoded and displayed in a user-friendly fashion for the user in this step, but rather simply displayed as a binary bit pattern. The reason being that decoding the bits into user-friendly messages would actually be encoding the bits into "user-frustrating" messages. The double role of the two registers also adds to the argument for not decoding the bits, since the diagnostic cannot be sure of the registers' current role (i.e. which decode template to utilize when displaying the contents).

Possible Output Messages:

```
Section 6 -- Status

   Step 65 - Read HP-IB Interface Chip PP/ID_BYTE Registers

      A binary representation of the respective registers follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         PARALLEL_POLL_MASK/FIRST_ID_BYTE register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ####  ####  ####  ####  ####  ####  ####  ####
         ---------------------------------------------------------
         PARALLEL_POLL_SENSE/SECOND_ID_BYTE register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ####  ####  ####  ####  ####  ####  ####  ####
         ---------------------------------------------------------

   End of Step 65 - Read HP-IB Interface Chip PP/ID_BYTE Registers

End of Section 6 -- Status
```

Possible Error/Warning Messages:

None specified by the diagnostic.

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK
```

Step 66—Read HPIB_STATUS Register

This step is used to obtain information about the current status (configuration) of the HP-IB and the HP-IB Device Adapter Talker/Listener/Controller Chip . This information is maintained in the read-only HPIB_STATUS register on the HP-IB DA. After this register is read in by the diagnostic program, the respective bits are decoded and displayed to the operator in a user-friendly manner.

Note

In order to determine the consistency of reporting pending interrupts, the HP-IB Interface Chip's INTERRUPTING_CONDITIONS register will have to be read in.

Possible Output Messages:

```
Section 6 -- Status

   Step 66 - Read HPIB_STATUS Register

      HP-IB Interface Chip is NOT the System Controller.     (Bit 24 = 0)
      HP-IB Interface Chip IS the System Controller.         (Bit 24 = 1)

      HP-IB Interface Chip is in SLOW mode.                  (Bit 25 = 0)
      HP-IB Interface Chip is in FAST mode.                  (Bit 25 = 1)

      HP-IB Interface Chip's D1 value from the last read
        operation was 0.                                     (Bit 26 = 0)
      HP-IB Interface Chip's D1 value from the last read
        operation was 1.                                     (Bit 26 = 1)

      HP-IB Interface Chip's DO value from the last read
        operation was 0.                                     (Bit 27 = 0)
      HP-IB Interface Chip's DO value from the last read
        operation was 1.                                     (Bit 27 = 1)

      HP-IB Interface Chip is NOT interrupting.              (Bit 28 = 0)
      HP-IB Interface Chip IS interrupting.                  (Bit 28 = 1)

      Group Execute Trigger has NOT interrupted.             (Bit 29 = 0)
      Group Execute Trigger HAS interrupted.                 (Bit 29 = 1)

      Interface Clear has NOT interrupted.                   (Bit 30 = 0)
      Interface Clear HAS interrupted.                       (Bit 30 = 1)

      Hardware did NOT pass most recent test.                (Bit 31 = 0)
      Hardware PASSED most recent test.                      (Bit 31 = 1)


      A binary representation of the respective register follows:
      NOTE: Dashes represent undefined bits.
```

```
-------------------------------------------------------
HPIB_STATUS register's image:

Bit #:     0     4     8    12    16    20    24    28

Value:     ####  ####  ####  ####  ####  ####  ####  ####
-------------------------------------------------------
```

End of Step 66 - Read HPIB_STATUS Register

End of Section 6 -- Status

Possible Error/Warning Messages:

```
*** ERROR -- INCONSISTENCY IN INTERRUPT PENDING STATUS.          (HDADERR 5090)
***
***            INTERRUPTING_CONDITIONS register: bit  0 = 1
***            HPIB_STATUS register            : bit 28 = 0

*** ERROR -- INCONSISTENCY IN INTERRUPT PENDING STATUS.          (HDADERR 5091)
***
***            INTERRUPTING_CONDITIONS register: bit  0 = 0
***            HPIB_STATUS register            : bit 28 = 1
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK
```

Step 67—Read BUS_STATUS Register

This step is used to obtain information about the current state of the HP-IB control bus (5 general interface management lines and 3 handshake lines) by reading in the contents of the BUS_STATUS Register. The image of the HP-IB control bus is latched into this register with the leading edge of the select signal for the register. The output of this step is the fully decoded representation of the HP-IB status.

Note

Reading this register is an effective way to determine if there is any device in handshake mode connected to the HP-IB. The reason for this is that when a handshake device is in fact connected to the HP-IB, at least one of the following signals will be at the logic zero level: NDAC, NRFD. When there are no handshake devices connected to the HP-IB, these signals will both be at the logic one level.

Possible Output Messages:

```
Section 6 -- Status

   Step 67 - Read BUS_STATUS Register

      The logic levels of the respective bits are as follows:

                        Line ID                  Logic Level
                        -------                  -----------
         EOI - End or Identify    (Bit 24):          #
         REN - Remote Enable      (Bit 25):          #
         SRQ - Service Request    (Bit 26):          #
         ATN - Attention          (Bit 27):          #
         IFC - Interface Clear    (Bit 28):          #

         DAV - Data valid         (Bit 29):          #
        NDAC - Not Data Accepted  (Bit 30):          #
        NRFD - Not Ready For Data (Bit 31):          #

      A binary representation of the respective register follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         BUS_STATUS register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ####  ####  ####  ####  ####  ####  ####  ####
         ---------------------------------------------------------


      End of Step 67 - Read BUS_STATUS Register

End of Section 6 -- Status
```

Possible Error/Warning Messages:

```
*** WARNING -- No device in handshake mode is connected to the HP-IB,
***            depicted by the NDAC and NRFD lines both being at the
***            logic one level.                                    (HDADWARN 6050)
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_READ_REG
HPIB_UNLOCK
```

Section 10—Register Level Input/Output Transactions

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

Warning

The user of this section must exercise EXTREME CAUTION when sending information over the HP-IB. If a negligent user sends "garbage" information to a system disk, the result could be a corrupted disk and a system crash!

This section can be executed by the diagnostician when he/she wishes to do "peeks" and/or "pokes" to the device adapter. That is to say, this section allows the user to read/write any register in the device adapter's address space.

Warning

In order for this section to be of any value, the device adapter being diagnosed should not be accessed by any process other than HPIBDAD. This is to ensure that any configuration modifications made by the diagnostic are pending for succeeding transactions.

Possible Output Messages:

```
Section 10 -- Register Level Input/Output Transactions

   At the prompt, enter one of the following commands:
     1) "Input Register" Command:

            i <decimal register number>

        For Example:
          To input register number 159, type "i 159<CR>"

     2) "Output Register" Command:

            o <decimal register number> <hex data>

        For Example:
          To output 0x02BAD to register number 12 (decimal), type
          "o 12 2bad<CR>"

     3) A lone <CR> will cause this section to terminate.

   %

    : !

End of Section 10 -- Register Level Input/Output Transactions
```

Note All commands/data can be entered in upper and/or lower case characters.

Possible Error/Warning Messages:

```
*** WARNING -- This section is intended for personnel which have a good
***            understanding of the HP-IB Device Adapter's architecture.
***            It is strongly recommended that you print off "More Help" on
***            Section 10, or reference the user's manual before using this
***            section.                                          (HDADWARN 6060)

*** WARNING -- Invalid or missing register number ... the register number
***            value is not a properly formatted DECIMAL integer.
***            Please try again.                                 (HDADWARN 6061)

*** WARNING -- Invalid register number ... the register number entered
***            is beyond the device adapter's address space (highest
***            register number is decimal 1023).
***            Please try again.                                 (HDADWARN 6062)

*** WARNING -- Invalid or missing datum ... the datum value is not a properly
***            formatted HEXADECIMAL integer.
***            Please try again.                                 (HDADWARN 6064)

*** WARNING -- Invalid command ... the command entered cannot be decoded.
***            Please try again.                                 (HDADWARN 6065)
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_WRITE_REG
HPIB_READ_REG
HPIB_UNLOCK
```

Section 11—Data/Command Transaction on HP-IB

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

Executing this section will allow the user to send data/commands to a particular device connected to the interface bus, as well as receive data from the device. Essentially, this section gives the user complete control of the information to be sent to the frontplane interface chip's Register 2 (Outbound FIFO). This implies that the user must have a very good working knowledge of the HP-IB protocol; however, examples of some of the more common transactions can be observed by running Section 1 (**More Help**) of this diagnostic and entering "11" at the prompt.

When this section is run, data entered is expected to be in hexadecimal format. Also, the user may restart information entry by entering a lone semicolon (;) at any prompt. Entering a lone <CR> will terminate information entry, whereas entering a lone colon (:) terminates data entry AND conveys to the diagnostic that return data is expected from a device on the HP-IB. When expected data is returned within the timeout period, it will be displayed in hexadecimal format; however, if the timeout period elapses, an appropriate error message will be output.

In order to make this section a little more beneficial to the user, the HPIBDAD will take care of issuing the necessary (Un)Talk/(Un)Listen addressing. Therefore, the user will be required to simply enter the address of the device he/she wishes to communicate with in addition to the data to be sent.

The user should make sure that if a command is being sent to a device, that it is "terminated" according to the protocol of the particular device. For example, some devices accept a semicolon (;) as a command delimiter, others expect the EOI line to be asserted, etc. (to assert the EOI line, the number two (2) should be inserted as the most significant digit into the byte where the EOI is desired; e.g. if an EOI is desired while sending the hex byte 49, the user should enter the hex datum of 249—this sets the END bit in the frontplane interface chip's Outbound FIFO).

Note

In order for this diagnostic section to execute properly, the HP-IB Device Adapter being diagnosed must be the System Controller. Therefore, the HPIB_STATUS register will be read in at the onset of this section in order to verify the System Controller status. If the device adapter under test is not the System Controller, a warning message will be output and the section will be exited. However, it is not expected that this scenario will often occur, since the device adapter under test will usually be the System Controller.

Also note that the REN (Remote Enable) Line will be asserted on the DA under test by HPIBDAD before the data/command transaction takes place on the HP-IB.

Caution

A timeout error condition may exist if the device adapter is not able to send data/commands over the HP-IB due to a "configuration" problem (e.g. DA is neither the HP-IB Controller nor addressed to talk). Therefore, in this type of situation, there actually isn't a hardware/software problem, but the user may infer this from the error message. Similarly, the user may have requested information to be returned from a device on the HP-IB, but that device may be very slow in collecting the requisite data, therefore causing an error message to be output when an actual hardware/software error may not exist.

Warning

The user of this section must exercise EXTREME CAUTION when sending information over the HP-IB. If a negligent user sends "garbage" information to a system disk, the result could be a corrupted disk and a system crash!

Possible Output Messages:

```
Section 11 -- Data/Command Transaction on HP-IB

   Example scripts can be observed by executing Section 1 -- More Help
   and entering "11" at the prompt.

   Please enter the HP-IB address of the device you wish to
   transact with (0..29) :

   At a prompt, enter one of the following:
     1) A hexadecimal integer (10-bit maximum per line--i.e. 0..3FF)
     2) A lone <CR> to terminate information entry
     3) A lone colon (:) to terminate information entry AND convey to the
        diagnostic that return data is expected
     4) A lone semicolon (;) to abort the current information entry session
        and to start over

   CAUTION: Care must be taken not to enter a hexadecimal integer that
   matches a language localized control message.  For example, if a lone
   'e' is entered, it is an indication to the diagnostic to exit.  In this
   case, "0e" should be entered.

   >>

   The device RETURNED the following data (displayed in hex format):

   ... Information entry to be restarted.

   Information being sent to HP-IB Interface Chip's Outbound FIFO ...

End of Section 11 -- Data/Command Transaction on HP-IB
```

Possible Error/Warning Messages:

```
*** ERROR -- THE NUMBER OF DATA BYTES RETURNED BY THE DEVICE EXCEEDED
***          THE SPECIFIED BYTE COUNT.                          (HDADERR 5100)
***
***          Byte count was set to: !
***          Data  bytes  returned: !

*** WARNING -- Invalid response.  Please answer the question with one
***            of the choices given.                            (HDADWARN 6001)

*** WARNING -- It is strongly recommended that you print off "More Help" on
***            Section 11, or reference the user's manual before using this
***            section.                                         (HDADWARN 6070)

*** WARNING -- The device adapter under test is NOT the System
***            Controller, therefore this section cannot be
***            executed.                                        (HDADWARN 6072)

*** WARNING -- Information entered is not a properly formatted
***            HEXADECIMAL integer.
***            Please try again.  For example: "2BE<CR>".       (HDADWARN 6075)

*** WARNING -- Information entered exceeds the 10-bit limit.
***            Please try again.  For example: "3FF<CR>".       (HDADWARN 6076)

*** WARNING -- The number of data units entered has exceeded the buffer size.
***            Please terminate the current data entry
***            when prompted.                                   (HDADWARN 6077)
```

HP-IB DAR Operations Used:

```
HPIB_LOCK
HPIB_WRITE_REG
HPIB_READ_REG
HPIB_INPUT
HPIB_RESET
HPIB_UNLOCK
```

Error and Warning Messages

The following provides a listing, in numerical order, of the most significant error and warning messages displayed by the system.

Error Messages

The following provides a listing, in numerical order, of the most significant error messages displayed by the system.

```
5005 *** ERROR -- IODC CHECKSUM FAILED.                              (HDADERR 5005)
```

```
5010 *** ERROR -- PB INTERFACE CHIP (PBIC) LOOPBACK FAILED.          (HDADERR 5010)
     ***
     ***          Data written to PBIC (in hex)       Data read from PBIC (in hex)
     ***          ----------------------------        ----------------------------
     ***                   !                                  !
```

```
5020 *** ERROR -- HP-IB INTERFACE CHIP (HIC) LOOPBACK FAILED.        (HDADERR 5020)
     ***
     ***          Data written to HIC (in hex)        Data read from HIC (in hex)
     ***          ----------------------------        ----------------------------
     ***                   !                                  !
```

```
5030 *** ERROR -- PB INTERFACE CHIP (PBIC) TEST FAILED.              (HDADERR 5030)
     ***          ! register failed the "Register Verification" test.
     ***
     ***          Data written to PBIC (in hex)       Data read from PBIC (in hex)
     ***          ----------------------------        ----------------------------
```

```
5031 *** ERROR -- HP-IB INTERFACE CHIP (HIC) TEST FAILED.          (HDADERR 5031)
     ***          ! register failed the
     ***          "Register Verification" test.
     ***
     ***          Data written to HIC (in hex)       Data read from HIC (in hex)
     ***          ---------------------------        ---------------------------
```

```
5035 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5035)
     ***          The interface chip "IFC" test failed.
```

```
5036 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5036)
     ***          The interface chip "Talk/Listen" test failed.
```

```
5037 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5037)
     ***          The interface chip "REN" test failed.
```

```
5038 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5038)
     ***          The interface chip "FIFO" test failed.
```

```
5039 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5039)
     ***          The interface chip "SRQ" test failed.
```

```
5040 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5040)
     ***          The interface chip "Parallel Poll" test failed.
```

```
5041 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                (HDADERR 5041)
     ***          The interface chip "Secondary Address" test failed.
```

```
5042 *** ERROR -- HP-IB INTERFACE CHIP TEST FAILED.                    (HDADERR 5042)
     ***          The interface chip "CRC" test failed.

-------------------------------------------------------------------------------

5045 *** ERROR -- HPIB_CONTROL/STATUS REGISTER SET VERIFICATION
     ***          TEST FAILED.                                         (HDADERR 5045)

-------------------------------------------------------------------------------

5046 *** ERROR -- GROUP EXECUTE TRIGGER OR HP-IB INTERFACE CHIP'S INTERRUPT
     ***          CIRCUITRY FAILED TEST.                               (HDADERR 5046)

-------------------------------------------------------------------------------

5047 *** ERROR -- ON-LINE TEST FAILED.                                  (HDADERR 5047)
     ***
     ***          This test is targeted to check the frontplane's General Interface
     ***          Management Lines (control transceiver), and BUS_STATUS register.

-------------------------------------------------------------------------------

5048 *** ERROR -- IFC INTERRUPT TEST FAILED.                            (HDADERR 5048)
     ***
     ***          This test is targeted to check the frontplane's IFC
     ***          interrupt circuitry.

-------------------------------------------------------------------------------

5049 *** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5049)
     ***          Data was corrupted.

-------------------------------------------------------------------------------

5050 *** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5050)
     ***          DMA termination condition incorrect.

-------------------------------------------------------------------------------

5051 *** ERROR -- DMA TEST NUMBER ! FAILED.                             (HDADERR 5051)
     ***          Incorrect residue value in the IO_DMA_COUNT register.

-------------------------------------------------------------------------------
```

```
5052 *** ERROR -- DMA TEST NUMBER ! FAILED.                    (HDADERR 5052)
     ***          Internal Software Error.
```

```
5053 *** ERROR -- DMA TEST NUMBER ! FAILED.                    (HDADERR 5053)
     ***          Inconsistency within PB Interface Chip with respect to
     ***          reporting "DMA length conflict" status.
```

```
5060 *** ERROR -- PB INTERFACE CHIP FAILURE.                   (HDADERR 5060)
     ***
     ***          PB Interface Chip reported to have ! bytes in FIFO,
     ***          however only 24 bytes are available.
```

```
5061 *** ERROR -- PB INTERFACE CHIP FAILURE.                   (HDADERR 5061)
     ***
     ***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) is set
     ***          (implying FIFO CNT should = 24); however, the FIFO CNT field
     ***          (Bits 23..27) = ! (decimal).
```

```
5062 *** ERROR -- PB INTERFACE CHIP FAILURE.                   (HDADERR 5062)
     ***
     ***          DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) is set
     ***          (implying FIFO CNT should = 0); however, the FIFO CNT field
     ***          (Bits 23..27) = ! (decimal).
```

```
5063 *** ERROR -- PB INTERFACE CHIP FAILURE.                   (HDADERR 5063)
     ***
     ***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) and
     ***          FIFO EMPTY bit (Bit 21) are both set.
```

```
5064 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5064)
     ***
     ***          THE "INTERRUPT PENDING" BIT WAS INADVERTENTLY SET:
     ***            The INTERRUPT PENDING bit (Bit 0) of
     ***            INTERRUPTING_CONDITIONS = 1; however, interrupts are
     ***            disabled, depicted by the INTERRUPT ENABLE bit (Bit 0) of
     ***            INTERRUPT_MASK = 0.
```

```
5065 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5065)
     ***
     ***          AN INTERRUPTING CONDITION BIT WAS INADVERTENTLY SET:
     ***           One or more bits of INTERRUPTING_CONDITIONS = 1, even though the
     ***           interrupts have been masked, depicted by the respective bits of
     ***           INTERRUPT_MASK = 0.
```

```
5066 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5066)
     ***
     ***          THE "INTERRUPT PENDING" BIT FAILED TO BE SET:
     ***            One or more bits of INTERRUPTING_CONDITIONS and Bit 0 of
     ***            INTERRUPTING_MASK = 1; however, the INTERRUPT PENDING bit
     ***            (Bit 0) of INTERRUPTING_CONDITIONS = 0.
```

```
5067 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5067)
     ***
     ***          THE "INTERRUPT PENDING" BIT WAS INADVERTENTLY SET:
     ***            No interrupting condition bit is set, however the
     ***            INTERRUPT PENDING bit (Bit 0) of INTERRUPT_CONDITIONS = 1.
```

```
5068 *** ERROR -- INCONSISTENCY IN INTERRUPT STATUS.                (HDADERR 5068)
     ***
     ***          The "INTERRUPT PENDING" bit (Bit 0) of
     ***          INTERRUPTING_CONDITIONS = 1;
     ***          however, the interrupt input bit of the DIAGNOSTIC_STATUS
     ***          register (Bit 0) = 1, which indicates that the PB Interface
     ***          Chip did not recognize the interrupt request.
```

```
5069 *** ERROR -- PB INTERFACE CHIP FAILURE.                        (HDADERR 5069)
     ***
     ***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) = 0
     ***          (implying FIFO CNT should be less than 24); however, the
     ***          FIFO CNT field (Bits 23..27) = ! (decimal).
```

```
5070 *** ERROR -- PB INTERFACE CHIP FAILURE.                        (HDADERR 5070)
     ***
     ***          DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) = 0
     ***          (implying FIFO CNT should be greater than 0); however, the
     ***          FIFO CNT field (Bits 23..27) = ! (decimal).
```

```
5080 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                     (HDADERR 5080)
     ***
     ***          HP-IB SYSTEM CONTROLLER bit (Bit 12) should be set because
     ***          the HP-IB Interface Chip is off-line; however, Bit 12 = 0.
```

```
5081 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5081)
     ***
     ***          HP-IB CONTROLLER bit (Bit 11) should be set because the device
     ***          adapter IS the System Controller and it has asserted the IFC line;
     ***          however, Bit 11 = 0.
```

```
5082 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5082)
     ***
     ***          ADDRESSED TO TALK OR IDENTIFY bit (Bit 13) should be set because
     ***          the TALK ALWAYS bit is set (within the ADDRESS register);
     ***          however, Bit 13 = 0.
```

```
5083 *** ERROR -- HP-IB INTERFACE CHIP FAILURE.                    (HDADERR 5083)
     ***
     ***          ADDRESSED TO LISTEN bit (Bit 14) should be set because the
     ***          LISTEN ALWAYS bit is set (within the ADDRESS register);
     ***          however, Bit 14 = 0.
```

```
5084 *** ERROR -- INCONSISTENCY IN SYSTEM CONTROLLER STATUS.        (HDADERR 5084)
     ***
     ***          The SYSTEM CNTL bit within the HPIB_STATUS register
     ***          is reset, and the HP-IB Interface Chip is on-line;
     ***          however, Bit 12 = 1.
```

```
5085 *** ERROR -- INCONSISTENCY IN SYSTEM CONTROLLER STATUS.          (HDADERR 5085)
     ***
     ***          The SYSTEM CNTL bit within the HPIB_STATUS register
     ***          is set; however, Bit 12 = 0.
```

```
5090 *** ERROR -- INCONSISTENCY IN INTERRUPT PENDING STATUS.          (HDADERR 5090)
     ***
     ***            INTERRUPTING_CONDITIONS register: bit  0 = 1
     ***            HPIB_STATUS register            : bit 28 = 0
```

```
5091 *** ERROR -- INCONSISTENCY IN INTERRUPT PENDING STATUS.          (HDADERR 5091)
     ***
     ***            INTERRUPTING_CONDITIONS register: bit  0 = 0
     ***            HPIB_STATUS register            : bit 28 = 1
```

```
5100 *** ERROR -- THE NUMBER OF DATA BYTES RETURNED BY THE DEVICE EXCEEDED
     ***          THE SPECIFIED BYTE COUNT.                          (HDADERR 5100)
     ***
     ***          Byte count was set to: !
     ***          Data  bytes  returned: !
```

Warning Messages

The following provides a listing, in numerical order, of the most significant warning messages displayed by the system.

6001

```
*** WARNING -- Invalid response.  Please answer the question with one
***            of the choices given.
(HDADWARN 6001)
More Help (1..8, 10, 11, <CR>) :
```

6010

```
*** WARNING -- Soft Physical Address Capability = 0x!,
***            I expected  0x80.
(HDADWARN 6010)
```

6011

```
*** WARNING -- Type of Module = ! (UNKNOWN PRODUCT),
***            I expected a 4 (TP_A_DMA).
(HDADWARN 6011)
```

6015

```
*** WARNING -- The device adapter under test is NOT the System
***            Controller, therefore the "On-Line Test" cannot be
***            executed.
(HDADWARN 6015)
```

6016 *** WARNING -- The device adapter under test is NOT the System
*** Controller, therefore the "IFC Interrupt Test" cannot
*** be executed.
(HDADWARN 6016)

6020 *** WARNING -- The IO_STATUS register has one or more undefined bits
*** reading in as a 1 (I expected 0's).
(HDADWARN 6020)

6022 *** WARNING -- A SOFT ERROR (length conflict) occurred since the last
*** write to the IO_COMMAND register.
*** (IO_STATUS Bit 22 = 1)
(HDADWARN 6022)

6023 *** WARNING -- A FATAL ERROR occurred since the last write to the
*** IO_COMMAND register.
*** (IO_STATUS Bit 24 = 1)
(HDADWARN 6023)

6025 *** WARNING -- PB Interface Chip HAS generated a PB bus error since
*** the last reset command.
*** (DIAGNOSTIC_STATUS Bit 1 = 0)
(HDADWARN 6025)

```
6030        *** WARNING -- The INITIALIZE OUTBOUND FIFO bit value was read in as
            ***            being 1, but should always be read as 0.
(HDADWARN 6030)
```

```
6050        *** WARNING -- No device in handshake mode is connected to the HP-IB,
            ***            depicted by the NDAC and NRFD lines both being at the

            ***            logic one level.
(HDADWARN 6050)
```

```
6060        *** WARNING -- This section is intended for personnel which have a good

            ***            understanding of the HP-IB Device Adapter's architecture.

            ***            It is strongly recommended that you print off "More Help"
on
            ***            Section 10, or reference the user's manual before using
this
            ***            section.
(HDADWARN 6060)
```

```
6061        *** WARNING -- Invalid or missing register number ... the register
number
            ***            value is not a properly formatted DECIMAL integer.

            ***            Please try again.
(HDADWARN 6061)
```

```
6062        *** WARNING -- Invalid register number ... the register number entered

            ***            is beyond the device adapter's address space (highest

            ***            register number is decimal 1023).

            ***            Please try again.
(HDADWARN 6062)
```

6064 *** WARNING -- Invalid or missing datum ... the datum value is not a properly
*** formatted HEXADECIMAL integer.

*** Please try again.
(HDADWARN 6064)

6065 *** WARNING -- Invalid command ... the command entered cannot be decoded.
*** Please try again.
(HDADWARN 6065)

6070 *** WARNING -- It is strongly recommended that you print off "More Help" on
*** Section 11, or reference the user's manual before using this
*** section.
(HDADWARN 6070)

6072 *** WARNING -- The device adapter under test is NOT the System
*** Controller, therefore this section cannot be

*** executed.
(HDADWARN 6072)

6075 *** WARNING -- Information entered is not a properly formatted
*** HEXADECIMAL integer.

*** Please try again. For example: "2BE<CR>".
(HDADWARN 6075)

6076 *** WARNING -- Information entered exceeds the 10-bit limit.
*** Please try again. For example: "3FF<CR>".
(HDADWARN 6076)

6077 *** WARNING -- The number of data units entered has exceeded the buffer size.
*** Please terminate the current data entry
*** when prompted.
(HDADWARN 6077)

Contents

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GPIO Device Adapter Diagnostic

Introduction

The GPIO Device Adapter Diagnostic (GPIODAD) is part of the online diagnostics package. It is designed to provide its user with a means of determining if the specified GPIO Device Adapter (DA) and its related hardware are operating properly, and if not, which FRU should be replaced. There are a variety of tests which the user can run to determine the source of a problem. Some of the tests require writing and reading data to and from (respectively) the DA after a loopback hood has been placed on the DA's frontplane.

GPIODAD can be utilized in three ways: 1) to verify the functionality of the GPIO Device Adapter (part number 28651A), 2) to isolate a fault within the GPIO interface down to the Field Replaceable Unit (FRU) level, and 3) to isolate a fault within the GPIO Device Adapter down to the component level (if possible). Additional features of GPIODAD allow the user to reset the GPIO Device Adapter and read/write various registers.

In order to execute a large percentage of GPIODAD, the user must have the capability to run destructive tests. However, some of the sections do allow the user to execute them in Normal Mode. All of the tests can be run from any terminal.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10029.

Minimum Configuration

The hardware required to run GPIODAD consists of a Precision Bus (PB) GPIO Device Adapter (part number 28651A), as well as an 815 computer system with all the necessary equipment to bring the operating system (HP-UX) up and running.

Moreover, in order to *fully* test the GPIO Device Adapter, a GPIO loopback hood (part number 28651-60003) must be connected to the GPIO. This will allow the frontplane drivers/receivers and external interrupt circuitry to be tested.

In order to run GPIODAD, the online diagnostics diagnostic system must be present, along with the portability interface routines. Also, the diagnostic must guarantee that regardless of what condition the GPIO Device Adapter (DA) to be tested is in, the system will not crash by running the diagnostic on it.

Other software that must be present in the system to execute GPIODAD includes the following: the GPIO Device Access Routines (DAR) which act as an interface between the diagnostics and the driver, and the GPIO Device Adapter Manager (DAM) which is the driver to the GPIO DA. Note that the DAR is technically part of the portability interface, as far as the online diagnostics module structure is concerned.

Operating Instructions

GPIODAD can be run in two different modes, which are described below. Nevertheless, the description of all three diagnostic user environments (with respect to MPE/online diagnostics) are illustrated for the sake of completeness.

Note

GPIODAD does not execute any tests in *Disruptive Mode*, nor is this mode supported by HP-UX/online diagnostics. Within HP-UX/online diagnostics, any sections/steps that are designated to be executed in *Disruptive Mode* are executed in *Normal Mode* (see below).

- *Disruptive Mode* - Indicates that the program can run tests on the selected device that are disruptive in nature. A disruptive test is one that does not destroy any data on the device, but could cause errors for other users on the system. For example, if a user was to run the internal selftest on a system disk, that test might be considered disruptive since the disk would temporarily go off-line to perform the test, thus causing errors for others who tried to access the disk at that time.
- *Destructive Mode* - Indicates that the program may run any test it desires on the selected device. This mode is required for tests that have the potential for corrupting data on the device being tested (i.e., Destructive tests). There are virtually no restrictions on tests run in this mode; therefore, this mode is handled with extreme care by the diagnostic program. An example of a test that would require this mode in order to run would be one that reformats the media on a system disk, thus destroying all of the data on it.
- *Normal Mode* - Indicates that the diagnostic program cannot run any tests on the selected device that are considered to be potentially destructive or disruptive in nature.

GPIODAD can be accessed by users via the Diagnostic User Interface (DUI) provided by the online diagnostics.

Default Tests

The following are the default tests and sections for GPIODAD.

```
Section 3     Identify

Section 6     Status

  Step 61       Read PB Interface Chip IO_STATUS Register
```

RUN Command

To bring up the Online Diagnostic subsystem, enter the following command to the HP-UX system prompt:

```
% sysdiag
```

The diagnostic subsystem responds with the following prompt indicating that access has been granted to the user:

```
DUI >
```

Typing **HELP** causes a summary of the DUI function and its commands to appear on the screen.

Note

The device to be tested must be powered up and on line. The physical device location (pdev) shown below matches the same device shown on the "typical A1002A" system configuration, described in the chapter on DUI. The pdev value entered must be correct for the system being tested.

GPIODAD is initiated by using the **run gpiodad** command. For further information on the run command provided by the DUI, please refer to the online diagnostics DUI ES. All parameters available in the **run** command are acceptable as parameters when executing this diagnostic.

Note

All of the sections in this diagnostic can be executed from any terminal, even if a specific test requires the user to have the capability to run destructive tests. This implementation therefore allows the diagnostic to be run from a remote terminal; however, there may be system limitations that would not allow the use of a remote terminal.

Test Execution

When GPIODAD is invoked, the following header and welcome messages will be displayed:

```
**************************************************************
******                                                  ******
******       GPIODAD : GPIO Device Adapter Diagnostic   ******
******                                                  ******
******      (c) Copyright Hewlett-Packard Company 1987  ******
******                  All Rights Reserved             ******
******                                                  ******
******                    Version V.UU.FF               ******
******                                                  ******
**************************************************************

Welcome, Today is day, date, time
```

After the header and welcome messages are displayed via a program services call, the diagnostic will call another program services routine in order to obtain access to the device that was selected for testing (in addition to setting up the sections and steps to be run).

This routine will exit with its *status* parameter (passed by reference) being any one of three possible values. The first of which is *successful*. This indicates that all sections and steps have been validated and that the system granted access to the device.

The second possible value is *dssd_device_in_use*. If this value is returned, it indicates that the system did not grant access to the device. If this happens, the following error message will be issued by the diagnostic:

```
*** ERROR -- GPIO DEVICE ADAPTER ALREADY IN USE BY THE
***          DIAGNOSTIC SYSTEM.                              (GDADERR 5000)
***
***          Someone has already gained exclusive rights to the
***          GPIO Device Adapter that you requested, and it is illegal
***          to have two copies of the GPIODAD diagnosing the same GPIO
***          Device Adapter simultaneously.
```

The diagnostic will terminate execution after outputting this error message.

The third possible status value is *dssd_internal_error*. When this value is active upon exiting the subroutine, it indicates that an error such as no device adapter at the specified LDEV was found. online diagnostics itself will output the error message for this situation, *not* GPIODAD. The diagnostic will terminate upon regaining control.

If all went well up to this point, the sections and steps specified by the user will be executed and the results displayed. If the user did not specify any sections/steps to be run, the default sections and steps will be executed (Sections 3 and 6). If at any time, the number of errors generated exceeds the limit specified by the user in the *errcount* parameter (of the DUI run command), the following message will be output:

```
*** WARNING -- The maximum specified number of error occurrences has
***            been exceeded.                                    (GDADWARN 6000)
```

The diagnostic will then terminate its execution. If the *errpause* parameter of the run command was assigned to "on", then the diagnostic will stop after each error is generated and ask the user if the testing should continue. The prompt that will be displayed is as follows:

```
Do you wish to continue? (Y/N) [Y] :
```

If the response is "Y", then the testing will resume (if possible), and if the response is "N", the diagnostic will terminate its execution. If the sections and steps specified by the user were executed the number of times specified in the *loop* parameter of the run command without the number of errors exceeding the *errcount* value, the diagnostic will terminate normally.

At any time that the diagnostic is prompting the user for information, the user may enter "exit" to terminate its execution, or enter "suspend" to temporarily suspend its execution. Either the entire word or any number of characters which uniquely identify the respective language localized command may be entered. Moreover, the letters entered may be in any combination of upper and lower case characters. If the user exits in this fashion, the following message is displayed:

```
... Exiting GPIODAD per your request.
```

If the user temporarily suspends execution in this manner, the message that will be displayed is as follows:

```
... GPIODAD suspended per your request.
```

The user can then perform tasks through the Diagnostic User Interface (DUI) and subsequently resume execution of GPIODAD, or he/she can abort the GPIODAD entirely.

Detailed Test Descriptions

The remainder of this section discusses each section and step in detail. As a quick reference, the following table was included to list all of the sections and steps available for use in GPIODAD.

Section No.	Diagnostic Function
1	More Help
2	Reset
3	Identify
4	Local Loopback from PB Interface Chip
5	Hardware Test
6	Status Step 61 - Read PB Interface Chip IO_STATUS Register Step 62 - Read PB Interface Chip DIAGNOSTIC_STATUS Register Step 63 - Read Device Adapter IO_GPIO_STATUS Register Step 64 - Read Device Adapter IO_GPIO_INHI/LO Registers
8	External Loopback
10	Register Level Input/Output Transactions
11	Data Transaction on GPIO

Section 1 **More Help** [*Normal Mode, Not in Default Set*] Gives additional information about each of the sections and steps.

Section 2 **Reset** [*Destructive Mode, Not in Default Set*] This section initiates the following activities: reset the GPIO Device Adapter (DA) and the GPIO Device Adapter Manager (DAM) to a known state, load the appropriate information into the DA in order to have it operate properly.

Section 3 **Identify** [*Destructive Mode, In Default Set*] Issues an `Identify` command to the GPIO DAM, which acquires nearly all of the requested information from the GPIO DA's IODC. The information returned to the diagnostic is then decoded and displayed.

Section 4 **Local Loopback from PB Interface Chip** [*Destructive Mode, Not in Default Set*] The local loopback tests will determine the operational status of the backplane of the GPIO DA.

Section 5 **Hardware Test** [*Destructive Mode, Not in Default Set*] This section will perform a thorough hardware test on the GPIO DA. If the tests determine that something within the DA is abnormal, messages indicating what the problem is likely to be are displayed to the user.

Section 6 **Status** [*Destructive Mode, In Default Set*] This section is broken down into four steps so that the diagnostician can convey to the GPIODAD precisely what status information he/she wishes to examine. Moreover, the diagnostician can have a very thorough status report of the GPIO DA if he/she desires it by executing all four steps.

Step 61 **Read PB Interface Chip IO_STATUS Register**

Step 62 **Read PB Interface Chip DIAGNOSTIC_STATUS Register**

Step 63 **Read Device Adapter IO_GPIO_STATUS Register**

Step 64 **Read Device Adapter IO_GPIO_INHI/LO Registers**

Section 8 **External Loopback** [*Destructive Mode, Not in Default Set*] This section performs a loopback test on the entire data path of the GPIO DA, including the frontplane drivers/receivers.

Section 10 **Register Level Input/Output Transactions** [*Destructive Mode, Not in Default Set*] This section can be executed by the user to do peeks or pokes to any address on the GPIO DA.

Section 11 **Data Transaction on GPIO**

Section 1—More Help

```
Minimum Mode Required        : Normal

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

More Help is an interactive section which allows the user to obtain more information about a particular section than is given when typing help gpiodad at the DUI prompt. This is needed because it is not desirable to spew large help screens at the user when he/she is looking for general help, but it is desirable to give more information about certain sections when requested.

This section allows all users from any terminal to obtain the additional information that they request.

Possible Output Messages:

```
Section 1 -- More Help

   This Section allows you to get more information on any of the Sections
   [1..6, 8, 10, 11] of this diagnostic.  Please indicate the number of the
   section for which you require more information.  Entering a lone <CR> to
   the prompt exits this section.

   More Help (1..6, 8, 10, 11, <CR>) :


End of Section 1 -- More Help
```

If the user enters a section number in response to the prompt, the pertinent information would be displayed for the user to read. The numbering scheme used for the help messages is as follows: the number of the first message of each section is equal to *(section_number) * 100 + 10000*. This allows for 100 messages per section. Note that when multiple messages exist for a given section, all of the corresponding messages are displayed.

Possible Error/Warning Messages:

If the user inputs a number of a section that is not implemented (i.e., not in the set {1,2,3,4,5,6,8,10,11}), then the following message is output:

```
*** WARNING -- Invalid response.  Please answer the question with one
***            of the choices given.                          (GDADWARN 6001)

More Help (1..6, 8, 10, 11, <CR>) :
```

Note that the user is prompted again for input.

GPIO DAR Operations Used:

None

Section 2—Reset

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : No

In Auto-diagnostic Set?     : No
```

This section informs the Device Adapter Manager (DAM)—via the Device Access Routines—to reset the GPIO Device Adapter (DA) and DAM to its power-on state. The DAM will then transfer all pertinent data onto the DA that the DA needs to operate properly.

Possible Output Messages:

```
Section 2 -- Reset

   NO ERRORS DETECTED while resetting the device adapter.

End of Section 2 -- Reset
```

Possible Error/Warning Messages:

```
None specified by the diagnostic.
```

GPIO DAR Operations Used:

```
gpio_reset_card
```

Section 3—Identify

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : Yes

In Auto-diagnostic Set?     : No
```

Identify issues an **Identify** command to the GPIO DAR, which acquires the requested information from the GPIO DAM, which in turn acquires most of the information from the GPIO DA's IODC (the only information not stored in the IODC is the DAM's version code). The diagnostic then decodes the information obtained and displays it in a manner that is informative to the user. This section can be used to determine the GPIO DA's hardware and software versions, as well as the version of the DAM being used. This section has an added benefit in that if it executes successfully, the path from the diagnostic to the GPIO DA is known to be at least partially functional.

Note Hardware Version and Software Version will be displayed as hexadecimal numbers.

Possible Output Messages:

```
Section 3 -- Identify


   Hardware Version                : ?

   Soft Physical Address Capability : 0

   Type of Module                  : 4 (Type A DMA I/O Adapter)

   Software Version                : ?

   Device Adapter Manager Version  : ?

   DAR Version                     : ?

End of Section 3 -- Identify
```

Note The Hardware Version, Software Version, and Device Adapter Manager Version fields may vary in time, therefore cannot be explicitly specified within this document.

Possible Error/Warning Messages:

If the Soft Physical Address Capability is not 0, the following message is displayed:

```
*** WARNING -- Soft Physical Address Capability = !,
***            I expected a 0.                                  (GDADWARN 6010)
```

If the module type value returned is not that of a Type A DMA I/O Adapter, the following message is displayed:

```
*** WARNING -- Type of Module = ! (UNKNOWN PRODUCT),
***            I expected a 4 (TP_A_DMA).                       (GDADWARN 6011)
```

GPIO DAR Operations Used:

```
gpio_identify
```

Section 4—Local Loopback from PB Interface Chip

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

The local loopback tests will determine the operational status of the backplane of the GPIO Device Adapter. This will be accomplished by writing and reading data to and from (respectively) the GPIO DA via GPIODAD.

In this section, data will be written to the PB Interface Chip PB Interface Chip and read back, testing the hardware layer "just below" the backplane.

Note

The PB Interface chip is used to interface the PB backplane to the midplane of the GPIO DA.

GPIODAD will compare the data read with the data written, and display the appropriate messages.

Possible Output Messages:

```
Section 4 -- Local Loopback from PB Interface Chip

   NO ERRORS DETECTED while executing loopback from the PB
   Interface Chip.

End of Section 4 -- Local Loopback from PB Interface Chip
```

Possible Error/Warning Messages:

```
*** ERROR -- PB INTERFACE CHIP (PBIC) LOOPBACK FAILED.          (GDADERR 5010)
***
***          Data written to PBIC (in hex): !
***          Data read  from PBIC (in hex): !
```

GPIO DAR Operations Used:

```
gpio_read_reg
gpio_write_reg
```

Section 5—Hardware Test

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

Executing this section will perform a thorough hardware test on the GPIO DA. Not only will the PB Interface chip be tested, but the glue logic and backplane transceivers will also be tested. The only components that will be untested after this section is executed are the glue logic that is inaccessible to GPIODAD . In order to run this section, a loopback hood must first be connected to the respective device adapter. After the user confirms that the loopback hood has been connected, the diagnostic performs the following specific tests:

RESET CARD - a CMD_RESET is sent to the IO_COMMAND register on the card

INTERNAL REGISTER TEST - various patterns (0, all 1s, 5s, As, walking 1) are written out to and read back from the IO_EIM, IO_DMA_LINK, IO_DMA_COUNT registers

READ IO_STATUS - verifies that the card is ready by reading bit 25 (RDY) of the IO_STATUS register

READ IODC - verifies that the 8-byte IODC on the card is readable and contains correct information for the Soft Physical Address and Module Type entries

EXTERNAL REGISTER TEST - verifies the path to/from the external registers on the card by writing out then reading back a series of bit patterns: 0s, 1s, 5s, As, and walking 1. (Information written to bits 0,1,2,3,4 of the IO_GPIO_CONTROL register is read in from bits 3,4,5,6,7 of the IO_GPIO_STATUS register (since the external loopback hood maps the corresponding pins across.)

FRONT-PLANE TRANSFER TEST - The data path from the backplane circuitry through to and including the frontplane drivers/receivers is tested by writing out and reading back a series of bit-patterns under varying configurations of the card. The patterns: all 0's, all 1's, 5's, A's, walking 1's are sent out to the IO_GPIO_OUTHI/LO registers and read in from the IO_GPIO_INHI/LO registers (which are tied to the output registers by the external loopback hood) under width={16-bit, 8-bit}, pctl/pflg={0/0,1/1}, and mode=full.

DMA TEST NUMBER 1 - This test will DMA OUT one byte of data (or two if width is 16-bit). DMA completion will be determined via the DAM (driver) receiving an interrupt from the card. The data DMA'd OUT will be verified to be correct by doing a direct register read of the frontplane input register(s) (which are tied to the output register(s) by the external loopback hood).

DMA TEST NUMBER 2 - This test will DMA OUT 500 bytes of data. DMA completion will be determined via the DAM receiving an interrupt from the card. The last byte of data (or two if width is 16-bit) DMA'd OUT will be verified to be correct by doing a direct register read of the frontplane input register(s) (which are tied to the output register(s) by the external loopback hood).

DMA TEST NUMBER 3 - This test will DMA IN one byte of data (or two if width is 16-bit). DMA completion will be determined via the DAM receiving an interrupt from the card. The data DMA'd IN will be verified to be correct by comparing the contents of the buffer it is stored into with the data that was put on the frontplane output register(s) by Direct I/O (and looped in to the frontplane input register(s) by the external loopback hood).

DMA TEST NUMBER 4 - This test will DMA IN 500 bytes of data. DMA completion will be determined via the DAM receiving an interrupt from the card. The data DMA'd IN will be verified to be correct by comparing the contents of the buffer it is stored into with the data that was put on the frontplane output register(s) by Direct I/O (and looped in to the frontplane input register(s) by the external loopback hood).

SETTLING TIME TEST - This test performs a simple one-byte DMA OUT over all values 0 ... 15 of settling time in the IO_GPIO_DELAY register. Data is not verified, but the diagnostic checks that the EOC bit in the Shazam IO_STATUS register (bit 31) is on.

DINCLK TEST - The ability of the card to latch data on the PFLG ready to busy transition is verified. The DINCLK source in the IO_GPIO_DELAY register is set to a value of 100 and data put out on the frontplane output registers is checked for on the frontplane input registers before and after the event causing the latch (which are tied to the output register(s) by the external loopback hood).

INTER-RUPTS TEST - An external interrupt is generated and verified as having been recognized by the card. A 1 is written to bit CON4 of the IO_GPIO_CONTROL register to set up for the interrupt, external interrupts are enabled, and finally a 0 is written to CON4 to cause the interrupt (since the CON4 pin is tied to the interrupt line by the external loopback hood). After the interrupt, the diagnostic verifies that the NINTIN bit of Shazam's DIAGNOSTIC_STATUS register is off.

NRESET TEST - The card is reset and the pattern AA is written to the IO_GPIO_CONTROL register. The CON0-4 bits should be correctly mapped onto STS0-4 by the loopback hood. This is verified by a read of the IO_GPIO_STATUS register. Then, the card is reset again and the STS0-4 bits are checked. They should now be all 1s.

Possible Output Messages:

```
Section 5 -- Hardware Test

   Is the loopback hood connected to the respective GPIO Device Adapter?
   (Y/N) [Y] :

   If you wish to execute this section, please connect it.

   NO ERRORS DETECTED while checking the Device Adapter for
   READY status.

   NO ERRORS DETECTED whie checking the Device Adapter's
   SPA entry in the IODC.

   NO ERRORS DETECTED while checking the Device Adapter's
   Module Type entry in the IODC.

   NO ERRORS DETECTED while checking the Device Adapter's
   External Registers: IO_GPIO_CONTROL and IO_GPIO_STATUS.

   NO ERRORS DETECTED while checking the PB Interface Chip's
   IO_EIM register.

   NO ERRORS DETECTED while checking the PB Interface Chip's
   IO_DMA_LINK register.

   NO ERRORS DETECTED while checking the PB Interface Chip's
   IO_DMA_COUNT register.

   Initiating Hardware Test Loopback ...

   Initiating Hardware Test DMA ...

   NO ERRORS DETECTED during "DMA" testing.
   Current configuration: #
   Current test number: #

   NO ERRORS DETECTED during ANY of the "DMA" Tests.

   NO ERRORS DETECTED during the "Settling Time" Test.

   NO ERRORS DETECTED during the "External Interrupts" Test.

   NO ERRORS DETECTED during the "NRESET" Test.

End of Section 5 -- Hardware Test
```

Possible Error/Warning Messages:

```
*** ERROR -- READY STATUS TEST FAILED.                          (GDADERR 5011)
***          The IO_STATUS register indicates that the Device Adapter
***          is NOT READY.

*** ERROR -- INCORRECT IODC SOFT PHYSICAL ADDRESS.              (GDADERR 5012)
***          The IODC contains an SPA entry of #.
***          This is NOT the expected value.

*** ERROR -- INCORRECT IODC MODULE TYPE                         (GDADERR 5013)
***          The IODC contains a Module Type entry of #.
***          This is NOT the expected value.

*** ERROR -- EXTERNAL REGISTER TEST FAILED.                     (GDADERR 5014)
***          Data written to IO_GPIO_CONTROL (in hex): #
***          Data read back from IO_GPIO_STATUS (in hex): #

*** ERROR -- INTERNAL REGISTER TEST FAILED.                     (GDADERR 5015)
***          Failure encountered while writing to / reading from
***          the Shazam IO_EIM register.

*** ERROR -- INTERNAL REGISTER TEST FAILED.                     (GDADERR 5016)
***          Failure encountered while writing to / reading from
***          the Shazam IO_DMA_LINK register.

*** ERROR -- INTERNAL REGISTER TEST FAILED.                     (GDADERR 5017)
***          Failure encountered while writing to / reading from
***          the Shazam IO_DMA_COUNT register.

*** ERROR -- FRONTPLANE TRANSFER TEST FAILED.                   (GDADERR 5018)
***          Timeout occurred while performing a direct loopback to
***          the Device Adapter's frontplane.
***          Current configuration: #

*** ERROR -- FRONTPLANE TRANSFER TEST FAILED.                   (GDADERR 5019)
***          Data corrupted during direct loopback to the Device Adapter's
***          frontplane.
***
***          Data written out  (in hex): #
***          Data read back in (in hex): #
***          Current configuration: #
```

```
*** ERROR -- FAILURE DURING DMA TEST.                          (GDADERR 5030)
***          The Device Adapter did not indicate READY status before
***          the DMA transfer began.
***          Current configuration: #
***          Current test number: #

*** ERROR -- FAILURE DURING DMA TEST.                          (GDADERR 5031)
***          Incorrect residue value in the IO_DMA_COUNT register.

*** ERROR -- FAILURE DURING DMA TEST.                          (GDADERR 5032)
***          A soft error was indicated by the IO_STATUS register after DMA.
***          Current configuration: #
***          Current test number: #

*** ERROR -- FAILURE DURING DMA TEST.                          (GDADERR 5033)
***          A fatal error was indicated by the IO_STATUS register after DMA.
***          Current configuration: #
***          Current test number: #

*** ERROR -- FAILURE DURING DMA TEST.                          (GDADERR 5034)
***          The IO_STATUS register indicates NOT READY after DMA.
***          Current configuration: #
***          Current test number: #

*** ERROR -- FAILURE DURING DMA TEST.                          (GDADERR 5035)
***          The EOC bit in the IO_STATUS register is off after DMA.
***          Current configuration: #
***          Current test number: #

*** ERROR -- FAILURE DURING SMALL DMA OUT TEST.                (GDADERR 5036)
***          The data dma transferred out was corrupted.
***          Current configuration: #
***          Current test number: #
***          Data intended to be sent out (in hex): #
***          Data actually read in to verify (in hex): #

*** ERROR -- FAILURE DURING LARGE DMA OUT TEST.                (GDADERR 5037)
***          The data dma transferred out was corrupted.
***          Current configuration: #
***          Current test number: #
***          Data intended to be sent out (in hex): #
***          Data actually read in to verify (in hex): #
```

```
*** ERROR -- FAILURE DURING SMALL DMA IN TEST.                    (GDADERR 5038)
***          The data dma transferred in was corrupted.
***          Current configuration: #
***          Current test number: #
***          Data directly sent out (in hex): #
***          Data dma'd in (in hex): #

*** ERROR -- FAILURE DURING LARGE DMA IN TEST.                    (GDADERR 5039)
***          The data dma transferred in was corrupted.
***          Current configuration: #
***          Current test number: #
***          Data directly sent out (in hex): #
***          Data dma'd in (in hex): #

*** ERROR -- FAILURE DURING SETTLING TIME TEST.                   (GDADERR 5040)
***          The Device Adapter was NOT READY before DMA transfer.

*** ERROR -- FAILURE DURING SETTLING TIME TEST.                   (GDADERR 5041)
***          The EOC bit in the IO_STATUS register is off after DMA.

*** ERROR -- FAILURE DURING DINCLK TEST.                          (GDADERR 5043)
***          Normal data transfer could not be validated before varying
***          the DINCLK source to #.

*** ERROR -- FAILURE DURING DINCLK TEST.                          (GDADERR 5044)
***          Data was not correctly latched with the DINCLK source
***          set to #.

*** ERROR    FAILURE DURING EXTERNAL INTERRUPTS TEST.             (GDADERR 5045)
***          After asserting the interrupt line, the IO_STATUS register
***          did not indicate the correct external interrupt status.

*** ERROR    FAILURE DURING NRESET TEST.                          (GDADERR 5046)
***          The IO_STATUS register did not contain the correct contents
***          during a reset test.
```

GPIO DAR Functions Used:

```
gpio_reset_card
gpio_read_reg
gpio_write_reg
gpio_input
gpio_output
```

Section 6—Status

```
Minimum Mode Required       : Destructive

Terminal Used for Execution : Any

In Default Set?             : Yes

In Auto-diagnostic Set?     : No
```

This section is broken down into four steps so that the diagnostician can convey to GPIODAD precisely what status information he/she wishes to examine. Moreover, the diagnostician can have a very thorough status report of the GPIO Device Adapter if he/she desires it by executing all four steps. In order to make this ample supply of status information easier for the diagnostician to assimilate, it is fully decoded and transformed into user-friendly messages by GPIODAD before being displayed to the diagnostic user.

If this section is run without the desired steps being explicitly specified, Step 61 will run by default.

Step 61—Read PB Interface Chip IO_STATUS Register

Executing this step will display to the user various module specific status information in a user-friendly manner.

Possible Output Messages:

```
Section 6 -- Status

   Step 61 - Read PB Interface Chip IO_STATUS Register

        An interrupt has NOT occurred since the last write to
        IO_COMMAND.                                          (Bit  0 = 0)

        An interrupt message HAS been sent since the last write
        to the IO_COMMAND register.                          (Bit  0 = 1)

        An interrupt message was NOT issued due to circuitry external
        to the PB Interface Chip.                            (Bit  2 = 0)

        An interrupt HAS been issued due to circuitry external to
        the PB Interface Chip.                               (Bit  2 = 1)

        Transfer NOT completed.                              (Bit  3 = 0)

        Transfer completed.                                  (Bit  3 = 1)

        A soft error (length conflict) has NOT occurred since the
        last write to the IO_COMMAND register.               (Bit 22 = 0)

        A fatal error has NOT occurred since the last write to
        the IO_COMMAND register.                             (Bit 24 = 0)

        The device adapter is NOT ready for a new command.   (Bit 25 = 0)

        The device adapter IS ready for a new command.       (Bit 25 = 1)

        An interrupt message has NOT been sent since last
        ii_clear.                                            (Bit 26 = 0)

        An interrupt message HAS been sent since last
        ii_clear.                                            (Bit 26 = 1)

        The EOC bit of the IO_DMA_LINK register
        is NOT set.                                          (Bit 31 = 0)

        The EOC bit of the IO_DMA_LINK register IS set.      (Bit 31 = 1)

     A binary representation of the respective register(s) follows:
     NOTE: Dashes represent undefined bits.
```

```
            ------------------------------------------------------
            IO_STATUS register's image:

            Bit #:     0     4     8     12    16    20    24    28

            Value:     #-##  ----  ----  ----  ----  --#-  ###-  ---#
            ------------------------------------------------------

        End of Step 61 - Read PB Interface Chip IO_STATUS Register

     End of Section 6 -- Status
```

Possible Error/Warning Messages:

```
*** WARNING -- The IO_STATUS register has one or more undefined bits
***            reading in as a 1 (I expected all 0's).          (GDADWARN 6034)

*** WARNING -- A SOFT ERROR (length conflict) occurred since the last
***            write to the IO_COMMAND register.
***            (IO_STATUS Bit 22 = 1)                           (GDADWARN 6031)

*** WARNING -- A FATAL ERROR occurred since the last write to the
***            IO_COMMAND register.
***            (IO_STATUS Bit 24 = 1)                           (GDADWARN 6032)
```

GPIO DAR Operations Used:

```
gpio_read_reg
```

Step 62—Read PB Interface Chip DIAGNOSTIC_STATUS Register

When this step is executed, the respective register will be read in, decoded and displayed in a user-friendly fashion. The information output deals mainly with the internal state of the PB Interface Chip.

Possible Output Messages:

```
Section 6 -- Status

   Step 62 -- Read PB Interface Chip DIAGNOSTIC_STATUS Register

      PB Interface Chip DIAGNOSTIC_STATUS Register Data:

         Circuitry external to the PB Interface Chip HAS
           issued an interrupt request.                    (Bit  0 = 0)

         Circuitry external to the PB Interface Chip HAS NOT
           issued an interrupt request.                    (Bit  0 = 1)

         The PB Interface Chip did NOT generate a PB error
           since the last reset command.                   (Bit  1 = 1)

         DMA is DISABLED.                                  (Bit  4 = 0)
         DMA is ENABLED.                                   (Bit  4 = 1)

         Interrupt message transmission is DISABLED.       (Bit 19 = 0)
         Interrupt message transmission is ENABLED.        (Bit 19 = 1)

         The FIFO is NOT FULL.                             (Bit 20 = 0)
         The FIFO is FULL.                                 (Bit 20 = 1)

         The FIFO is NOT EMPTY.                            (Bit 21 = 0)
         The FIFO is EMPTY.                                (Bit 21 = 1)

         There is 1 byte in the FIFO.                      (Bits 23..27)
         There are ! bytes in the FIFO.                    (Bits 23..27)

      A binary representation of the respective register(s) follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         DIAGNOSTIC_STATUS register's image:

         Bit #:     0     4     8    12    16    20    24    28

         Value:     ####  ####  ####  ####  ####  ####  ####  ####
         ---------------------------------------------------------

   End of Step 62 - Read PB Interface Chip DIAGNOSTIC_STATUS Register
```

End of Section 6 -- Status

Possible Error/Warning Messages:

```
*** WARNING -- PB Interface Chip HAS generated a PB bus error since
***            the last reset command.
***            (DIAGNOSTIC_STATUS Bit 1 = 0)                    (GDADWARN 6040)

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (GDADERR 5071)
***
***          PB Interface Chip reported to have ! bytes in FIFO,
***          however only 24 bytes are available.

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (GDADERR 5072)
***
***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) is set
***          (implying FIFO CNT should = 24); however, the FIFO CNT field
***          (Bits 23..27) = ! (decimal).

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (GDADERR 5073)
***
***          DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) is set
***          (implying FIFO CNT should = 0); however, the FIFO CNT field
***          (Bits 23..27) = ! (decimal).

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (GDADERR 5074)
***
***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) and
***          FIFO EMPTY bit (Bit 21) are both set.

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (GDADERR 5076)
***
***          DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) = 0
***          (implying FIFO CNT should be less than 24); however, the
***          FIFO CNT field (Bits 23..27) = 24.

*** ERROR -- PB INTERFACE CHIP FAILURE.                         (GDADERR 5075)
***
***          DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) = 0
***          (implying FIFO CNT should be greater than 0); however, the
***          FIFO CNT field (Bits 23..27) = 0.
```

GPIO DAR Operations Used:

```
gpio_read_reg
```

Step 63—Read Device Adapter IO_GPIO_STATUS Register

Running this step will result in status information of the interface with the peripheral to be displayed in a user-friendly fashion.

Possible Output Messages:

```
Section 6 -- Status

   Step 63 - Read Device Adapter IO_GPIO_STATUS Register

      The logic levels of the respective bits are as follows:

                     Line ID                          Logic Level
                     -------                          -----------
          RDY - Frontplane State          (Bit 0):         #
                (Frontplane state READY.)
                (Frontplane state BUSY.)

          PFLG - Peripheral Flag          (Bit 1):         #

          PCTL - Peripheral Control       (Bit 2):         #

          EINT/STS4 - EINT/X-Status Line 4 (Bit 3):        #

          STS0 - Extended Status Line 0    (Bit 4):        #
          STS1 - Extended Status Line 1    (Bit 5):        #
          STS2 - Extended Status Line 2    (Bit 6):        #
          STS3 - Extended Status Line 3    (Bit 7):        #


      A binary representation of the respective register(s) follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         IO_GPIO_STATUS register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ----  ----  ----  ----  ----  ----  ####  ####
         ---------------------------------------------------------

   End of Step 63 - Read Device Adapter IO_GPIO_STATUS Register

End of Section 6 -- Status
```

Possible Error/Warning Messages:

None specified by the diagnostic.

GPIO DAR Operations Used:

gpio_read_reg

Step 64—Read Device Adapter IO_GPIO-INHI/LO Registers

This step is executed when the user desires to view the data within the IO_GPIO_INHI and IO_GPIO_INLO registers.

Possible Output Messages:

```
Section 6 -- Status

   Step 64 - Read Device Adapter IO_GPIO_INHI/LO Registers

      A binary representation of the respective register(s) follows:
      NOTE: Dashes represent undefined bits.

         ---------------------------------------------------------
         IO_GPIO_INHI register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ----  ----  ----  ----  ----  ----  ####  ####
         ---------------------------------------------------------
         IO_GPIO_INLO register's image:

         Bit #:     0     4     8     12    16    20    24    28

         Value:     ----  ----  ----  ----  ----  ----  ####  ####
         ---------------------------------------------------------

   End of Step 64 - Read Device Adapter IO_GPIO_INHI/LO Registers

End of Section 6 -- Status
```

Possible Error/Warning Messages:

None specified by the diagnostic.

GPIO DAR Operations Used:

gpio_read_reg

Section 8—External Loopback

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

Executing this section allows the user to test the data path of the entire device adapter, including the frontplane drivers/receivers. However, in order to run this section, a loopback hood must first be connected to the respective device adapter. After the user confirms that the loopback hood has been connected, the diagnostic performs a loopback test via the frontplane (since the output and input registers are tied together by the hood) and the results are displayed to the user.

Note

A loopback hood must be connected to the respective GPIO Device Adapter before this section is executed, or else a timeout error will be reported and the diagnostic will terminate.

Possible Output Messages:

```
Section 8 -- External Loopback

   Is the loopback hood connected to the respective GPIO Device Adapter?
   (Y/N) [Y] :

   Initiating Loopback ...

   If you wish to execute this section, please connect it.

   NO ERRORS DETECTED while executing the external loopback via the GPIO
   Device Adapter's frontplane.

End of Section 8 -- External Loopback
```

Possible Error/Warning Messages:

```
*** ERROR -- EXTERNAL LOOPBACK FAILED.                          (GDADERR 5080)
***
***          Data written to frontplane (in hex): !
***          Data read  from frontplane (in hex): !

*** ERROR -- EXTERNAL LOOPBACK TIMED OUT.                       (GDADERR 5082)
***
***          The IO_GPIO_STATUS register did not indicate ready
***          after waiting an appropriate delay for the transfer
***          to complete.
```

GPIO DAR Operations Used:

```
gpio_read_reg
gpio_write_reg
```

Section 10—Register Level Input/Output Transactions

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

Warning **The user of this section must exercise EXTREME CAUTION when sending information over the GPIO.**

This section can be executed by the diagnostician when he/she wishes to do "peeks" and/or "pokes" to the device adapter. That is to say, this section allows the user to read/write any register on the device adapter's address space.

Warning **In order for this section to be of any value, the device adapter being diagnosed should not be accessed by any process other than GPIODAD. This is to ensure that any configuration modifications made by the diagnostic are pending for succeeding transactions.**

Possible Output Messages:

```
Section 10 -- Register Level Input/Output Transactions

   At the prompt, enter one of the following commands:
     1) "Input Register" Command:

            i <decimal register number>

        For Example:
          To input register number 159, type "i 159<CR>"

     2) "Output Register" Command:

            o <decimal register number> <hex data>

        For Example:
          To output 0x02BAD to register number 12 (decimal), type
          "o 12 2bad<CR>"

     3) A lone <CR> will cause this section to terminate.

   >>

    : !

End of Section 10 -- Register Level Input/Output Transactions
```

Note All commands/data can be entered in upper and/or lower case characters.

Possible Error/Warning Messages:

```
*** WARNING -- This section is intended for personnel which have a good
***            understanding of the GPIO Device Adapter's architecture.
***            It is strongly recommended that you print off "More Help" on
***            Section 10, or reference the user's manual before using this
***            section.                                          (GDADWARN 6050)

*** WARNING -- Invalid or missing register number ... the register number
***            value is not a properly formatted DECIMAL integer.
***            Please try again.                                 (GDADWARN 6051)

*** WARNING -- Invalid register number ... the register number entered
***            is beyond the device adapter's address space (highest
***            register number is decimal 1023).
***            Please try again.                                 (GDADWARN 6052)

*** WARNING -- Invalid or missing datum ... the datum value is not a properly
***            formatted HEXADECIMAL integer.
***            Please try again.                                 (GDADWARN 6053)

*** WARNING -- Invalid command ... the command entered cannot be decoded.
***            Please try again.                                 (GDADWARN 6054)
```

GPIO DAR Operations Used:

```
gpio_write_reg
gpio_read_reg
```

Section 11—Data Transaction on GPIO

```
Minimum Mode Required        : Destructive

Terminal Used for Execution : Any

In Default Set?              : No

In Auto-diagnostic Set?      : No
```

Executing this section will allow the user to configure the GPIO card and then perform a data transaction with a device connected to the interface. If the user selects 8-bit operation, a single byte of data can be sent or received over the GPIO. If the user selects 16-bit operation, two bytes of data can be sent (the high byte is entered by the user and the low byte is all 0's) or received over the GPIO. This implies that the user must have a very good working knowledge of the particular device protocol.

When this section is run, single-byte data entered is expected to be in hexadecimal format. Also, the user may restart information entry by entering a lone semicolon (;) at any prompt. Entering a lone (:) will convey to the diagnostic that a byte (or two) of return data is expected from a device on the GPIO. When expected data is returned within the timeout period, it will be displayed in hexadecimal format; however, if the timeout period elapses, an appropriate error message will be output.

Possible Output Messages:

```
Section 11 -- Data Transaction on GPIO


        WIDTH - Bit 0 of IO_GPIO_CONFIG Register
          Do you wish to have 8-bit (enter 0) or 16-bit (enter 1) DMA
          transfers on the frontplane?
          (0/1) [0] :

        PFLG - Bit 1 of IO_GPIO_CONFIG Register
          Do you wish to have PFLG indicate "Ready" when it is at a logic
          low state (enter 0) or when it is at a logic high state (enter 1)?
          (0/1) [0] :

        PCTL - Bit 2 of IO_GPIO_CONFIG Register
          Do you wish to have PCTL set control when it is at a logic low
          state (enter 0) or when it is at a logic high state (enter 1)?
          (0/1) [0] :

        PDDR - Bit 3 of IO_GPIO_CONFIG Register
          Do you wish to have PDDR signify the "out" direction when it is
          at a logic low state (enter 0) or when it is at a logic high
          state (enter 1)?
          (0/1) [0] :

        MODE - Bit 7 of IO_GPIO_CONFIG Register
          Handshake Modes:  0 = Full Mode (or going to set Strobed)
```

```
                          1 = Pulsed Mode
      Enter the number corresponding to the desired handshake mode.
      (0/1) [0] :

    STROBE - Bit 6 of IO_GPIO_CONFIG Register
      Handshake Modes:  0 = other mode already set
                          1 = Strobed Mode
      Enter the number corresponding to the desired handshake mode.
      (0/1) [0] :

    At a prompt, enter one of the following:
    1) A hexadecimal integer (8-bit maximum -- i.e. 0..FF)
    2) A lone colon (:) to convey to the diagnostic that a byte of data
       from the attached device is expected
    3) A lone semicolon (;) to abort the current information entry session
       and to start over

  CAUTION: Care must be taken not to enter a hexadecimal integer that
  matches a language localized control message.  For example, if a lone
  'e' is entered, it is an indication to the diagnostic to exit.  In this
  case, "0e" should be entered.

  >>

  The device RETURNED the following data (low byte only if 8-bit width) -
  HIGH BYTE (in hex format):
  LOW  BYTE (in hex format):

  ... Information entry to be restarted.

  Information being sent to GPIO output register ...

End of Section 11 -- Data Transaction on GPIO
```

Possible Error/Warning Messages:

```
*** WARNING -- It is strongly recommended that you print off "More Help" on
***            Section 11, or reference the user's manual before using this
***            section.                                          (GDADWARN 6070)

*** WARNING -- Information entered is not a properly formatted
***            HEXADECIMAL integer.                              (GDADWARN 6075)
***
***            Try it again.  For example: "2E<CR>".

*** WARNING -- Information entered exceeds the 8-bit limit.       (GDADWARN 6076)
***
***            Try it again.  For example: "FF<CR>".
```

GPIO DAR Operations Used:

```
gpio_write_reg
gpio_read_reg
gpio_reset_card
```

Error and Warning Messages

The following is a list of the most significant error and warning messages displayed by the system, arranged in numerical order.

Error Messages

The following is a list of the most significant error messages displayed by the system, arranged in numerical order.

5010	*** ERROR -- PB INTERFACE CHIP (PBIC) LOOPBACK FAILED. 5010)	(GDADERR
	***	
	*** Data written to PBIC (in hex): !	
	*** Data read from PBIC (in hex): !	
5011	*** ERROR -- READY STATUS TEST FAILED. 5011)	(GDADERR
	*** The IO_STATUS register indicates that the Device Adapter	
	*** is NOT READY.	
5012	*** ERROR -- INCORRECT IODC SOFT PHYSICAL ADDRESS. 5012)	(GDADERR
	*** The IODC contains an SPA entry of #.	
	*** This is NOT the expected value.	
5013	*** ERROR -- INCORRECT IODC MODULE TYPE 5013)	(GDADERR
	*** The IODC contains a Module Type entry of #.	
	*** This is NOT the expected value.	
5014	*** ERROR -- EXTERNAL REGISTER TEST FAILED. 5014)	(GDADERR
	*** Data written to IO_GPIO_CONTROL (in hex): #	
	*** Data read back from IO_GPIO_STATUS (in hex): #	

5015	*** ERROR -- INTERNAL REGISTER TEST FAILED. (GDADERR 5015) *** Failure encountered while writing to / reading from *** the Shazam IO_EIM register.
5016	*** ERROR -- INTERNAL REGISTER TEST FAILED. (GDADERR 5016) *** Failure encountered while writing to / reading from *** the Shazam IO_DMA_LINK register.
5017	*** ERROR -- INTERNAL REGISTER TEST FAILED. (GDADERR 5017) *** Failure encountered while writing to / reading from *** the Shazam IO_DMA_COUNT register.
5018	*** ERROR -- FRONTPLANE TRANSFER TEST FAILED. (GDADERR 5018) *** Timeout occurred while performing a direct loopback to *** the Device Adapter's frontplane. *** Current configuration: #
5019	*** ERROR -- FRONTPLANE TRANSFER TEST FAILED. (GDADERR 5019) *** Data corrupted during direct loopback to the Device Adapter's *** frontplane. *** *** Data written out (in hex): # *** Data read back in (in hex): # *** Current configuration: #

5030	*** ERROR -- FAILURE DURING DMA TEST.	(GDADERR 5030)
	*** The Device Adapter did not indicate READY status before	
	*** the DMA transfer began.	
	*** Current configuration: #	
	*** Current test number: #	
5031	*** ERROR -- FAILURE DURING DMA TEST.	(GDADERR 5031)
	*** Incorrect residue value in the IO_DMA_COUNT register.	
5032	*** ERROR -- FAILURE DURING DMA TEST.	(GDADERR 5032)
	*** A soft error was indicated by the IO_STATUS register after DMA.	
	*** Current configuration: #	
	*** Current test number: #	
5033	*** ERROR -- FAILURE DURING DMA TEST.	(GDADERR 5033)
	*** A fatal error was indicated by the IO_STATUS register after DMA.	
	*** Current configuration: #	
	*** Current test number: #	
5034	*** ERROR -- FAILURE DURING DMA TEST.	(GDADERR 5034)
	*** The IO_STATUS register indicates NOT READY after DMA.	
	*** Current configuration: #	
	*** Current test number: #	

5035	*** ERROR -- FAILURE DURING DMA TEST. 5035)	(GDADERR
	*** The EOC bit in the IO_STATUS register is off after DMA.	
	*** Current configuration: #	
	*** Current test number: #	
5036	*** ERROR -- FAILURE DURING SMALL DMA OUT TEST. 5036)	(GDADERR
	*** The data dma transferred out was corrupted.	
	*** Current configuration: #	
	*** Current test number: #	
	*** Data intended to be sent out (in hex): #	
	*** Data actually read in to verify (in hex): #	
5037	*** ERROR -- FAILURE DURING LARGE DMA OUT TEST. 5037)	(GDADERR
	*** The data dma transferred out was corrupted.	
	*** Current configuration: #	
	*** Current test number: #	
	*** Data intended to be sent out (in hex): #	
	*** Data actually read in to verify (in hex): #	
5038	*** ERROR -- FAILURE DURING SMALL DMA IN TEST. 5038)	(GDADERR
	*** The data dma transferred in was corrupted.	
	*** Current configuration: #	
	*** Current test number: #	
	*** Data directly sent out (in hex): #	
	*** Data dma'd in (in hex): #	

5039 *** ERROR -- FAILURE DURING LARGE DMA IN TEST. (GDADERR 5039)
*** The data dma transferred in was corrupted.
*** Current configuration: #
*** Current test number: #
*** Data directly sent out (in hex): #
*** Data dma'd in (in hex): #

5040 *** ERROR -- FAILURE DURING SETTLING TIME TEST. (GDADERR 5040)
*** The Device Adapter was NOT READY before DMA transfer.

5041 *** ERROR -- FAILURE DURING SETTLING TIME TEST. (GDADERR 5041)
*** The EOC bit in the IO_STATUS register is off after DMA.

5043 *** ERROR -- FAILURE DURING DINCLK TEST. (GDADERR 5043)
*** Normal data transfer could not be validated before varying
*** the DINCLK source to #.

5044 *** ERROR -- FAILURE DURING DINCLK TEST. (GDADERR 5044)
*** Data was not correctly latched with the DINCLK source
*** set to #.

5045 *** ERROR FAILURE DURING EXTERNAL INTERRUPTS TEST. (GDADERR 5045)
*** After asserting the interrupt line, the IO_STATUS register
*** did not indicate the correct external interrupt status.

5046	*** ERROR 5046)	FAILURE DURING NRESET TEST. (GDADERR
	***	The IO_STATUS register did not contain the correct contents
	***	during a reset test.
5071	*** ERROR -- 5071)	PB INTERFACE CHIP FAILURE. (GDADERR
	***	
	***	PB Interface Chip reported to have ! bytes in FIFO,
	***	however only 24 bytes are available.
5072	*** ERROR -- 5072)	PB INTERFACE CHIP FAILURE. (GDADERR
	***	
	***	DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) is set
	***	(implying FIFO CNT should = 24); however, the FIFO CNT field
	***	(Bits 23..27) = ! (decimal).
5073	*** ERROR -- 5073)	PB INTERFACE CHIP FAILURE. (GDADERR
	***	
	***	DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) is set
	***	(implying FIFO CNT should = 0); however, the FIFO CNT field
	***	(Bits 23..27) = ! (decimal).
5074	*** ERROR -- 5074)	PB INTERFACE CHIP FAILURE. (GDADERR
	***	
	***	DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) and
	***	FIFO EMPTY bit (Bit 21) are both set.

```
5075        *** ERROR -- PB INTERFACE CHIP FAILURE.                    (GDADERR
            5075)
            ***
            ***         DIAGNOSTIC_STATUS register's FIFO EMPTY bit (Bit 21) = 0
            ***         (implying FIFO CNT should be greater than 0); however, the
            ***         FIFO CNT field (Bits 23..27) = 0.

5076        *** ERROR -- PB INTERFACE CHIP FAILURE.                    (GDADERR
            5076)
            ***
            ***         DIAGNOSTIC_STATUS register's FIFO FULL bit (Bit 20) = 0
            ***         (implying FIFO CNT should be less than 24); however, the
            ***         FIFO CNT field (Bits 23..27) = 24.

5080        *** ERROR -- EXTERNAL LOOPBACK FAILED.                     (GDADERR
            5080)
            ***
            ***         Data written to frontplane (in hex): !
            ***         Data read  from frontplane (in hex): !

5082        *** ERROR -- EXTERNAL LOOPBACK TIMED OUT.                  (GDADERR
            5082)
            ***
            ***         The IO_GPIO_STATUS register did not indicate ready
            ***         after waiting an appropriate delay for the transfer
            ***         to complete.
```

Warning Messages

The following is a list of the most significant warning messages displayed by the system, arranged in numerical order.

6001

```
*** WARNING -- Invalid response.  Please answer the question with one
***            of the choices given.
(GDADWARN 6001)
More Help (1..6, 8, 10, 11, <CR>) :
```

6010

```
*** WARNING -- Soft Physical Address Capability = !,
***            I expected a 0.
(GDADWARN 6010)
```

6011

```
*** WARNING -- Type of Module = ! (UNKNOWN PRODUCT),
***            I expected a 4 (TP_A_DMA).
(GDADWARN 6011)
```

6031

```
*** WARNING -- A SOFT ERROR (length conflict) occurred since the last
***            write to the IO_COMMAND register.
***            (IO_STATUS Bit 22 = 1)
(GDADWARN 6031)
```

6032

```
*** WARNING -- A FATAL ERROR occurred since the last write to the
***            IO_COMMAND register.
***            (IO_STATUS Bit 24 = 1)
(GDADWARN 6032)
```

```
6034        *** WARNING -- The IO_STATUS register has one or more undefined bits
            ***            reading in as a 1 (I expected all 0's).
            (GDADWARN 6034)

------------------------------------------------------------------------

6040        *** WARNING -- PB Interface Chip HAS generated a PB bus error since
            ***            the last reset command.
            ***            (DIAGNOSTIC_STATUS Bit 1 = 0)
            (GDADWARN 6040)

------------------------------------------------------------------------

6050        *** WARNING -- This section is intended for personnel which have a good
            ***            understanding of the GPIO Device Adapter's architecture.
            ***            It is strongly recommended that you print off "More Help"
            on
            ***            Section 10, or reference the user's manual before using
            this
            ***            section.
            (GDADWARN 6050)

------------------------------------------------------------------------

6051        *** WARNING -- Invalid or missing register number ... the register
            number
            ***            value is not a properly formatted DECIMAL integer.
            ***            Please try again.
            (GDADWARN 6051)

------------------------------------------------------------------------

6052        *** WARNING -- Invalid register number ... the register number entered
            ***            is beyond the device adapter's address space (highest
            ***            register number is decimal 1023).
            ***            Please try again.
            (GDADWARN 6052)

------------------------------------------------------------------------
```

6053	*** WARNING -- Invalid or missing datum ... the datum value is not a properly *** formatted HEXADECIMAL integer. *** Please try again. (GDADWARN 6053)
6054	*** WARNING -- Invalid command ... the command entered cannot be decoded. *** Please try again. (GDADWARN 6054)
6070	*** WARNING -- It is strongly recommended that you print off "More Help" on *** Section 11, or reference the user's manual before using this *** section. (GDADWARN 6070)
6075	*** WARNING -- Information entered is not a properly formatted *** HEXADECIMAL integer. (GDADWARN 6075) *** *** Try it again. For example: "2E<CR>".
6076	*** WARNING -- Information entered exceeds the 8-bit limit. (GDADWARN 6076) *** *** Try it again. For example: "FF<CR>".

Contents

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HP OSI EXPRESS 802.4 Diagnostic

Introduction

This document describes the HP OSI EXPRESS 802.4 card online diagnostic hereafter referred to as `OSI4DAD` ("DAD" stands for "Device Adapter Diagnostic").

The HP OSI EXPRESS 802.4 card is an HP Precision Bus (HP-PB) IO Architecture-based card with the capability of executing multiple layers of the ISO/MAP protocol family. The card is intended to be used in the HP-UX operating system.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10041.

Minimum Configuration

The minimum hardware configuration required to run `OSI4DAD` consists of the following:

- An HP Model 815 SPU
- An HP OSI EXPRESS 802.4 card
- A carrierband or broadband modem card

The minimum software configuration required to run `OSI4DAD` consists of the following:

- The 7.0 release of the HP-UX operating system
- The online diagnostics subsystem
- `OSI4DAD` and its message catalog

Operating Instructions

OSI4DAD can be run in two different modes: normal mode or destructive mode. Normal mode tests are non-destructive of board data; destructive mode tests, however, are destructive of board data.

If a destructive step is selected, the following prompt will be issued once to the user:

```
*** WARNING -- A DESTRUCTIVE SECTION HAS BEEN CHOSEN. (OSI4DADWARN 6012)
*** This section will not be permitted to execute if HP OSI Express Link is
*** currently running.  To shut down HP OSI Express Link, run "/etc/mapshutrc
*** -c <card_name>", where the default card_name is "osi0".  At this point, you
*** may elect to either preserve card state information or proceed with this
*** section, which will destroy card state information.  To preserve card state
*** information, run "/etc/osicarddump -c <card_name> -o <outfile>", where the
*** default card_name is "osi0", and the default outfile is "/tmp/osidumpfile".

      Do you wish to continue (Y/N) [Y]?
```

Default Tests

If the user does not specify sections and steps to be run the default sections and steps will be executed:

```
Sections 3      Identify

Section 6       Status

Section 7       802.4 Statistics
```

If the user enters

```
run osi4dad dev=osi0
```

then only sections 3, 6, and 7 will be run.

If the user says

```
run osi4dad dev=osi0 section=14
```

then only section 14, step 141, will be run; step 142 will not be run.

RUN Command

To bring up the Online Diagnostic subsystem, enter the following command to the HP-UX system prompt:

```
% sysdiag
```

The diagnostic subsystem responds with the following prompt indicating that access has been granted to the user:

```
DUI >
```

Typing HELP causes a summary of the DUI function and its commands to appear on the screen.

Note

The device to be tested must be powered up and on line. The physical device location (pdev) must match the same device shown on the "typical A1002A" system configuration, described in the chapter on DUI, which appears in Volume 1 of this manual. The pdev value entered must be correct for the system being tested.

OSI4DAD is initiated by using the run osi4dad command. For further information on the run command provided by the DUI, please refer to the online diagnostics DUI ES. All parameters available in the run command are acceptable as parameters when executing this diagnostic.

Test Execution

When OSI4DAD is invoked, the following header and welcome message will be displayed:

```
**************************************************************
******                                                  ******
******          OSI4DAD Device Adapter Diagnostic       ******
******                                                  ******
******     (c) Copyright Hewlett-Packard Company 1989   ******
******              All Rights Reserved.                ******
******                   Version A.00.00                ******
******                                                  ******
**************************************************************

Welcome, Today is FRI, AUG 28, 1988,  2:53 AM
```

Once the run command is issued, the diagnostic will be invoked. Sections and steps specified by the user will be executed and the results output. If the user did not specify sections and steps to be run the default sections and steps will be executed.

If at any time, the number of errors generated reaches the limit specified by the user in the ERRCOUNT parameter, the following message will be output:

```
*** THE MAXIMUM NUMBER OF ERROR MESSAGES HAS BEEN EXCEEDED. (OSI4DADERR 99)
```

OSI4DAD will then terminate. If the ERRPAUSE parameter parameter of the run command was assigned to "on", then OSI4DAD will stop after each error is generated and ask the user if the test should be continued:

```
Do you wish to continue (Y/N) [Y]?
```

If the response is "Y" then the test will resume (if possible), and if the response is "N" OSI4DAD will terminate. If the sections and steps specified by the user were executed the number of times specified in the LOOP parameter of the run command without the number of errors exceeding the ERRCOUNT value, OSI4DAD will terminate normally.

At any time that OSI4DAD is prompting the user for information, the user may enter "exit" to terminate OSI4DAD. Either the entire word or only the first letter of the language localized word "exit" must be entered, in either upper or lower case. If the user exits in this manner, the following message is displayed:

```
Exiting OSI4DAD per user request...
```

Any time that OSI4DAD is not prompting the user for information, the user may enter a break character (CTRL-C or some other user defined command for HP-UX). When OSI4DAD detects the break, one of two actions will occur. If OSI4DAD has not bound to the driver, it will print the following message and return control to the DUI.

```
OSI4DAD suspended per user request...
```

When OSI4DAD is bound to the driver, it checks for interrupts at periodic intervals. If you enter CTRL-C between these intervals, the code will continue to execute until the next interval occurs.

Upon termination or suspension of OSI4DAD, control will return to the Diagnostic System (DUI).

Detailed Test Descriptions

The following sections are available for use with OSI4DAD.

Section No.	Diagnostic Function
1	More Help
2	Reset
3	Identify
4	Loopback
5	Selftest
6	Status
7	802.4 Statistics
8	Broadband External Loopback
9	Remote Node Test
10	Remote XID Test
11	Internal Hardware
13	EEPROM Test & Address Maintenance
14	802.4 Configuration Parameters
15	Failure History
16	Manufacturing Utilities

Section 1—More Help

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps In Default Set: None
```

More Help is an interactive section which allows the user to obtain more information about a particular section or step than is given when invoking the DUI Help routine (`help OSI4DAD`). This is needed because it is not desirable to spew large help screens at the user when (s)he is looking for general help, but it is desirable to give more information about certain sections. This is particularly true for the more obscure sections of `OSI4DAD`.

The user will be prompted to enter the number of the test section about which (s)he desires more information. Upon entering the number of a valid section, help from the message set file for that section will be displayed.

Possible Output Messages:

```
Section 1 -- More Help

  This section allows you to get more information on each of the
  test sections of OSI4DAD.  Please indicate the number of the
  section for which you need more information or enter <return>
  to exit More Help.

    1. More Help        6. Status                11. Internal Hardware
    2. Reset            7. 802.4 Statistics      12. Unused
    3. Identify         8. External Loopback     13. EEPROM Tests
    4. Loopback         9. Remote Node Test      14. 802.4 Configuration
    5. Selftest        10. Remote XID Test       15. Failure History
                                                 16. Manufacturing Utilities

    More Help?

End of Section 1 -- More Help
```

Section 2—Reset

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps In Default Set: None
```

The purpose of this section is to force the card into a known state, and clear any residual error conditions.

This command initializes the DMA controller chip, the frontplane, and the backplane, leaving the card ready for use. Previous RAM contents and other secondary state information may be lost. As per HP-PB IO architecture this is a hard reset with initialize (RESET.HI). This reset also resets the driver. To perform a partial test of card hardware without resetting the driver, Section 11, step 111 - *Hard Reset with Test (RESET.HT)* should be run.

After the hardware is initialized, the backplane handler is initialized, the backplane fatal error bit is cleared, the backplane state field is set to 0 (indicating no selftest was performed), the frontplane firmware is initialized, and the card goes into its idle loop waiting to be downloaded. While in the idle loop, the selftest failed LED and the off-card failure LED will be off.

Upon successful completion of this section, the card will be put "online". What this means is that the card and the driver will be synchronized and ready to be downloaded or used by the diagnostic. "Online" does not mean that the card is on the network. When the card is put in the "online" state the frontplane will check the *Initial In Ring Desired* field (which is configurable through section 14, step 142) and if it is true then the frontplane will attempt to enter the token ring. If *Initial In Ring Desired* is set to false, the card will stay "online" but not enter the token ring.

Possible Output Messages:

```
Section 2 -- Reset

      The card has been reset.

End of Section 2 -- Reset
```

Section 3—Identify

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps In Default Set: Entire section
```

The purpose of this section is to convey information about the board, the manager, and the DAR.

The identification information consists of board hardware, firmware, and software IDs and revision codes, as well as HP-PB IO architecture software IDs and revision codes. The user is informed if the card attached is not the expected one.

Possible Output Messages:

```
Section 3 -- Identify

  Active station address              = !
```

Next one of the following messages would be displayed identifying the current modem ID.

```
  Current modem id                    = Type A :  5 Mb carrierband
  Current modem id                    = Type C : 10 Mb fiberoptic
  Current modem id                    = Type D : 10 Mb non-frequency
                                                       agile broadband
  Current modem id                    = Type E : 10 Mb frequency agile
```

Next the part numbers, datecodes, software versions, and modem ID fields are displayed.

```
  RAM size (in bytes)                 = !
```

The following four messages are only displayed if the card is downloaded.

```
Downloaded software part number     = !
Downloaded software datecode        = !
DOWNLOADED IODC SVERSION:
  Software model    = !
  Software revision = !
  Software option   = !
Downloaded software version         = !
```

Otherwise, if the card is not downloaded the following message will be displayed:

```
Executing firmware version          = !
```

Finally the IO Dependent Code (IODC) fields are displayed.

```
IODC HVERSION:
  Hardware model    = !
  Hardware revision = !
IODC SVERSION:
  Software model    = !
  Software revision = !
  Software option   = !
IODC revision       = !

End of Section 3 -- Identify
```

Section 4—Loopback

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps In Default Set: None
```

The purpose of this section is to test the frontplane and the cable/modem combination.

The selftest firmware includes the following types of loopback:

TBC Loopback # 1 This test sends data from a predefined memory buffer on the card to the internal FIFO on the TBC chip and loops it back to the memory buffer. This test is the TBC's "Host Interface Test".

TBC Loopback # 2 This test sends data from a predefined memory buffer on the card to the TBC serial interface and loops it back, verifying the operation of the TBC transmit and receive machines. This test is the TBC's "Full- Duplex Test".

Modem Loopback # 1 This test sends a predefined card data buffer to the digital portion of the modem and loops it back. This loopback corresponds to "loop3B" in the "Physical Layer Management Service Specification" of the IEEE 802.4 standard.

Modem Loopback # 2 This test sends a predefined card data buffer to the analog portion of the modem and loops it back. This loopback corresponds to "loop3C" defined in the "Physical Layer Management Service Specification" of the IEEE 802.4 standard.

The TBC and modem loopback tests will cause the TBC and/or modem to be reinitialized. This could disrupt normal data transmission. Also, some modems do not implement both loop3B and loop3C.

The loopback tests performed in this section are also included in the "CCMD_IN_SELFTEST" portion of the "Section 5 - Selftest" section of the diagnostic. In both section 4 and section 5, the card firmware will supply the data for the loopback and will verify the data after the loopback.

Possible Output Messages:

```
Section 4 -- Loopback

  TBC Loopback #1   - Loopback to TBC midplane clock domain
                      completed successfully.
  TBC Loopback #2   - Loopback to TBC link clock domain
                      completed successfully.
  Modem Loopback #1 - Loopback to digital portion of the modem
                      completed successfully.
  Modem Loopback #2 - Loopback to analog portion of the modem
                      completed successfully.
End of Section 44 -- Loopback
```

Section 5—Selftest

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps In Default Set: None
```

The purpose of this section is to verify that the board hardware is functional.

This section is used to check the basic hardware functionality of the card. It is logically comprised of six steps as outlined below.

CMD_STOP.HALT	This command has the effect of cleanly halting any DMA data transfers which the card was processing. It is issued at this point to insure that no frame fragments are transmitted by the frontplane during the subsequent portions of the selftest.
Hard Reset with Test	This step performs a hard reset with test (RESET.HT). A power on with state lost will also perform a hard reset with test. RESET.HT is a destructive test and will complete in under 5 seconds.
Hard Reset with Initialize	This is the same functionality as provided in the "Section 2 - Reset" section of the diagnostic. It serves to initialize the DMA controller chip, the frontplane, and the backplane, leaving the card ready for use. Previous RAM contents and other secondary state information may be lost. This reset also resets the driver.
Preliminary Backplane Controller Circuitry Tests	These tests check some of the functionality of the Backplane Controller chip. Register Addressing Test - This test will verify that the chip, when used as an NIO slave, is able to correctly access all 16 registers in a register set. Quad Fetch Test - This test will verify that the chip is capable of correctly fetching a quad. It exercises the master circuitry on the chip by having it fetch 16 bytes from Spectrum memory. The diagnostic will confirm that the 16 bytes fetched onto the board are indeed the 16 bytes which were present in Spectrum memory.
CCMD_IN_SELFTEST	This test issues a CCMD_IN_SELFTEST to the card. When the backplane handler receives a CCMD_IN_SELFTEST, it calls the ccmd_in_selftest support firmware procedure using the address in the diagnostic and maintenance register set (DMRS) table. Unlike the RESET.xT selftests, this type of selftest does not have the time limit imposed by the NIO architecture. Elimination of this time limit allows a more extensive RAM test to be performed. Also, since the driver on the host is able to provide a buffer, actual DMA tests can be performed.

Final Backplane Controller Circuitry Tests

These tests check remaining functionality of the Backplane Controller chip.

Shield Test - This test will verify that the shield bit in the fence register is functional.

Fence Test - This test will verify that the fence register is functional.

CMD_STOP.DIAG Test - This test will verify that the chip correctly passes a CMD_STOP.DIAG command through to the firmware, and that the proper firmware routine is entered.

After selftest completes successfully, the ROM frontplane is initialized, and the CCMD_IN_SELFTEST procedure returns control to the backplane handler.

Upon successful completion of this section, the card will be put "online". What this means is that the card and the driver will be synchronized and ready to be downloaded or used by the diagnostic. "Online" does not mean that the card is on the network. When the card is put in the "online" state the frontplane will check the *Initial In Ring Desired* field (which is configurable through section 14, step 142) and if it is true then the frontplane will attempt to enter the token ring. If *Initial In Ring Desired* is set to false, the card will stay "online" but not enter the token ring.

Possible Output Messages:

```
Section 5 -- Selftest

  Performing CMD_STOP.HALT ....
  Performing RESET.HT .....
  Performing RESET.HI .....
  Performing Preliminary Backplane Controller Tests .....
  Performing CCMD_IN_SELFTEST .....
  Reading Card Status .....
  Performing Final Backplane Controller Tests .....
  Selftest Completed Successfully.
  OSI EXPRESS 802.4 card is functional.

End of Section 5 -- Selftest
```

Section 6—Status

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps In Default Set: Entire section
```

This test is designed to convey information about the current state of the board. It's purpose is distinct from that of section 3 (Identify) because section 3 conveys static information about what the board is, whereas this section conveys programmable or dynamic information about the board's current hardware or firmware state.

Section 6 returns dymanic information about the state of the card. Specifically it shows the status of the last selftest, the state of the frontplane, and the multicast address list.

Possible Output Messages:

```
Section 6 -- Status

  Card status read successfully.
```

Next, the active (current) station address of this card is displayed:

```
  Active station address: !
```

Next, the current state of the frontplane is displayed through one of the following five messages:

```
  ROM frontplane active.
  Selftest complete - no frontplane initialized.
  Download in progress - ROM frontplane active.
  Downloaded frontplane active.
  Download in progress - no frontplane active.
```

Finally, if any multicast addresses are active (this will only occur when the card is downloaded), then the following message will appear:

```
  The following multicast addresses are currently active:
```

Otherwise, this message will be displayed:

```
  No multicast addresses are currently active.

End of Section 6 -- Status
```

Section 7—802.4 Statistics

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps In Default Set: Entire Section
```

The purpose of this section is to display select useful statistics from the 802.4 frontplane. These statistics may be useful in configuring the network or diagnosing problems.

The frontplane Token Bus Controller (TBC) chip and the frontplane driver keep statistics on the operation of the network. These statistics are reset whenever the TBC and/or the frontplane driver is reset.

Possible Output Messages:

```
Section 7 -- 802.4 Statistics

Protocol Statistics:
  Member of token ring.........................!
  Tokens passed................................!
  Tokens heard.................................!
  Tokens skipped...............................!
  Last token rotation time.....................!
  Passes through no_successor_8 arc............!
  Passes through solicit_any arc...............!
  Passes through who_follows arc...............!
  Failed token passes..........................!
  Receive claim tokens.........................!
  Unexpected frames............................!
  Next station's address.............!
  Previous station's address...........!
Transmit Statistics:
  Frames transmitted...........................!
  Underrun errors..............................!
Receive Statistics:
  Frames received without error................!
  Frames received with errors..................!
  FCS errors...................................!
  E-bit in ed set..............................!
  Incomplete frames............................!
  Greater than 8191 bytes......................!
  Rejected due to insufficient buffer space....!
  Periods of non-silence.......................!
  Overrun errors...............................!
End of Section 7 -- 802.4 Statistics
```

Section 8—External Loopback

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps In Default Set: None
```

The purpose of this section is to provide an external loopback out to the headend remodulator on a broadband cable system.

This test invokes a special loopback that will verify the physical medium of broadband networks. This test is designed to be used by only the first node which is placed onto a new broadband installation, before a ring is established. This test depends upon the transmitted data being looped back to the sending node through the broadband headend remodulator. A predefined data buffer is sent onto the network using the TBC "Transmitter Test". The "Transmitter Test" allows the TBC to transmit and receive in a "modified" full-duplex mode, such that only the FCS of received frames is verified and the contents of the inbound frames are not written to the TBC FIFO.

This loopback will only be available for broadband modems. Also, this test will only be allowed if a token ring is not currently operating. This test will only be available with the ROM frontplane.

Possible Output Messages:

```
      Section 8 -- Broadband External Loopback

*** WARNING -- THIS TEST IS HIGHLY DESTRUCTIVE TO NETWORK ACTIVITY.
*** To safely run this test you must be the only node on the
*** broadband network.  If you are not DO NOT RUN THIS TEST!
*** The card firmware will disallow the test if tokens are
*** passing, however, if every station is a receive node it
*** cannot detect that and running this test would be highly
*** destructive to those nodes.  (OSI4DADWARN 6013)


        A link frame has been successfully transmitted onto the broadband
        cable to the headend remodulator and received back.


      End of Section 8 -- Broadband External Loopback
```

Section 9—Remote Node Test

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps in Default Set: None
```

The Remote node test tests the ability of this node to bounce a test frame off another node connected to the same physical (or logical if there are repeaters in the network) network. This is useful for two reasons. First, it gives the user that warm fuzzy feeling that (s)he can talk to a remote node. Secondly, it can point to upper level software problems. If a frame can be bounced off of another node using **OSI4DAD**, but normal communications do not work, the problem is not the hardware, it's the upper level software or the downloaded protocol stack.

This section sends an IEEE 802.2 Test frame. The user is asked for the length of the Test frame. This can be any length from 16 bytes (a minimum 802.4 frame header of 13 bytes plus a minimum 802.2 PDU of 3 bytes) to 8187 bytes (a maximum length 802.4 frame). The default is 4096 bytes (13 byte 802.4 frame header, 3 byte 802.2 PDU, and a 4080 byte 802.2 information field). When a Test response frame is received from the remote station, its length is checked for being either a minimum size frame or for being the specified length. If the response frame is not a minimum size frame, then the data is checked against the data sent. If it is not the same, then the Test frame part of the test fails.

This section will allow communication only to individual network addresses. If the user inputs a broadcast or multicast address as a response to the Remote Node Address prompt, an error message will be issued and the user will be prompted again for valid remote node address.

Note

The remote node MUST be capable of responding to IEEE 802.2 Test frames, and that node must be in a state that it can answer those frames.

Possible Output Messages:

```
Section 9 -- Remote Node Test
  This section sends a TEST frame and waits for a response from
  a specified remote node for a specified number of iterations.

  The following success/failure indicators are used:
    "." = The test frame bounced successfully.
    "$" = The test frame was not received before the timeout period.


  Remote Node Address (12 HEX digits) ->

  Number of test frames to send ("0" for infinite) [10] ->

  Length of test frames in bytes (16..8187) [4096] ->
```

```
  Press the interrupt character (usually <Control-C>)
  to prematurely stop the test.

.........

  ! out of ! TEST frames echoed successfully (!%).


End of Section 9 -- Remote Node Test
```

Whenever a frame has been received with erroneous data, the first 18 bytes of the frame are displayed and then the diagnostic exits. The frame is displayed in the following manner:

```
*** First ! bytes of frame received are:
* Dest Address        Source Address      DSAP  SSAP  Cntl Data
* |                   |                   |     |     |    |
* v                   v                   v     v     v    v
* !!
***
```

Section 10—Remote XID Test

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps in Default Set: None
```

The Remote XID Test allows the user to send IEEE 802.2 XID command frames to a user specified remote node and receive the response frame from the remote node.

This section sends the XID command, receives the response, and decodes the response and displays what type of service is available at the remote node.

The user is prompted for both the six byte remote node address and the one byte DSAP of the service on the remote system with which the XID frame should be sent to. The addresses that the user gives must be individual addresses; i.e., they can not be broadcast or multicast. Should the user input one of these illegal addresses, an error message will be issued and the user will be prompted again for a valid address.

Possible Output Messages:

```
Section 10 -- Remote XID Test
  This section sends an IEEE 802.2 XID frame to a user specified
  remote node and waits for an IEEE 802.2 XID response frame from
  that remote node.


  Remote Node Address (12 HEX digits) ->

  Remote DSAP Address (one even hex byte between $00 and $FE) [$00] ->

  Sending XID command frame...

  Received XID response frame...
```

If the remote DSAP supports type 1 operations, the following message is displayed:

```
  Remote DSAP ! has class I service.

End of Section 10 -- Remote XID Test
```

If the remote DSAP supports type 1 and 2 operations; the following message is displayed:

```
  Remote DSAP ! has class II service, window size = !.
```

If the remote DSAP supports type 1 and 3 operations; the following message is displayed:

```
  Remote DSAP ! has class III service.
```

If the remote DSAP supports type 1, 2, and 3 operations; the following message is displayed:

```
  Remote DSAP ! has class IV service.
```

If the remote node does not send back a response frame, the following message is displayed:

```
  ** No response received from remote node.
```

Whenever a frame has been received with erroneous data, the first 18 bytes of the frame are displayed and then the diagnostic exits. The frame is displayed in the following manner:

```
*** First ! bytes of frame received are:
* Dest Address        Source Address      DSAP  SSAP  Cntl Data
* |                   |                   |     |     |    |
* v                   v                   v     v     v    v
* !!
***
```

Section 11—Internal Hardware

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps in Default Set: None
```

The purpose of this section is to give the knowledgeable user additional testing tools.

The following steps provide selftest coverage which both overlaps with and goes beyond what Section 5 provides. The text below explains what each of the steps tests:

Step 111 - Hard Reset with Test

This step performs a hard reset with test (RESET.HT). This test is also performed as one portion of the "Section 5 - Selftest" section of the diagnostic. However, within section 5, the driver is also reset. Running this step provides a way of partially testing the card hardware without resetting the driver. A power on with state lost will also perform a RESET.HT. RESET.HT is a destructive test and will complete in under 5 seconds. The following tests are performed in order:

LED DTACK Test

Phantom DTACK Test

DTACK Test

Midplane Chip Register Test (with check for power-on defaults)

Midplane Chip Register Test (without check for power-on defaults)

Backplane Chip Register Test

ROM CRC

Counter Tests

EEPROM Tests - Before RAM is Available

Parity Transceiver Test

Quick RAM Test (over backplane handler RAM)

RAM Code Execution Test

RAM Interrupt Test

Simulated Hardware Watchdog Interrupt/Bus Error Tests

Frontplane DTACK Test

Step 112 - Comprehensive RAM Test

This step will perform a comprehensive RAM test. This test will be more thorough than that performed during a selftest or reset. It will test for the following:

Stuck-at Faults: One or more cells are stuck-at zero or stuck-at one.

Transition Faults: One or more cells fail to undergo a 0 to 1 and/or 1 to 0 transition.

Coupling Faults: This problem occurs because of capacitive coupling between cells or due to leakage current from one cell to another.

Multiple Access Faults: More than one cell may be accessed when one or more addresses are applied and a read or write operation is done.

Note

The comprehensive RAM test will take approximately 2.5 minutes per megabyte of card memory. The user will be given an approximate length of time the test will take and prompted as to whether or not to continue with the test.

Possible Output Messages:

```
Section 11 -- Internal Hardware

  Step 111 -- Hard Reset with Test

    Hard Reset successful.

  End of Step 111 -- Hard Reset with Test


  Step 112 -- Comprehensive RAM Test

    *** WARNING ***
    This step will take approximately ! minute(s) to run.

    Would you like to proceed with the test (Y/N) [N]?

    Card Comprehensive RAM Test successful.

  End of Step 112 -- Comprehensive RAM Test

End of Section 11 -- Internal Hardware
```

Section 13—EEPROM Test & Address Maintenance

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps in Default Set: None
```

This section provides steps to maintain the EEPROM. A step is provided to test writing to EEPROM, a step is provided to recover from EEPROM errors, a step is provided to return the link configuration values to their factory defaults, and a step is provided to change the MAC station address.

This section will consist of the following four steps:

Step 131 - EEPROM Write Test — This step will read the link configuration bank of EEPROM and examine the value of the diagnostic test word. This value will be complimented and the bank rewritten. If the write is successful we will assume the rest of EEPROM is capable of being written to.

Step 132 - Recover From EEPROM Error — This step will read from the failure history and link configuration(frontplane) partitions of EEPROM to see if any EEPROM errors exist (the user may have been previously told that one exists) and then perform the proper recovery if the user responds to a prompt.

The failure history data is spread over 3 partitions each of which contains 3 banks. Each partition independently maintains which bank it is using. Only one bank per partition is in use at any time. If an error is discovered in one partition, all three partitions must be recovered.

Step 133 - Return to Default Link Configuration Values — This step will switch to a new bank of read_write link configuration values. EEPROM maintains two copies of the link configuration data. One copy is read-only and contains the factory defaults and the other is read-write and contains the currently used values.

Note

Step 133 will base the default values upon the modem being used. Section 14, step 142 allows for the value of the *modem_id* to be updated. This value must be correct in order for step 133 to restore the proper defaults. Step 141 of section 14 may be run to review this value.

Step 134 - Change the MAC Station Address

This step allows the user to change the 802.4 station address stored in EEPROM. Section 14, step 141 may be run to view the current and default values. Running this step will change the future value which will not become current until the card is reset or the MAC frontplane is reinitialized.

Note

If an EEPROM fails the card needs to be replaced. In the factory it is possible that only the EEPROM need be replaced, but in the field the entire card should be replaced.

Possible Output Messages:

```
Section 13 -- EEPROM Test & Address Maintenance


 Step 131 -- EEPROM Write Test


    EEPROM write test was successful


  End of Step 131 -- EEPROM Write Test


  Step 132 -- Recover from EEPROM Error


An error has been found in a failure history partition.
Would you like an attempt made to recover from it (Y/N) [Y]?


An error has been found in the link configuration common bank.
Would you like an attempt made to recover from it (Y/N) [Y]?


An error has been found in the read-write modem bank of the link
configuration partition.
Would you like an attempt made to recover from it (Y/N) [Y]?


  End of Step 132 -- Recover from EEPROM Error


  Step 133 -- Return to Default Link Configuration Values
```

```
    Your MAC parameters have been returned to their factory defaults,
         however they are not yet active.
         You must reset the card (section 2) to make these
         defaults active.


  End of Step 133 -- Return to Default Link Configuration Values


  Step 134 -- Change the MAC Station Address

    New station address ->

    Your station address change has been written to EEPROM.
    You must now reset the card (section 2) to make this
    address active.


  End of Step 134 -- Change the MAC Station Address

End of Section 13 -- EEPROM Test & Address Maintenance
```

Section 14—802.4 Configuration Parameters

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps In Default Set: None
```

The purpose of this section is twofold: to display the MAC configuration parameters and to modify the MAC configuration parameters.

There are a number of parameters which are needed to configure the 802.4 frontplane. This section allows these parameters to be viewed and to be changed. A description of the two steps in this process is given below:

Step 141 - Display MAC Parameters

This step will display the MAC configuration parameters. For each parameter it's current and factory default value will be shown.

The value which was preset in the factory and can be returned to at any time by running step 133 of Section 13 of this diagnostic. Note that step 133 will return ALL of these parameters to their defaults, not select parameters. The default values are dependent upon the modem being used. When Section 14 is run without any steps having been specified, Step 141 will run as the default step.

Step 142 - Configure MAC Parameters

This step allows the MAC configuration parameters to be modified. Two modes of data entry exist: a terse mode which allows the experienced user to reply to a simple prompt and a verbose mode which is reached by entering "?" to a prompt and will provide a detailed help message before reprompting the user. At the end of this step, the user will be prompted to keep their changes and go online with them. Answering yes will cause the values to be written to EEPROM and a card reset command to be issued which will re-initialize the ROM frontplane and copy the EEPROM values into RAM. Answering no will lose the user's changes and not reset the frontplane.

Possible Output Messages:

```
Section 14 -- 802.4 Configuration Parameters

  Step 141 -- Display MAC Parameters


  ***
  *** Parameters preceded by an '*' have been prescaled.
  ***

Note on units:
All values are given in octet times.  The following table may be
used to convert octet times to micro seconds (us):

  Data Rate   MAC_symbol_time
  ---------   ---------------
    5 Mb/s         0.2 us
   10 Mb/s         0.1 us

   octet time = 8 * MAC_symbol_time


                                                  Current    Default
                                                    Value      Value
                                                ---------- ----------
  *High priority token hold time...............! !
  *Target rotation time (class 4)..............! !
  *Target rotation time (class 2)..............! !
  *Target rotation time (class 0)..............! !
  *Target rotation time (ring maintenance).....! !
  *Ring maintenance timer initial value........! !
  Maximum intersolicit count...................! !
  Slot time....................................! !
  Initial in ring state of TBC.................! !
  Minimum post-silence preamble length.........! !
  Minimum interframe preamble length...........! !

  Current modem id.............................!
  Current station address......................!
  Default station address......................!

  Transmit/receive channel.....................!

    End of Step 141 -- Display MAC Parameters

    Step 142 -- Configure MAC Parameters

      Choose the letter corresponding to the modem you have installed:

        A.  Type A :  5 Mb carrierband
```

```
          D.  Type D : 10 Mb non-frequency agile
                       broadband
          E.  Type E : 10 Mb frequency agile broadband

       Modem identification [!] ?

    *** WARNING: Slot time must be the same for ALL nodes.
   Serious problems can result when slot times differ.

    Slot time (range: 40 - 8191) [!] ?

The following MAC configuration parameters may be changed.  Hitting
carriage return (CR) causes the factory default value (displayed
in brackets) to be entered.  Entering "?" for a value will display
a detailed help message for that prompt.  After the help message has
been displayed the prompt will be redisplayed.


*** NOTE ***
*** Parameters preceded by an "*" will be prescaled.  The value entered
*** will be rounded up to the nearest multiple of 64 and then divided by
*** 64 before being stored.  For example, a value of 125 would be rounded
*** up to 128, then divided by 64 and stored as a 2.  When displayed in
*** section 141 or at any other time, the value displayed will be the
*** stored value multiplied by 64 which would be 128 in this example.
*** END NOTE ***


    Press RETURN to continue ...

Note on units:
All values are given in octet times.  The following table may be
used to convert octet times to micro seconds (us):

   Data Rate   MAC_symbol_time
   ---------   ---------------
     5 Mb/s         0.2 us
    10 Mb/s         0.1 us

    octet time = 8 * MAC_symbol_time


    Press RETURN to continue ...

       Enter the number of the parameter you would like to configure:

         1. *High priority token hold time
         2. *Target rotation time (class 4)
         3. *Target rotation time (class 2)
         4. *Target rotation time (class 0)
         5. *Target rotation time (ring maintenance)
```

```
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?

 *High priority token hold time (range: 0 - 2097151) [!]?
   Prescaled high priority token hold time = !

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 *Target rotation time (class 4) (range: 0 - 2097151) [!]?
   Prescaled target rotation time (class 4) = !

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 *Target rotation time (class 2) (range: 0 - 2097151) [!]?
   Prescaled target rotation time (class 2) = !

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
```

```
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 *Target rotation time (class 0) (range: 0 - 2097151) [!]?
   Prescaled target rotation time (class 0) = !

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 *Target rotation time (ring maintenance) (range: 0 - 2097151) [!]?
   Prescaled target rotation time (ring maintenance) = !

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 *Ring maintenance timer initial value (range: 0 - 2097151) [!]?
   Prescaled ring maintenance timer initial value = !

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
```

```
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 Maximum intersolicit count (range: 16 - 255) [!]?

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
*** WARNING: At least one node in the network should have its
             initial in ring desired parameter set to TRUE in
             order to maintain the ring.


Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
  5. *Target rotation time (ring maintenance)
  6. *Ring maintenance timer initial value
  7. Maximum intersolicit count
  8. Initial in ring desired
  9. Minimum post-silence preamble length
 10. Minimum interframe preamble length

Number (or press RETURN if finished)?
 Initial in ring desired (T/F) [!]?

Enter the number of the parameter you would like to configure:

  1. *High priority token hold time
  2. *Target rotation time (class 4)
  3. *Target rotation time (class 2)
  4. *Target rotation time (class 0)
```

```
    5. *Target rotation time (ring maintenance)
    6. *Ring maintenance timer initial value
    7. Maximum intersolicit count
    8. Initial in ring desired
    9. Minimum post-silence preamble length
   10. Minimum interframe preamble length

  Number (or press RETURN if finished)?
*** WARNING: This value has been preset in the factory to match
             your modem and link type.  It should only be changed
             by a knowledgeable network system administrator.
  Enter the number of the parameter you would like to configure:

    1. *High priority token hold time
    2. *Target rotation time (class 4)
    3. *Target rotation time (class 2)
    4. *Target rotation time (class 0)
    5. *Target rotation time (ring maintenance)
    6. *Ring maintenance timer initial value
    7. Maximum intersolicit count
    8. Initial in ring desired
    9. Minimum post-silence preamble length
   10. Minimum interframe preamble length

  Number (or press RETURN if finished)?
   Minimum post-silence preamble length (range: 4 - 9) [!]?

*** WARNING: This value has been preset in the factory to match
             your modem and link type.  It should only be changed
             by a knowledgeable network system administrator.


  Enter the number of the parameter you would like to configure:

    1. *High priority token hold time
    2. *Target rotation time (class 4)
    3. *Target rotation time (class 2)
    4. *Target rotation time (class 0)
    5. *Target rotation time (ring maintenance)
    6. *Ring maintenance timer initial value
    7. Maximum intersolicit count
    8. Initial in ring desired
    9. Minimum post-silence preamble length
   10. Minimum interframe preamble length

  Number (or press RETURN if finished)?
   Minimum interframe preamble length (range: 2 - 32) [!]?
```

```
***
*** Parameters preceded by an '*' have been prescaled.
***

                                                    Configured
                                                        Values
                                                    ----------
    *High priority token hold time..............!
    *Target rotation time (class 4).............!
    *Target rotation time (class 2).............!
    *Target rotation time (class 0).............!
    *Target rotation time (ring maintenance).....!
    *Ring maintenance timer initial value........!
    Maximum intersolicit count..................!
    Slot time...................................!
    Initial in ring state of TBC................!
    Minimum post-silence preamble length........!
    Minimum interframe preamble length..........!

    Current modem id............................!

    Do you want to keep this configuration and go online (Y/N) [Y]?

    Do you want to start over and reconfigure (Y/N) [Y]?

  End of Step 141 -- Display MAC Parameters

End of Section 14 -- 802.4 Config Parameters
```

Only a predetermined set of modems will be supported by this card. If a user switches to a new modem that is one of those supported or switches to a new modem that can use the same settings as one of the supported modems then simply changing the modem identification in step 142 will allow this diagnostic and the card firmware to work. If the modem does not conform to one of those supported the results are unpredictable and UNSUPPORTED.

Section 15—Failure History

```
Destructive to Board Data: No

Resulting Protocol Stack State: Unchanged

Steps in Default Set: None
```

The purpose of this section is to display the most recent "hard" failure which is stored in EEPROM.

This section will display the most recent "hard" failure. Any error which is internal to the card (i.e., not network related) will be logged to the failure history partition of EEPROM. The error will be kept until the next failure occurs which will overwrite it.

Possible Output Messages:

```
Section 15 -- Failure History

    Failure history log:
```

If no failure is logged the following message will be displayed:

```
    No failures are logged
```

If a failure is logged then one of the following messages will appear:

```
*** ERROR -- CARD FAILED SELFTEST. (OSI4DADERR 5501)


*** ERROR -- A HARDWARE WATCHDOG INTERRUPT OR BUS ERROR OCCURED.
*** (OSI4DADERR 5502)
*** REPLACE CARD


*** ERROR -- A SOFTWARE INTERRUPT ERROR OCCCURRED. (OSI4DADERR 5503)
*** REPLACE CARD


*** ERROR -- A COUNTER TEST ERROR OCCURRED.  (OSI4DADERR 5504)
*** REPLACE CARD


*** ERROR -- THE READ-MODIFY-WRITE CYCLE TEST FAILED.  (OSI4DADERR 5505)
*** REPLACE CARD


*** ERROR -- THE QUICK RAM TEST FAILED.  (OSI4DADERR 5506)
*** REPLACE CARD


*** ERROR -- THE ROM TEST FAILED.  (OSI4DADERR 5507)
```

```
*** REPLACE CARD


*** ERROR -- AN UNKNOWN HARDWARE ERROR HAS OCCURRED.  (OSI4DADERR 5508)
*** REPLACE CARD


*** ERROR -- POWERFAIL TEST FAILED.  (OSI4DADERR 5509)
*** REPLACE CARD


*** ERROR -- TIMER TEST FAILED.  (OSI4DADERR 5510)
*** REPLACE CARD


*** ERROR -- SOFTWARE WATCHDOG TIMER TEST FAILED.  (OSI4DADERR 5511)
*** REPLACE CARD


*** ERROR -- COMPREHENSIVE RAM TEST FAILED.  (OSI4DADERR 5512)
*** REPLACE CARD


*** ERROR - BACKPLANE/MIDPLANE DMA TEST FAILURE. (OSI4DADERR 5513)
*** REPLACE CARD


*** ERROR - RAM CODE EXECUTION TEST FAILED.  (OSI4DADERR 5514)
*** REPLACE CARD


*** ERROR - RAM INTERRUPT TEST FAILED.  (OSI4DADERR 5515)
*** REPLACE CARD


*** ERROR -- MIDPLANE CHIP REGISTER TEST FAILED.  (OSI4DADERR 5516)
*** REPLACE CARD


*** ERROR -- EEPROM TESTS DONE BEFORE RAM IS AVAILABLE FAILED. (OSI4DADERR 5517)
*** REPLACE CARD


*** ERROR -- EEPROM TESTS DONE AFTER RAM IS AVAILABLE FAILED. (OSI4DADERR 5518)
*** REPLACE CARD


*** ERROR -- INTERNAL RAM REFRESH COUNTER TEST FAILED.  (OSI4DADERR 5519)
*** REPLACE CARD
```

```
*** ERROR -- PARITY TRANSCEIVER TEST FAILED.  (OSI4DADERR 5520)
*** REPLACE CARD


*** ERROR -- BACKPLANE CONTROLLER REGISTER TEST FAILED. (OSI4DADERR 5521)
*** REPLACE CARD


*** ERROR -- LED DTACK TEST FAILED.  (OSI4DADERR 5522)
*** REPLACE CARD


*** ERROR -- PHANTOM DTACK TEST FAILED.  (OSI4DADERR 5523)
*** REPLACE CARD


*** ERROR -- BACKPLANE CONTROLLER DTACK TEST FAILED.
*** (OSI4DADERR 5524)
*** REPLACE CARD


*** ERROR -- NON-DESTRUCTIVE RAM TEST FAILED.  (OSI4DADERR 5525)
*** REPLACE CARD


*** ERROR -- POST-SELFTEST FAULT DETECTED.  (OSI4DADERR 5526)
*** REPLACE CARD


*** ERROR -- FRONTPLANE DTACK TEST FAILED.  (OSI4DADERR 5527)
*** REPLACE CARD


*** ERROR -- TBC TEST FAILED.  (OSI4DADERR 5528)
*** REPLACE CARD


*** ERROR -- LOOPBACK DETECTED AN ERROR IN THE MODEM.
*** (OSI4DADERR 5404)
```

The following information is for factory use:

```
                !

          Parity Error Information:


          The number of even parity errors = !

          The number of odd parity errors  = !

      End of Section 15 -- Failure History
```

Note

Only one of the above error messages would appear due to the fact that the card selftest will stop as soon as one of these errors occurs. In addition to the error message, a hex word will be displayed that will give factory personnel more detail on the failure. Also, a log of parity errors will be shown.

Section 16—Manufacturing Utilities

```
Destructive to Board Data: Yes

Resulting Protocol Stack State: Not Downloaded

Steps in Default Set: None
```

The purpose of this section is to give the knowledgeable user additional testing tools.

The following tests/utilities are considered useful for lab and factory debugging, but potentially dangerous in the field. Careless application could lead to false and confusing bug reports, or corrupt data on the card. Therefore, this section is preceded by a warning to keep non-factory users from running it.

The following is a brief description of each of the tests/utilities offered. These tests/utilities are presented in a menu which the user can choose from. After each test/utility executes, the menu is redisplayed and the user may choose another test/utility or hit carriage return to exit.

1 - Cmd_Stop This test causes a CMD_STOP to be written to the SRS. The purpose of the test is to see if the backplane correctly responds to this command. This command will also have the effect of stopping all DMA in progress and may be used for that purpose.

2 - Peek This utility allows the user to "peek" (observe ROM and RAM locations on the board). The user will be prompted for an IO memory address and the number of bytes to peek. There is a 4K limit on peeks to non-RAM (unenforced) and no limit to RAM locations.

3 - Poke This utility allows the user to "poke" (insert new values into) RAM locations. The user will be prompted as to whether they want a byte or word(16 bit) poke. Then the hex byte or word will be prompted for.

4 - Start Microprocessor This utility allows the user to specify an address in the 68020 address space which contains the next instruction to be executed. After prompting for an address, a Processor Status Word (PSW) must also be entered.

5 - Download This utility will cause a user supplied file to be downloaded to card RAM. The user will be prompted for a file name and notified if the file doesn't exist.

Possible Output Messages:

```
Section 16 -- Manufacturing Utilities

  **** WARNING ****

  This section is intended for factory use only.  These steps
  can be highly destructive to the card and should only be
  used by trained factory personnel.

  Do you wish to continue (Y/N) [N]?

  Choose the test you wish to perform:

    1.  Cmd_stop test
    2.  Peek
    3.  Poke
    4.  Startmicro
    5.  Download

  Choice (return to exit)?

  Cmd_Stop

    Cmd_stop test successful.


  Peek


    Card Memory Address (8 HEX digits or <CR> to quit) ?
    Number of bytes [160] ?

    Address      Data                                    Ascii
    ! : ! ! !

  Poke

    Byte or word poke (0,1) [0] ?
    Hex starting address (8 HEX digits, no '$') ?
    Even starting address (8 HEX digits, no '$') ?
    Hex byte ?
    Hex word ?
```

```
  Start Microprocessor

    Even starting address (8 HEX digits, no '$') ?
    Hex PSW (no '$') [2000] ?

  Download

    Filename ?
    Download complete.

End of Section 16 -- Manufacturing Utilities
```

Error and Warning Messages

The purpose of this section is to describe the error and warning messages included in the message catalog. These messages have the potential for appearing in any section of the diagnostic, at any time.

5000	*** ERROR -- THE HP OSI EXPRESS 802.4 CARD IS CURRENTLY BEING USED BY *** ANOTHER PROCESS. (OSI4DADERR 5000) *** Another user is in the process of downloading the card or is already *** diagnosing it. Under these circumstances, this instance of OSI4DAD may *** not gain access to the card.
5001	*** ERROR -- HP OSI EXPRESS 802.4 CARD DOES NOT RESPOND. (OSI4DADERR 5001) *** The problem may be one of the following: *** 1) The driver may not be configured properly. *** 2) The device is not an HP OSI Express 802.4 card. *** 3) The HP OSI Express 802.4 card is completely inoperable. *** 4) There is no HP OSI Express 802.4 card in the proper slot *** of the card cage.
5003	*** ERROR -- INSUFFICIENT SECURITY LEVEL. (OSI4DADERR 5003)
5004	*** ERROR --ROM FRONTPLANE ONLINE COMMAND FAILED. (OSI4DADERR 5004)
50011	*** ERROR -- CMD STOP FAILED. (OSI4DADERR 5011)
50012	*** ERROR -- SLEEP CALL FAILED. (OSI4DADERR 5012)
5021	*** ERROR -- Dar returned status of diodev_buff_too_small. (OSI4DADERR 5021)

5022	*** ERROR -- Dar returned status of diodev_fail. (OSI4DADERR 5022)
5023	*** ERROR -- A DMA operation has timed out. (OSI4DADERR 5023)
5024	*** ERROR -- Dar returned status of dfs_nonexist. (OSI4DADERR 5024)
5025	*** ERROR -- Dar returned illegal dar status. (OSI4DADERR 5025)
5026	*** ERROR -- DEVICE SPECIFIED IS NOT AN HP OSI EXPRESS 802.4 CARD. *** (OSI4DADERR 5026)
5027	*** ERROR -- REGISTER READ OPERATION FAILED. (OSI4DADERR 5027)
5030	*** ERROR -- REGISTER WRITE OPERATION FAILED. (OSI4DADERR 5030)
5031	*** ERROR -- SRS Io_Status Register = !. (OSI4DADERR 5031)
5032	*** ERROR -- DMRS Io_Status Register = !. (OSI4DADERR 5032)
5033	*** ERROR -- Completion List Entry = ! (OSI4DADERR 5033)
5050	*** ERROR -- READ OF SRS IO_STATUS FAILED DUE TO BAD DAR STATUS. *** (OSI4DADERR 5050)
5051	*** ERROR -- READ OF DMRS IO_STATUS FAILED DUE TO BAD DAR STATUS. *** (OSI4DADERR 5051)
5073	*** ERROR -- THE SRS READY BIT IS NOT SET. (OSI4DADERR 5073)

50074	*** ERROR -- THE DMRS READY BIT IS NOT SET. (OSI4DADERR 5074)
5093	*** ERROR -- FAILED BACKPLANE CONTROLLER QUAD FETCH TEST. (OSI4DADERR 5093)
5094	*** ERROR -- ATTEMPT TO READ QUAD FROM CARD MEMORY FAILED. (OSI4DADERR 5094)
5095	*** ERROR -- ATTEMPT TO WRITE QUAD TO CARD FAILED. (OSI4DADERR 5095)
5096	*** ERROR -- ATTEMPT TO POKE VALUE TO BACKPLANE CONTROLLER FENCE REGISTER *** FAILED. (OSI4DADERR 5096)
5097	*** ERROR -- FAILED BACKPLANE CONTROLLER SHIELD TEST. (OSI4DADERR 5097)
5099	*** ERROR -- FAILED BACKPLANE CONTROLLER FENCE TEST. (OSI4DADERR 5099)
5100	*** ERROR -- VALUE READ FROM IO REGISTER DID NOT MATCH VALUE EXPECTED. *** (OSI4DADERR 5100)
5101	*** ERROR -- FAILED BACKPLANE CONTROLLER REGISTER ADDRESSING TEST. *** (OSI4DADERR 5101)
5102	*** ERROR -- FAILED CMD_STOP.DIAG TEST. (OSI4DADERR 5102)
5140	*** ERROR -- FAILED ATTEMPT TO WRITE CMD_STOP.HALT TO CARD. (OSI4DADERR 5140)
5150	*** ERROR -- A SOFTWARE PROBLEM HAS BEEN DETECTED. (OSI4DADERR 5150) *** Please check your software configuration. If this fails to uncover the *** source of the problem, please contact your HP support representative.

5151	*** ERROR -- A PROBLEM WHICH MAY BE DUE TO A SOFTWARE OR A HARDWARE FAULT HAS *** BEEN DETECTED. (OSI4ADERR 5151) *** If HP OSI Express Link is currently running, you should first shut it down *** by running "/etc/mapshutrc -c <card_name>", where the default card_name is *** "osi0". At this point, either of the following actions may be taken: *** 1) In order to dump card memory to preserve the software state of the card, *** you may run "/etc/osicarddump -c <card_name> -o <outfile>", where the *** default card_name is "osi0", and the default outfile is *** "/tmp/osidumpfile"; *** 2) In order to isolate any failing hardware component, you may run Selftest *** (section 5)
5153	*** ERROR -- A HARDWARE PROBLEM HAS BEEN DETECTED. (OSI4DADERR 5153) *** Please replace the card.
5156	*** ERROR -- QUAD WRITTEN TO SYSTEM MEMORY DID NOT MATCH QUAD READ FROM CARD *** MEMORY. (OSI4DADERR 5156)
5157	*** ERROR -- UNABLE TO READ VALUE OF DG BIT. (OSI4DADERR 5157)
5158	*** ERROR -- THE CARD HAS EXPERIENCED A PROBLEM WHILE ACCESSING *** THE EEPROM. (OSI4DADERR 5158) *** Run Selftest (section 5) to verify the card hardware.

5159 *** ERROR -- THE FRONTPLANE HAS EXPERIENCED A SERIOUS ADDRESSING ERROR.
*** (OSI4DADERR 5159)
*** 1) In order to dump card memory to preserve the software state of the card,
*** you should run "/etc/osicarddump -c <card_name> -o <outfile>", where the
*** default card_name is "osi0", and the default outfile is
*** "/tmp/osidumpfile";
*** 2) In order to isolate any failing hardware component, you should run
*** Selftest (section 5)

5160 *** ERROR -- THE CARD HAS NOT BEEN INITIALIZED WITH A MODEM ID.
*** (OSI4DADERR 5160)
*** Run "Configure MAC Parameters" (section 14, step 142) to configure
*** a modem id and initialize the card with it.

5161 *** ERROR -- THE CARD HAS EXPERIENCED A SERIOUS ERROR WHICH WOULD INDICATE A
*** VERSION CONTROL PROBLEM WITH THE ROMS AND EEPROMS. (OSI4DADERR 5161)
*** Run Identify (section 3) and note your part numbers, version numbers, and
*** datecodes. Contact your HP support representative with this information.

5162 *** ERROR -- UNEXPECTED REPLY FROM THE CARD. (OSI4DADERR 5162)
*** This could be an internal software problem. Please make sure no
*** other processes are accessing the card at this time. If none are
*** and the problem persists, contact your HP support representative.

5163 *** ERROR -- UNEXPECTED ERROR RETURN WITHIN THE DIAGNOSTIC. (OSI4DADERR 5163)
*** This indicates an internal software problem. Please contact your
*** HP support representative.

5164	*** ERROR -- AN UNKNOWN CARD STATE WAS RETURNED BY THE CARD. (OSI4DADERR 5164) *** This indicates an internal software problem. Please contact your *** HP support representative.
5165	*** ERROR -- THE FRONTPLANE INTERRUPT CIRCUITRY HAS EXPERIENCED AN ERROR. *** Please run Selftest (section 5) to verify your hardware. If this *** error persists, contact your HP support representative. *** (OSI4DADERR 5165)
5166	*** ERROR -- UNDEFINED ERROR STATUS RETURNED. (OSI4DADERR 5166) *** This indicates an internal software problem. Please contact your *** HP support representative.
5167	*** ERROR -- THE CONFIGURED MODEM IS NOT SUPPORTED BY THE FIRMWARE. *** The modem chosen is not supported by the card firmware and must be *** changed to a supported value. Please run "Configure MAC Parameters" *** (section 14, step 142) to reconfigure your modem ID. *** (OSI4DADERR 5167)
5168	*** ERROR -- AN UNKNOWN ERROR OCCURRED. (OSI4DADERR 5168) *** Please run Selftest (section 5) to verify your hardware.
5169	*** ERROR -- THE CONFIGURED MODEM IS NOT SUPPORTED BY THE FIRMWARE. *** The modem chosen is not supported by the card firmware and must be *** changed to a supported value. Please configure a valid modem below. *** (OSI4DADERR 5169)

5190	*** ERROR -- PRE SEL_SEC_DEV CALL FAILED. (OSI4DADERR 5190)
5191	*** ERROR -- POST SEL_SEC_DEV CALL FAILED. (OSI4DADERR 5191)
5201	*** ERROR -- RESET CALL FAILED. (OSI4DADERR 5201)
5202	*** ERROR -- HARD RESET WITH TEST CALL FAILED. (OSI4DADERR 5202)
5203	*** ERROR -- HARD RESET WITH INITIALIZE CALL FAILED. (OSI4DADERR 5203)
5204	*** ERROR -- RESET CALL FAILED - NO LOOPBACK WAS PERFORMED. *** (OSI4DADERR 5204)
5300	*** ERROR -- INCORRECT TRANSFER COUNT RETURNED ON CCMD_IN_SELFTEST. *** (OSI4DADERR 5300)
5301	*** ERROR -- UNABLE TO IDENTIFY THE CARD. (OSI4DADERR 5301)
5302	*** ERROR -- UNABLE TO READ CARD STATUS. (OSI4DADERR 5302)
5303	*** ERROR -- WRONG BYTE COUNT ON CARD STATUS CALL. (OSI4DADERR 5303)
5304	*** ERROR -- WRONG BYTE COUNT ON CARD IDENTIFY CALL. (OSI4DADERR 5304)
5305	*** ERROR -- WRONG BYTE COUNT ON CARD STATISTICS CALL. (OSI4DADERR 5305)
5306	*** ERROR -- UNABLE TO READ CARD STATISTICS. (OSI4DADERR 5306)

5307	*** ERROR -- Hardware model = ! (UNKNOWN PRODUCT), expecting $8 *** Check to make sure you are diagnosing the correct card. *** (OSI4DADERR 5307)
5308	*** ERROR -- Software model = ! (UNKNOWN PRODUCT), expecting $58 *** Check to make sure you are diagnosing the correct card. *** (OSI4DADERR 5308)
5309	*** ERROR -- FRONTPLANE STATISTICS CALL TIMED OUT. (OSI4DADERR 5309) *** If you have recently run osicarddump to dump the contents of *** your card's memory, then this is an expected state. You *** will have to reset the card (section 2) in order to get *** the frontplane fully online. *** Otherwise,this could be a hardware or a software problem. *** Please run Selftest (section 5) to verify your card hardware. *** If that fails to isolate the problem and it persists, please *** contact your HP support representative.
5310	*** ERROR -- FRONTPLANE STATISTICS CALL TIMED OUT. (OSI4DADERR 5310) *** This could be a hardware or a software problem. If a hardware *** error has been indicated, follow the instructions given. If *** Selftest passed, then you have a software problem. In that case *** contact your HP support representative.
5401	*** ERROR -- AN ERROR WAS DETECTED IN THE TBC (FRONTPLANE). (OSI4DADERR 5401) *** REPLACE THE HP OSI EXPRESS 802.4 CARD.
5402	*** ERROR -- LOOPBACK DETECTED A DMA ERROR. (OSI4DADERR 5402) *** REPLACE THE HP OSI EXPRESS 802.4 CARD.

5403	*** ERROR -- AN ERROR WAS DETECTED IN THE DIGITAL PORTION *** OF THE MODEM. (OSI4DADERR 5403)
5404	*** ERROR -- UNABLE TO COMMUNICATE WITH THE MODEM. (OSI4DADERR 5404)
5405	*** ERROR -- MODEM CLOCK NOT AVAILABLE. (OSI4DADERR 5405)
5406	*** ERROR -- NETWORK ERROR. (OSI4DADERR 5406) *** This error could be caused by any of the following: *** 1) A physical problem with the network. *** 2) A bad connection to the network by this node. *** 3) Bad MAC parameters and frontplane configuration. *** Especially check your slot_time parameter. *** 4) Bad card hardware. Run Selftest (section 5).
5407	*** ERROR -- AN ERROR WAS DETECTED IN THE ANALOG PORTION *** OF THE MODEM. (OSI4DADERR 5407)
5408	*** ERROR -- LOOPBACK HAS DETECTED AN UNKNOWN ERROR. (OSI4DADERR 5408) *** Rerun the test. This could be a problem in the card firmware *** or the host diagnostic. If problem persists, replace the card.
5409	*** ERROR -- LOOPBACK DETECTED A CRC OR UNDERRUN ERROR. (OSI4DADERR 5409) *** Verify your network by running Remote Mode Test (section 9) *** and Statistics (section 7), and verify your modem and card by *** running Selftest (section 5).
5410	*** ERROR -- TBC LOOPBACK #1 FAILED. (OSI4DADERR 5410)
5411	*** ERROR -- TBC LOOPBACK #2 FAILED. (OSI4DADERR 5411)

5412 *** ERROR -- MODEM LOOPBACK #1 FAILED. (OSI4DADERR 5412)

5413 *** ERROR -- MODEM LOOPBACK #2 FAILED. (OSI4DADERR 5413)

5414 *** ERROR -- BROADBAND HEADEND LOOPBACK CALL FAILED. (OSI4DADERR 5414)

5415 *** ERROR -- WRONG NUMBER OF BYTES RECEIVED ON LOOPBACK CALL. (OSI4DADERR 5415)

*** Run Selftest (section 5) to verify your card.

5416 *** REPLACE THE HP OSI EXPRESS 802.4 CARD.

5417 *** This error can be caused by one of several conditions.

*** Follow, in order, the steps below until you isolate the problem:

*** 1. A loose connection. Check the seating of your HP OSI Express
*** 802.4 card and your modem. Also check the cable which
*** connects them to make sure it is securely plugged into both
*** cards.

*** 2. A bad cable. To detect a bad cable between the HP OSI Express
*** 802.4 card and the modem, swap your current cable with a
*** known good cable and repeat the test. If it passes then
*** the cable was faulty. If it still fails then continue to
*** work down this list.

*** 3. A bad modem. To detect a bad modem, swap your modem with a
*** known good modem and repeat the test. If it passes then the
*** modem was faulty. If it still fails then continue to work
*** down this list.

*** 4. A bad HP OSI Express 802.4 card. Running Selftest (section 5)
*** will test the card hardware for errors.

```
*** If you have an internal modem, replace the HP OSI Express 802.4
card.
*** If you have an external modem, this error can be caused by one
*** of several conditions.
*** Follow, in order, the steps below until you isolate the problem:
*** 1.  A loose connection.  Check the seating of your HP OSI Express
***     802.4 card and your modem.  Also check the cable which
***     connects them to make sure it is securely plugged into both
***     cards.
*** 2.  A bad cable.  To detect a bad cable between the HP OSI Express
***     802.4 card and the modem, swap your current cable with a
***     known good cable and repeat the test.  If it passes then
***     the cable was faulty.  If it still fails then continue to
***     work down this list.
*** 3.  A bad modem.  To detect a bad modem, swap your modem with a
***     known good modem and repeat the test.  If it passes then the
***     modem was faulty.  If it still fails then continue to work
***     down this list.
*** 4.  A bad HP OSI Express 802.4 card.  Running Selftest (section 5)
***     will test the card hardware for errors.
```

5419	*** ERROR -- FRONTPLANE CHIP IS BUSY. (OSI4DADERR 5419) *** Several things could cause this condition: *** 1) Your card hardware may be defective. To determine if this *** is the cause, run Selftest (section 5). *** 2) You may be experiencing network errors. Run Statstics *** (section 7) and examine the statistics for possible causes.
5501	*** ERROR -- CARD FAILED SELFTEST. (OSI4DADERR 5501)
5502	*** ERROR -- A HARDWARE WATCHDOG INTERRUPT OR BUS ERROR OCCURRED. *** (OSI4DADERR 5502) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5503	*** ERROR -- A SOFTWARE INTERRUPT ERROR OCCURRED. (OSI4DADERR 5503) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5504	*** ERROR -- A COUNTER TEST ERROR OCCURRED. (OSI4DADERR 5504) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5505	*** ERROR -- THE READ-MODIFY-WRITE CYCLE TEST FAILED. (OSI4DADERR 5505) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5506	*** ERROR -- THE QUICK RAM TEST FAILED. (OSI4DADERR 5506) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5507	*** ERROR -- THE ROM TEST FAILED. (OSI4DADERR 5507) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5508	*** ERROR -- AN UNKNOWN HARDWARE ERROR HAS OCCURRED. (OSI4DADERR 5508) *** REPLACE THE HP OSI EXPRESS 802.4 CARD

5509	*** ERROR -- POWERFAIL TEST FAILED. (OSI4DADERR 5509) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5510	*** ERROR -- TIMER TEST FAILED. (OSI4DADERR 5510) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5511	*** ERROR -- SOFTWARE WATCHDOG TIMER TEST FAILED. (OSI4DADERR 5511) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5512	*** ERROR -- COMPREHENSIVE RAM TEST FAILED. (OSI4DADERR 5512) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5513	*** ERROR -- BACKPLANE/MIDPLANE DMA TEST FAILURE. (OSI4DADERR 5513) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5514	*** ERROR -- RAM CODE EXECUTION TEST FAILED. (OSI4DADERR 5514) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5515	*** ERROR -- RAM INTERRUPT TEST FAILED. (OSI4DADERR 5515) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5516	*** ERROR -- MIDPLANE CHIP REGISTER TEST FAILED. (OSI4DADERR 5516) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5517	*** ERROR -- EEPROM TESTS DONE BEFORE RAM IS AVAILABLE FAILED. (OSI4DADERR 5517) *** REPLACE THE HP OSI EXPRESS 802.4 CARD

5518	*** ERROR -- EEPROM TESTS DONE AFTER RAM IS AVAILABLE FAILED. (OSI4DADERR 5518) *** This error may be recoverable. Please run "Recover From EEPROM Error" *** (section 13, step 132) to see if recovery is possible.
5519	*** ERROR -- INTERNAL RAM REFRESH COUNTER TEST FAILED. (OSI4DADERR 5519) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5520	*** ERROR -- PARITY TRANSCEIVER TEST FAILED. (OSI4DADERR 5520) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5521	*** ERROR -- BACKPLANE CONTROLLER REGISTER TEST FAILED. (OSI4DADERR 5521) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5522	*** ERROR -- LED DTACK TEST FAILED. (OSI4DADERR 5522) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5523	*** ERROR -- PHANTOM DTACK TEST FAILED. (OSI4DADERR 5523) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5524	*** ERROR -- BACKPLANE CONTROLLER DTACK TEST FAILED. *** (OSI4DADERR 5524) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5525	*** ERROR -- NON-DESTRUCTIVE RAM TEST FAILED. (OSI4DADERR 5525) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5526	*** ERROR -- POST-SELFTEST FAULT DETECTED. (OSI4DADERR 5526) *** This could be a hardware or a software problem. *** Check your system console for a disaster log notification. *** Run Selftest (section 5) to test your card hardware.

5527	*** ERROR -- FRONTPLANE DTACK TEST FAILED. (OSI4DADERR 5527) *** REPLACE THE HP OSI EXPRESS 802.4 CARD
5528	*** ERROR -- TBC TEST FAILED. (OSI4DADERR 5528)
5530	*** ERROR -- ROM FRONTPLANE INITIALIZATION ERROR. *** (OSI4DADERR 5530)
5531	*** COMMAND WORD ERROR - INVALID COMMAND WORD. (OSI4DADERR 5531)
5546	*** ERROR -- THE CARD IS IN FATAL ERROR MODE. *** ATTEMPTING TO OBTAIN DIAGNOSTIC ACCESS. (OSI4DADERR 5546)
5547	*** ERROR -- CMD_STOP.DIAG FAILED. (OSI4DADERR 5547)
5548	*** ERROR -- CARD WON'T GO INTO DIAGNOSTIC MODE. (OSI4DADERR 5548)
5549	*** ERROR -- UNABLE TO READ IO_STATUS FROM SRS. (OSI4DADERR 5549)
5550	*** ERROR -- CCMD_IN_SELFTEST CALL FAILED. (OSI4DADERR 5550)
5551	*** ERROR -- COMPREHENSIVE RAM TEST CALL FAILED. (OSI4DADERR 5551)
5601	*** ERROR -- DATA COMPARE ERRORS. (OSI4DADERR 5601)
5603	*** ERROR -- ADD SSAP FAILED. (OSI4DADERR 5603)
5604	*** ERROR -- DELETE SSAP FAILED. (OSI4DADERR 5604)

5605	*** ERROR -- WRITE FRAME FAILED. (OSI4DADERR 5605)
5606	*** ERROR -- READ FRAME FAILED. (OSI4DADERR 5606)
5607	*** ERROR -- WRONG BYTE COUNT ON TRANSMIT CALL. (OSI4DADERR 5607) *** Run Selftest (section 5) to verify your card hardware.
5608	*** ERROR -- WRONG BYTE COUNT ON RECEIVE CALL. (OSI4DADERR 5608) *** The length received was outside the bounds of a legal frame.
5609	*** ERROR -- TOO MANY TRIES AT BINDING SSAP. (OSI4DADERR 5609) *** Your card appears to be busy. Please try again.
5610	*** ERROR -- REMOTE RESPONDED, BUT SSAP IS WRONG. (OSI4DADERR 5610) *** Expected response SSAP = $01; received SSAP = !. *** SSAP may be in use by another application.
5611	*** ERROR -- REMOTE RESPONDED, BUT CONTROL FIELD IS WRONG. (OSI4DADERR 5611) *** Expected control field = $F3; received control field = !. *** SSAP may be in use by another application.
5612	*** ERROR -- REMOTE RESPONDED, BUT LENGTH OF PACKET IS WRONG. (OSI4DADERR 5612) *** Expected packet length is one of ! or 16. *** Received packet length = !.
5614	*** ERROR -- REMOTE RESPONDED, BUT SEQUENCE NUMBER IS WRONG. (OSI4DADERR 5614) *** Expected sequence number = !; received sequence number = !.

5615 *** ERROR -- REMOTE RESPONDED, BUT SSAP IS WRONG. (OSI4DADERR 5615)
*** Expected response SSAP = !; received SSAP = !.
*** SSAP may be in use by another application.

5616 *** ERROR -- REMOTE RESPONDED, BUT LENGTH IS WRONG. (OSI4DADERR 5616)
*** Expected frame length of 19 bytes; received frame length = !.

5618 *** ERROR -- REMOTE RESPONDED, BUT CONTROL FIELD IS WRONG. (OSI4DADERR 5618)
*** Expected control field = $BF; received control field = !.

5619 *** ERROR -- REMOTE RESPONDED, BUT FORMAT IDENTIFIER IS WRONG. (OSI4DADERR 5619)
*** Expected format identifier = $81; received format identifier = !.

5620 *** ERROR -- REMOTE RESPONDED, BUT UNKNOWN CLASS OF SERVICE. (OSI4DADERR 5620)
*** Expected either $01, $03, $05, or $07; received !.

5621 *** ERROR -- UNABLE TO WRITE TO THE TBC. (OSI4DADERR 5621)
*** An error occurred while transferring the frame to the TBC.
*** Please run Selftest (section 5) to check the card hardware.

5622 *** ERROR -- UNABLE TO ALLOCATE A TRANSMIT BUFFER ON THE CARD.
*** (OSI4DADERR 5622)
*** If the card is downloaded, this would indicate that all available
*** card resources are being utilized. You will have to wait and
*** try again. If the card is not downloaded, this could indicate
*** a hardware or software problem. Please run Selftest (section 5)
*** to verify your hardware.

5623	*** ERROR -- WRITE FRAME BUFFERS RECEIVED OUT OF SEQUENCE. (OSI4DADERR 5623) *** This indicates an internal software problem. Try again and if *** the problem persists, contact your HP support representative.
5624	*** ERROR -- AN UNKNOWN WRITE FRAME ERROR WAS RETURNED. (OSI4DADERR 5624) *** This indicates an internal software problem. Try again and if *** the problem persists, contact your HP support representative.
5625	*** ERROR -- SSAP NOT ACTIVE. (OSI4DADERR 5625) *** The user-specified SSAP is not in the set of active SSAPs. *** This indicates an internal software problem. Try again and if *** the problem persists, contact your HP support representative.
5626	*** ERROR -- SSAP TABLE IS FULL. UNABLE TO ADD SSAP. (OSI4DADERR 5626) *** If the card is downloaded this could indicate that a capacity *** limit has been reached. You will needed to close unneeded *** connections or wait and try again. If the card is not downloaded, *** it will need to be reset by running Reset (section 2) to clear *** the SAP table.
5627	*** ERROR -- SSAP NOT ADDED. AN ERROR OCCURRED. (OSI4DADERR 5627) *** This indicates an internal software problem. Try again and if *** the problem persists, contact your HP support representative.

5628 *** WARNING -- RAM DIAGNOSTIC MANAGER IS NOT AVAILABLE. (OSI4DADWARN 5628)
*** Two possibilities exist for the cause of this:
*** 1. The currently active version of downloaded software does
*** not contain the RAM Diagnostic Manager. Check your version
*** control information and your installation procedure.
*** 2. The download process was interrupted and left in an
*** incomplete state. You should reset the card and re-download
*** to see if that clears the error.
*** If neither of the above resolve the problem, contact your HP
*** representative.

5629 *** ERROR -- UNABLE TO DELETE THE SSAP. (OSI4DADERR 5629)
*** This indicates an internal software problem. Try again and if
*** the problem persists, contact your HP support representative.

5632 *** ERROR -- RECEIVE OF FRAME ABORTED BY FIRMWARE. (OSI4DADERR 5632)
*** Reset the card by running Reset (section 2), and then try again. If
*** the error persists, run Selftest (section 5) to verify the card. If
*** Selftest shows no error and this error persists, you have an
*** internal software error and should contact your HP support representative.

5633 *** ERROR -- TIMED OUT WAITING FOR TRANSMIT REPLY. (OSI4DADERR 5633)
*** (1) If the card is downloaded, try the following steps in the
*** order presented:
*** (a) The card may be extremely busy. Examine Statistics
*** (section 7) to see if this might be the case. If so, you
*** will have to wait or reduce the activity level of the
*** card. Wait and repeat the test before trying step (b)
*** below.
*** (b) The card may be hung. Run Identify (section 3) to see
*** if the card responds. Also, running Status (section 6)
*** will show the state of the frontplane if the card
*** responds. If the card fails to respond (i.e. times out)
*** run Selftest (section 5) to verify the card hardware. If
*** Selftest passes, the card will be reset and you can
*** download it and try again.
*** (c) The card may have a hardware or software problem. Run
*** Selftest (section 5) to verify the card hardware. If this
*** fails to isolate the problem and the problem persists,
*** please contact your HP support representative.
*** (2) If the card is not downloaded, this could indicate a hardware
*** or software problem. Run Selftest (section 5) to verify the
*** card hardware. If selftest passes, repeat the test. If the
*** problem reoccurs, contact your HP support representative.

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5634        *** ERROR -- TIMED OUT WAITING FOR ADD SSAP REPLY.  (OSI4DADERR 5634)
            *** (1) If the card is downloaded, try the following steps in the
            ***     ordsr presented:
            ***     (a) The card may be extremely busy.  Examine Statistics
            ***         (section 7) to see if this might be the case. If so, you
            ***         will have to wait or reduce the activity level of the
            ***         card.  Wait and repeat the test before trying step (b)
            ***         below.
            ***     (b) The card may be hung.  Run Identify (section 3) to see
            ***         if the card responds.  Also, running Status (section 6)
            ***         will show the state of the frontplane if the card
            ***         responds.  If the card fails to respond (i.e. times out)
            ***         run Selftest (section 5) to verify the card hardware.  If
            ***         Selftest passes, the card will be reset and you can
            ***         download it and try again.
            ***     (c) The card may have a hardware or software problem.  Run
            ***         Selftest (section 5) to verify the card hardware.  If this
            ***         fails to isolate the problem and the problem persists,
            ***         please contact your HP support representative.
            *** (2) If the card is not downloaded, this could indicate a hardware
            ***     or software problem.  Run Selftest (section 5) to verify the
            ***     card hardware.  If selftest passes, repeat the test.  If the
            ***     problem reoccurs, contact your HP support representative.
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5635 *** ERROR -- TIMED OUT WAITING FOR DELETE SSAP REPLY. (OSI4DADERR 5635)
*** (1) If the card is downloaded, try the following steps in the
*** order presented:
*** (a) The card may be extremely busy. Examine Statistics
*** (section 7) to see if this might be the case.% If
*** so, you will have to wait or reduce the activity level
*** of the card. Wait and repeat the test before trying step
*** "b" below.
*** (b) The card may be hung. Run Identify (section 3) to see
*** if the card responds. Also, running Status (section 6)
*** will show the state of the frontplane if the card
*** responds. If the card fails to respond (i.e. times out)
*** run Selftest (section 5) to verify the card hardware. If
*** Selftest passes, the card will be reset and you can
*** download it and try again.
*** (c) The card may have a hardware or software problem. Run
*** Selftest (section 5) to verify the card hardware. If this
*** fails to isolate the problem and the problem persists,
*** please contact your HP support representative.
*** (2) If the card is not downloaded, this could indicate a hardware
*** or software problem. Run Selftest (section 5) to verify the
*** card hardware. If selftest passes, repeat the test. If the
*** problem persists, contact your HP support representative.

5636 *** ERROR -- ADD SSAP FAILED FOR UNKNOWN REASONS. (OSI4DADERR 5636)
*** You may want to try again, using a different SAP.

5637 *** ERROR -- THE READ FRAME REPLY COMMAND FAILED. (OSI4DADERR 5637)

5638	*** ERROR -- WRONG BYTE COUNT RECEIVED WHILE SETTING UP TRANSMIT. *** (OSI4DADERR 5638) *** This would seem to indicate an internal software problem. Try *** again and if the problem persists, contact your HP support representative.
5639	*** ERROR -- WRONG BYTE COUNT RECEIVED WHILE CLEANING UP AFTER *** RECEIVE. (OSI4DADERR 5639) *** This would seem to indicate an internal software problem. Try *** again and if the problem persists, contact your HP support representative.
5640	*** ERROR -- TIMED OUT WAITING FOR RECEIPT OF PACKET. (OSI4DADERR 5640) *** (1) Verify a correct DSAP was entered. *** (2) Verify target node is online and in ring. *** (a) If not, put target node in ring and repeat test. *** (b) If it is, proceed to step (2) below. *** (3) Repeat test with a different target node. *** If statistics fail to isolate the problem, try *** sending a test packet from another node to this *** node or between two known good nodes. If this *** works, your original sending node is suspect. Run *** Selftest (section 5) on it to verify the hardware. *** Otherwise the network is suspect. Verify connections *** and examine statistics. If it is a broadband network, *** take down all but one node and run the broadband *** headend loopback test on that node (section 8).

```
5642        *** ERROR -- THE CARD HAS EXPERIENCED UNDERRUN ERRORS WHILE
            *** TRANSMITTING.  (OSI4DADERR 5642)
            *** This could indicate a hardware problem.
            *** Run Selftest (section 5) to verify your card hardware.

5643        *** ERROR -- LAST ATTEMPT TO TRANSMIT PACKETS FAILED.
            *** This could indicate a hardware problem.
            *** Run Selftest (section 5) to verify your card hardware.
            *** (OSI4DADERR 5643)

5644        *** ERROR -- DELETE SSAP FAILED FOR UNKNOWN REASONS.
            *** (OSI4DADERR 5644)
            *** This could indicate an internal software problem.
            *** Run Selftest (section 5) to verify your card hardware.
            *** If the problem persists, please contact your HP support
            representative.

5645        *** ERROR -- FCS ERROR(S) WHILE WAITING FOR REPLY.  (OSI4DADERR 5645)
            *** FCS error(s) prior to transmission = !
            *** FCS error(s) after timeout         = !
            ***
            *** The following conditions may have caused this error:
            ***   (1) Problems in the cable system or a network component
            ***       failure (e.g. headend remodulator).
            ***   (2) Network errors.
            ***   (3) Defective modem or receiver circuitry on our node.
            ***   (4) Defective modem or transmitter circuitry on remote node.
            *** The following steps should be followed to attempt to resolve
            *** this error:
            ***   (1) Verify your connections (i.e. cable system).
            ***   (2) Examine your statistics (section 7) for errors.
            ***   (3) Run Selftest (section 5).
```

```
5646        *** ERROR -- E-BIT IN ED ERROR(S) WHILE WAITING FOR REPLY. (OSI4DADERR
            5646)
            *** E BIT error(s) prior to transmission = !
            *** E BIT error(s) after timeout         = !
            ***
            *** The following conditions may have caused this error:
            ***   (1) Problems in the cable system or a network component
            ***       failure (e.g. headend remodulator).
            ***   (2) Network errors.
            ***   (3) Defective modem or receiver circuitry on our node.
            ***   (4) Defective modem or transmitter circuitry on remote node.
            *** The following steps should be followed to attempt to resolve
            *** this error:
            ***   (1) Verify your connections (i.e. cable system).
            ***   (2) Examine your statistics (section 7) for errors.
            ***   (3) Run Selftest (section 5).
```

```
5647        *** ERROR -- INCOMPLETE FRAME ERROR(S) WHILE WAITING FOR REPLY.
            *** (OSI4DADERR 5647)
            *** INCOMPLETE FRAME error(s) prior to transmission = !
            *** INCOMPLETE FRAME error(s) after timeout         = !
            ***
            *** The following conditions may have caused this error:
            ***   (1) Problems in the cable system or a network component
            ***       failure (e.g. headend remodulator).
            ***   (2) Network errors.
            ***   (3) Defective modem or receiver circuitry on our node.
            ***   (4) Defective modem or transmitter circuitry on remote node.
            *** The following steps should be followed to attempt to resolve
            *** this error:
            ***   (1) Verify your connections (i.e. cable system).
            ***   (2) Examine your statistics (section 7) for errors.
            ***   (3) Run Selftest (section 5).
```

```
5648        *** ERROR -- FRAME GREATER THAN 8191 BYTES ERROR(S) WHILE
            *** WAITING FOR REPLY.
            *** > 8191 bytes error(s) prior to transmission = !
            *** > 8191 bytes error(s) after timeout         = !
            *** (OSI4DADERR 5648)
            ***
            *** The following conditions may have caused this error:
            ***   (1) Problems in the cable system or a network component
            ***       failure (e.g. headend remodulator).
            ***   (2) Network errors.
            ***   (3) Defective modem or receiver circuitry on our node.
            ***   (4) Defective modem or transmitter circuitry on remote node.
            *** The following steps should be followed to attempt to resolve
            *** this error:
            ***   (1) Verify your connections (i.e. cable system).
            ***   (2) Examine your statistics (section 7) for errors.
            ***   (3) Run Selftest (section 5).
```

```
5649        *** ERROR -- FRAME REJECTED DUE TO INSUFFICIENT BUFFER SPACE
            *** ERROR(S) WHILE WAITING FOR REPLY.  (OSI4DADERR 5649)
            *** Rejection error(s) prior to transmission = !
            *** Rejection error(s) after timeout         = !
```

```
5650        *** ERROR -- OVERRUN ERROR(S) WHILE WAITING FOR REPLY.  (OSI4DADERR
            5650)
            *** OVERRUN error(s) prior to transmission = !
            *** OVERRUN error(s) after timeout         = !
            ***
            *** The following conditions may have caused this error:
            ***   (1) Problems in the cable system or a network component
            ***       failure (e.g. headend remodulator).
            ***   (2) Network errors.
            ***   (3) Defective modem or receiver circuitry on our node.
            ***   (4) Defective modem or transmitter circuitry on remote node.
            *** The following steps should be followed to attempt to resolve
            *** this error:
            ***   (1) Verify your connections (i.e. cable system).
            ***   (2) Examine your statistics (section 7) for errors.
            ***   (3) Run Selftest (section 5).
            ***   (4) Verify minimum interframe preamble length of
            ***       transmitting station.
```

```
5651        *** ERROR -- PERIODS OF NON-SILENCE ERROR(S) WHILE WAITING FOR REPLY.
            *** Non-silence error(s) prior to transmission = !
            *** Non-silence error(s) after timeout         = !
            *** (OSI4DADERR 5651)
            ***
            *** The following conditions may have caused this error:
            ***   (1) Problems in the cable system or a network component
            ***       failure (e.g. headend remodulator).
            ***   (2) Network errors.
            ***   (3) Defective modem or receiver circuitry on our node.
            ***   (4) Defective modem or transmitter circuitry on remote node.
            *** The following steps should be followed to attempt to resolve
            *** this error:
            ***   (1) Verify your connections (i.e. cablo system).
            ***   (2) Examine your statistics (section 7) for errors.
            ***   (3) Run Selftest (section 5).
```

5652	*** ERROR -- THE TBC HAS REPORTED A FAULTY TRANSMITTER CONDITION. *** (OSI4DADERR 5652) *** Three possible conditions may cause this error: *** 1. A hardware error may have occurred. To determine if this *** is the cause, run Selftest (section 5). *** 2. Bad MAC parameters and frontplane configuration. *** Especially check the slot_time parameter. It must be the *** same for ALL nodes in the ring. *** 3. No nodes may be "in ring". Verify that at least two *** nodes have their in_ring_desired parameters set to "TRUE". *** To do this, run "Display MAC Parameters" (section 14, step 141) *** of the diagnostic for each node you wish to check.
5653	*** ERROR -- THE TBC HAS REPORTED AN ERROR FROM THE MODEM. (OSI4DADERR 5653) *** The modem has informed the TBC of a physical error. *** Please run Selftest (section 5) to attempt to isolate the problem.
5701	*** ERROR -- EEPROM HAS EXPERIENCED AN UNRECOVERABLE ERROR. *** REPLACE THE HP OSI EXPRESS 802.4 CARD. (OSI4DADERR 5701)
5702	*** ERROR -- UNABLE TO READ FROM EEPROM. (OSI4DADERR 5702) *** This error may be recoverable. Run "Recover From EEPROM Error" *** (section 13, step 132) to attempt recovery.
5704	*** ERROR -- EEPROM READ CALL FAILED. (OSI4DADERR 5704)
5705	*** ERROR -- EEPROM WRITE CALL FAILED. (OSI4DADERR 5705)

5706	*** ERROR -- EEPROM WRITE TEST FAILED. (OSI4DADERR 5706) *** An attempt to write to the test byte in EEPROM and read it back checking *** for the proper value has failed. This could indicate a problem in EEPROM. *** Run "Recover From EEPROM Error" (section 13, step 132) to see if EEPROM *** is bad.
5707	*** ERROR -- UNABLE TO CONTINUE DUE TO EEPROM ERROR. (OSI4DADERR 5707) *** An error occurred trying to read a bank of EEPROM for the purpose *** of recovering another bank. Rerun this step until this error no longer *** appears or you get a write error.
5708	*** ERROR -- WRONG NUMBER OF BYTES RECEIVED ON EEPROM ACCESS. *** (OSI4DADERR 5708)
5709	*** ERROR -- EEPROM BUSY. UNABLE TO ACCESS THE EEPROM. (OSI4DADERR 5709) *** Make sure you have exclusive access of the card.
5710	*** ERROR -- UNABLE TO READ FROM EEPROM. (OSI4DADERR 5710)
5711	*** ERROR -- THE VERSION OF THE EEPROM IS NOT COMPATIBLE WITH *** THE DIAGNOSTIC. (OSI4DADERR 5711) *** Expected EEPROM version !; card has version !. *** No further access to EEPROM will be allowed through this program, *** however, non-EEPROM access will still function. Please contact *** your HP support representative with this information.

5712	*** ERROR -- EEPROM ACCESS ERROR. (OSI4DADERR 5712) *** Please run "Recover From EEPROM Error" (section 13, step 132) to see if *** this error is recoverable.
5802	*** ERROR -- PEEK CALL FAILED. (OSI4DADERR 5802) *** An error has occurred while trying to perform a peek from the card. *** This error may be unrelated to PEEK. *** Please run Selftest (section 5) to verify your card hardware.
5803	*** ERROR -- POKE CALL FAILED. (OSI4DADERR 5803)
5804	*** ERROR -- STARTMICRO CALL FAILED. (OSI4DADERR 5804)
5805	*** ERROR -- DOWNLOAD CALL FAILED. (OSI4DADERR 5805)
5806	*** ERROR -- REGISTER READ CALL FAILED. (OSI4DADERR 5806)
5807	*** ERROR -- REGISTER WRITE CALL FAILED. (OSI4DADERR 5807)
5808	*** ERROR -- PEEK ADDRESS CALL FAILED. (OSI4DADERR 5808)
5809	*** ERROR -- WRONG TRANSFER COUNT ON PEEK. (OSI4DADERR 5809) *** Expecting ! bytes, received ! bytes. *** Now displaying bytes received.

5901	*** ERROR -- UNKNOWN MODEM IDENTIFICATION. (OSI4DADERR 5901) *** Received modem id of: ! *** You will not be able to operate with this modem id. *** Please run "802.4 Configuration Parameters" (section 14, step 142) to *** configure a new modem id.
5902	*** ERROR -- MAC RESET CALL FAILED. (OSI4DADERR 5902)
5903	*** ERROR -- WRONG BYTE COUNT RECEIVED WHILE ATTEMPTING TO RESET THE *** FRONTPLANE. (OSI4DADERR 5903)
5904	*** ERROR -- UNKNOWN TRANSMIT/RECEIVE CHANNEL. (OSI4DADERR 5904) *** This error indicates an internal software error. *** Please contact your HP support representative.
5905	*** ERROR -- UNKNOWN MODEM ID. (OSI4DADERR 5905) *** Received modem id of: ! *** You must choose a new modem id from the list below.
5906	*** ERROR -- DUPLICATE MAC ADDRESS DETECTED. (OSI4DADERR 5906) *** This node and another node on this network have the same *** MAC station address. One of them must have their address *** changed. Change the MAC Station Address (section 13, step 134) *** may be used to make the change on the node in error.
6001	*** WARNING -- YOU HAVE NOT INITIALIZED YOUR MODEM. *** You must run "Configure MAC Parameters" (section 14, step 142) to *** initialize your modem type before you attempt to enter the token ring. *** (OSI4DADWARN 6001)

6002	*** WARNING -- YOU HAVE NOT INITIALIZED YOUR MODEM. *** You must do so in order to ready this card for use. *** Please answer the following prompt with your modem type. *** (OSI4DADWARN 6002)
6004	*** WARNING -- DIAGNOSTIC SAP IN USE BY ANOTHER PROCESS. (OSI4DADWARN 6004) *** Another process has bound to the diagnostic SAP. *** This section can only be run after the other process finishes.
6006	*** WARNING -- SAP ! ALREADY IN USE BY ANOTHER PROCESS. (OSI4DADWARN 6006)
6007	*** WARNING -- UNABLE TO PERFORM BROADBAND HEADEND LOOPBACK. *** A TOKEN RING IS OPERATING ON THE NETWORK. (OSI4DADWARN 6007)
6010	*** WARNING -- THE FRONTPLANE IS OFFLINE. (OSI4DADWARN 6010) *** The frontplane must be online before any network connections *** may be made. You will need to reset the card (section 2) *** to place the card online. If that fails to place the card *** online, run Selftest (section 5) to verify the card hardware.
6011	*** WARNING -- THE FRONTPLANE IS OFFLINE. (OSI4DADWARN 6011) *** The frontplane must be online to perform this test. *** If your card is downloaded, run Status (section 6) to *** determine the card state. If your card is not downloaded, *** run Reset (section 2) to place the card online.

6012 *** WARNING -- A DESTRUCTIVE SECTION HAS BEEN CHOSEN. (OSI4DADWARN 6012)

*** This section will not be permitted to execute if HP OSI Express Link is

*** currently running. To shut down HP OSI Express Link, run "/etc/mapshutrc

*** -c <card_name>", where the default card_name is "osi0". At this point, you

*** may elect to either preserve card state information or proceed with this

*** section, which will destroy card state information. To preserve card state

*** information, run "/etc/osicarddump -c <card_name> -o <outfile>", where the

*** default card_name is "osi0", and the default outfile is "/tmp/osidumpfile".

6013 *** WARNING -- THIS TEST MAY DISRUPT NETWORK ACTIVITY.

*** To safely run this test you must be the only node on the broadband network.

*** If you are not DO NOT RUN THIS TEST. The card firmware will disallow the

*** test if tokens are passing through this station. However, if every station

*** is listen-only, this cannot be detected, and running this test could

*** disrupt traffic to those nodes. (OSI4DADWARN 6013)

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