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HP 9000 Series 800 Computers

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Safety Considerations

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

WARNING

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

CAUTION

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

Preface

This manual contains information about the Online Diagnostics Subsystem SPU and I/O Diagnostics for the HP Series 3000/930/950 and 9000/825/840/850S 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 SPU and I/O diagnostic programs currently supported and descriptions of the subsystem under MPE XL and HP-UX.

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Conventions

NOTATION	DESCRIPTION
UPPERCASE	Within syntax statements, characters in uppercase must be entered in exactly the order shown, though you can enter them in either uppercase or lowercase. For example: `SHOWJOB` Valid entries: `showjob` `ShowJob` `SHOWJOB` Invalid entries: `shojwob` `Shojob` `SHOW_JOB`
italics	Within syntax statements, a word in italics represents a formal parameter or argument that you must replace with an actual value. In the following example, you must replace *filename* with the name of the file you want to release: `RELEASE` *filename*
punctuation	Within syntax statements, punctuation characters (other than brackets, braces, vertical parallel lines, and ellipses) must be entered exactly as shown.
[ ]	Within syntax statements, brackets enclose optional elements. In the following example, brackets around `,TEMP` indicate that the parameter and its delimiter are optional: `PURGE` *filename*[`,TEMP`] When several elements within brackets are stacked, you can select any one of the elements or none. In the following example, you can select *devicename* or *deviceclass* or neither: `SHOWDEV` [*devicename*] [*deviceclass*]
shading	Within an example of interactive dialog, shaded characters indicate user input or responses to prompts. In the following example, OMEGA is the user's response to the NEW NAME prompt: `NEW NAME? OMEGA`

Conventions (Continued)

NOTATION	DESCRIPTION
[ ]	The symbol [ ] indicates a key on the terminal's keyboard. For example, [CTRL] indicates the Control key.
[CTRL]*char*	[CTRL]*char* indicates a control character. For example, [CTRL]Y means you have to simultaneously press the Control key and the Y key on the keyboard.
base prefixes	The prefixes %, #, and $ specify the numerical base of the value that follows: *%num* specifies an octal number *#num* specifies a decimal number *$num* specifies a hexadecimal number When no base is specified, decimal is assumed.

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Online Diagnostics Overview

Introduction

The Online Diagnostic subsystem provides a means of testing hardware modules and devices attached to the HP Precision Architecture (HPPA) computer system using either the MPE XL or HP-UX operating system. The HPPA system and the diagnostic system are intimately tied together for error logging, auto-diagnostics, and restricting access to other users during diagnostic testing.

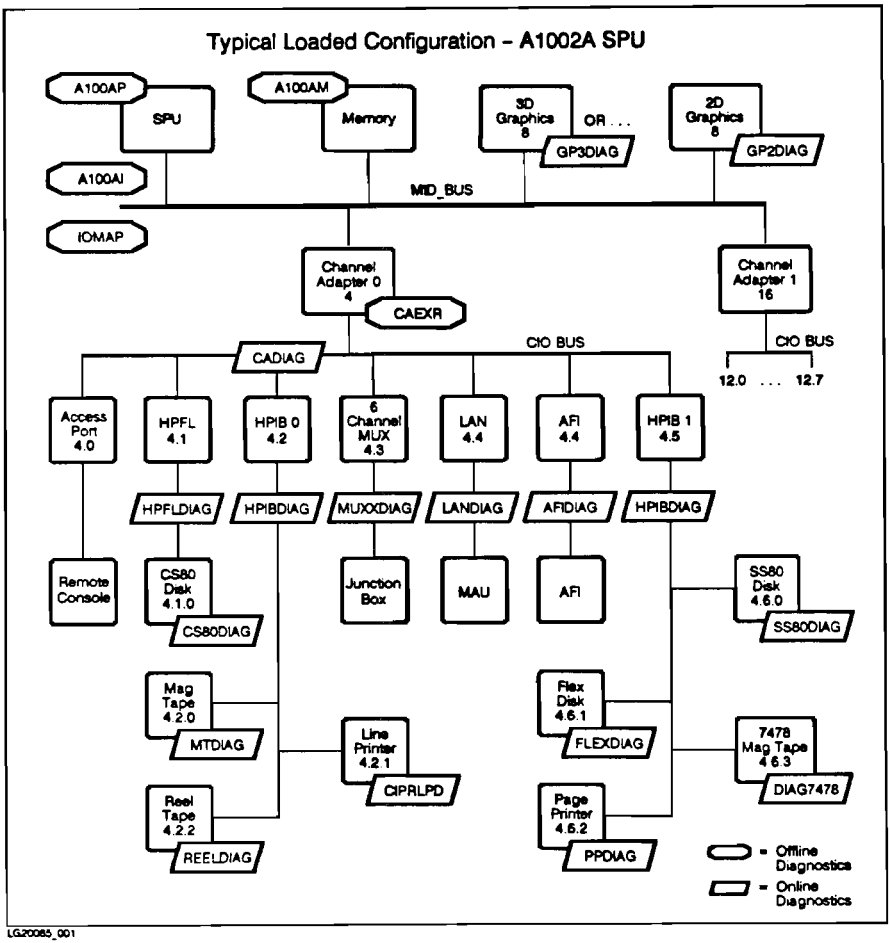
The subsystem provides a common, standard user interface to all the diagnostic programs and utilities, as well as a controlling mechanism for diagnostic access to I/O devices on the system. It can also execute auto-diagnostics (MPE XL only) for I/O modules or devices generating catastrophic errors. Finally, the subsystem can control the normal I/O error logging process, allowing dynamic display of errors as they occur.

Each major hardware component or aspect of an HPPA system can be tested by a diagnostic. Each diagnostic is described separately in the following chapters. All of the Diagnostic/Utility chapters share the same format.

Introduction	Brief explanation of the purpose and nature of the diagnostic.
Defects and Enhancements	STARS Database product number for comments about the diagnostic.
Minimum Configuration	Necessary hardware and software to run the diagnostic.
Auto-Diagnostics	The sections that are automatically executed when the MPE XL system encounters a catastrophic error.
Operating Instructions	Information about how to start the diagnostic.
Default Tests	Lists the tests that are automatically executed if no test sections are specified in the **RUN** command.
RUN Command	Sample **RUN** command using the typical loaded system configuration described in this chapter.
Test Execution	What happens after the diagnostic is started.
Test Section Descriptions	What is being tested by each section of the diagnostic.
Commands	Commands available during the diagnostic (if any).
Error and Warning Messages	Lists all error and warning messages displayed by the diagnostic along with a probable cause and suggested action statements.

Sample Configuration

The following sample configuration is provided as a guide to typical device addresses. In most cases the user must specify the device address for the device to be tested. Refer back to this diagram when determining the device path portion of the RUN command parameters for each diagnostic. Alter the path to reflect the device address or system actually under test.



LG20085_001

Operating Requirements

In order to support the Online Diagnostic subsystem, an HPPA computer system must be up and running. User access to at least one functioning terminal is also required.

Online Diagnostic Subsystem Components

The Online Diagnostic subsystem is composed of the the Diagnostic User Interface (DUI) and the diagnostic programs which can be run using either the MPE XL or HP-UX operating system.

Diagnostic User Interface

The DUI provides the communication link between the user and the diagnostic system. The DUI provides such functions as sending messages to the user from diagnostic programs, and returning replies to the appropriate section(s) of the online diagnostic software.

Diagnostic Programs

The diagnostic programs are a comprehensive set of software to test the devices and components supported on the HP Precision Architecture computer family.

Diagnostic programs are divided into three groups: diagnostics and verifiers; utilities and tools; and system exercisers. Diagnostics are programs that can determine which field replaceable units (FRUs) are malfunctioning.

Verifiers cannot isolate defective FRUs, but can verify which functions of the device are operating properly. Verifiers can determine probable cause of device failures or aid the user in making such determinations. Some diagnostics and verifiers provide thorough tests of the internal I/O modules as well as complete functional tests and system type tests for peripheral devices.

Utilities and tools provide a means for obtaining system information or performing specific I/O operations. System exercisers provide a means of using (loading) a particular part of the system. These programs provide a way of using system resources under stress conditions that equal or exceed those expected under maximum load.

External excercisers are interactive programs provided for some diagnostics to provide the user with access to the set of internal diagnostics and utilities within a particular device (i.e., SS/80 disc).

Some diagnostics can only be invoked on systems using either the MPE XL or HP-UX operating system. The next sections describe the diagnostics available on MPE XL and HP-UX.

Available Diagnostics: MPE XL

The following diagnostic programs and utilities along with the Diagnostic User Interface (DUI) and any background processes are currently supported on the MPE XL operating system.

Diagnostics

- CS/80 Disc Diagnostic (CS80DIAG)
- HP7974A/7978 Magnetic Tape Drive Diagnostic (DIAG7478)
- Ciper Line Printer Diagnostic (CIPERLPD)
- Page Printer Diagnostic (PPDIAG)
- PSI Device Adapter Diagnostic (PSIDAD)
- CIO Channel Adapter Diagnostic (CADIAG)
- HP-IB Device Adapter Diagnostic (HPIBDIAG)
- Six-Port Mux Diagnostic (MUXDIAG)
- LAN Diagnostic (LANDAD)
- HP7479/80 Magnetic Tape Drive Diagnostic (REELDIAG)
- Fiber Link Device Adapter Diagnostic (HPFLDIAG)
- Flexible Disc Diagnostic (FLEXDIAG)

Subsystem Utilities

- System and Memory Log Analysis Tool (LOGTOOL)
- System Map (SYSMAP)
- Terminal Diagnostic System Monitor (TERMDSM)
- I/O Test Tool (IOTT)
- MPE XL Online Diagnostic Installer (DIAGINST)

Online Diagnostic Subsystem Operating Software

- Diagnostic User Interface (DUI)
- Diagnostic Monitor

More detailed information concerning MPE XL Online Diagnostic subsystem security can be found by referring to the MPE XL System Configuration manual (P/N 32650-90042).

Available Diagnostics: HP-UX

The following diagnostic programs and utilities along with the Diagnostic User Interface (DUI) and any background processes are currently supported on the HP-UX operating system.

Diagnostics

- CS80 Disc Diagnostic (CS80DIAG)
- HP7974A/7978 Magnetic Tape Drive Diagnostic (DIAG7478)
- Line Printer Diagnostic (CIPERLPD)
- HPIB Device Adapter Diagnostic (HPIBDIAG)
- Six-Port MUX Diagnostic (MUXDIAG)
- Memory Diagnostic (MEMDIAG)
- LAN Diagnostic (LANDAD)
- PSI Device Adapter Diagnostic (PSIDAD)
- AFI Device Adapter Diagnostic (AFIDAD)
- SS80 DISC Diagnostic (SS80DIAG)
- HP7479/80 Magnetic Tape Drive Diagnostic (REELDIAG)
- HP98720A Graphics Processor Diagnostic (GP3DDIAG)
- HP98556A Graphics Subsystem Diagnostic (GS2DDIAG)
- Fiber Link Device Adapter Diagnostic (HPFLDIAG)
- Flexible Disc Diagnostic (FLEXDIAG)

Subsystem Utilities

- HP-UX Logging Facility (DELOG, DECODE)

Online Diagnostic Subsystem Operating Software

- Diagnostic User Interface (DUI)

More detailed information concerning HP-UX Online Diagnostic subsystem security, the Online Diagnostic subsystem directory tree, Diagnostic special files, and DUI permissions may be found by referring to the HP-UX System Administrator's manual (P/N 92453-90004)

DUI Modes

The diagnostic system provides three modes of operation for each diagnostic program: disruptive mode, destructive mode, and normal mode. The diagnostic system determines the mode that each diagnostic program is allowed to run in by considering such things as the device being tested, whether the program is to be run in auto-diagnostic mode, and the user mode that the system is running in. When the diagnostic program requests access to a device, either at program initiation or at some other time, it is told which mode it is to run in via a device control procedure.

In general, the diagnostic is usually granted destructive mode unless the selected device is a system disc or exclusive access to the device cannot be obtained for the diagnostic. The diagnostic program must decide which tests can be run in the mode it was given.

Disruptive Mode	In disruptive mode, the program can run tests of a "disruptive" nature on the selected device. A disruptive test does not destroy any data on the device, but could cause errors for other users on the system. For example, the internal selftest on a system disc is disruptive, since the disc temporarily goes offline to perform the test, causing errors for others who try to access the disc at the same time.
Destructive Mode	In destructive mode, the program may run any test on the selected device. This mode is required for tests that have the potential for corrupting data on the device being tested. There are virtually no restrictions on tests run in this mode and, therefore, this mode is handled with extreme care by the diagnostic program. An example of a destructive test is one that reformats the media on a system disc, thus destroying all of the data on it.
Normal Mode	In normal mode, the diagnostic program cannot run any tests on the selected device that are potentially destructive or disruptive in nature.

User Modes

There are three user modes available: Single User Mode, Multi-User Mode (normal state), and Single Disc Mode.

Single User	Can be selected by a user with the required capability. The primary purpose of Single User Mode is for testing that may cause data integrity problems. Typically, it is used only in the event of a major problem with the system hardware.
Multi-User Mode	Can be selected by a user with the required capability.
Single Disc Mode	Is selectable only on system boot-up and is system specific.

Security

Four levels of security are available for users in the Online Diagnostic subsystem. Access to the various programs is restricted by security level. In addition, each program may restrict certain functionality to users of various security levels.

Level 0 The highest security; the user may install, remove, or update programs through a utility program and may do anything that a user at level 1 may do.

Level 1 The user may perform destructive tests, read or modify data on any device, may enter SUM or MUM modes, and do anything that a user at level 2 may do.

Level 2 The user may perform disruptive tests, but may not display or modify user data, and may do anything that a user at level 3 may do.

Level 3 The user may run non-disruptive tests only.

The following table lists the user capabilities required for each security level for both MPE XL and HP-UX implementations.

Security	MPE XL	HP-UX
Level 0	SM,DI	Superuser; Configurable
Level 1	SM,DI,OP	Configurable
Level 2	SM,DI,OP,AM	Configurable
Level 3	all others	Users not in /usr/diag/security

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Diagnostic User Interface

Introduction

The Diagnostic User Interface (DUI) provides access to all programs in the Online Diagnostic subsystem. Numerous commands are available to start, stop, and monitor the diagnostic programs. A HELP facility provides users with information on any of the DUI commands. The DUI has its own security checks which augment system security mechanisms to ensure system and data integrity. Since some diagnostic programs may destroy data, the DUI checks the user's capability and mode of access before granting diagnostic program usage. To execute some diagnostics, the user must have sole access to the system; this mode of operation is called Single User Mode (SUM). The DUI supports execution of multiple diagnostic programs from a single session. This implies that a user can access and run more than one program at a time. This capability allows the user to place a variable load on a device or system for test purposes.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10023.

Operating Instructions

To access the Online Diagnostic subsystem, enter the following command to the MPE XL system prompt:

```
SYSDIAG
```

To access the Online Diagnostic subsystem, enter the following command to the HP UX system prompt:

```
% /usr/diag/bin/sysdiag
```

The system will respond with the following header, message, and prompt:

```
*************************************************************
*****                                                   ***
*****              ONLINE DIAGNOSTIC SUBSYSTEM          ***
*****                                                   ***
*****       (C) Copyright Hewlett Packard Co. 1987      ***
*****                   All Rights Reserved.            ***
*****   DUI Version A.xx.yy   Monitor Version A.xx.yy   ***
*****                                                   ***
*************************************************************

Type "HELP" for assistance.

DUI >
```

No monitor version appears on HP-UX systems. In addition, on HP-UX systems, a positive integer will appear as part of the DUI prompt: "DUI 3>", for example. This number represents how many commands have been entered into the current DUI session. The user is now free to enter commands and data. All user input appears to the right of any system, subsystem, or diagnostic/utility program prompt. To exit the DUI, the user simply types **EXIT**.

Syntax

Command syntax is as follows:

- Commands and options may be reduced to the shortest sensible abbreviation or mnemonic.
- Delimiters for commands and options are spaces, and in some instances semicolons (MPE XL).
- The delimiter for items in a list is a comma.
- Upper and lower case command lines are equivalent.
- The user may be prompted for more information. If one of several responses are possible, those that are valid will be shown within parenthesis. The default answer will be indicated in square brackets. This response may be selected simply by typing Return. For example, if a user tries to exit while running a process, the following message will be displayed:

```
Do you wish to abort the currently running processes (Y/N) [N]?
```

Valid responses include "Y" and "N". Hitting the Return key selects the default response "N".

Continuation Lines

If the text of a command is too long to fit on one line, the user may use continuation lines to complete entry of the command. To accomplish this task, the user simply places an ampersand "&" character as the last character of the line. The DUI will then prompt the user for the remainder of the input with a double arrow DUI prompt. A command may consist of numerous continuation lines provided that the total length of the text entered does not exceed 255 characters. The following illustrates this:

```
DUI > run wizbang errcount=9&
DUI >> ldev=3 erronly
```

Comments

Command lines may include comments if desired. Comments are designated by braces "{ }" and may be embedded in a line anywhere whitespace is allowed. The following example illustrates the use of comments.

```
DUI >  list all     {This is a comment}
DUI > run exer2     {disc exerciser} pdev=8.0.0 {Joe's disc pack}
DUI > run tapediag {This is line 1's comment} &
DUI >> pdev=8.2.3  {Note the "&" above was recognized}
```

Input/Output Files

The DUI manipulates various input and output files which must meet specific criteria. All input files (USE files, TESTFILE = files, files used in input redirection) as well as all files created for output (TRACEFILE = files, redirected output and hardcopy files) will have the same characteristics. The input files may be created with any editor. Input and output files utilized by the DUI may reside in any directory area as long as the user has the appropriate capability to access them. The directory "path" may be specified for all files. If the file name provided for an output file already exists, it will NOT be overwritten, rather an error message will be printed.

The following table lists DUI differences for MPE XL and HP-UX:

Description	MPE XL	HP-UX
Maximum USE file nesting level	10	10
Maximum processes per DUI	10	System Dependent
User Interrupt Key	CTRL Y	CTRL C
Command (REDO) Stack depth	5	10
Input/Output Files	80 Char Records Unnumbered	Char string (80 max)
Directory "path"	file.group.acct	/dir/dir/ ... /file
Monitor Version	A.xx.yy	

User Interrupts

The effects of typing a user interrupt while in the DUI depends upon what action is taking place. Furthermore, the specific key (usually some control character) which is defined as the user interrupt may vary from system to system. (See above.) The various conditions and their effects on user interrupt execution are described below.

System Activity Before Interrupt	System Action After Interrupt
If doing nothing (no active processes or use file), an interrupt will:	Do nothing.
If executing a use file, an interrupt will:	Stop reading and close the use file (including any nested ones). Take no action in regard to any running or suspended processes.
If a program service interrupt is pending:	That process will be informed of the interrupt.
If a program is running in foreground (e.g."run cs80diag;pdev=8.0.0" without a background option) and has not requested to service an interrupt:	That process will be suspended.
If background processes are running, an interrupt will:	Do nothing.
If "WAIT" mode is active, an interrupt will:	Terminate the wait mode.

When an interrupt is detected, the above conditional rules are checked to determine what action should be taken. In all cases, a message is displayed on the terminal screen acknowledging the interrupt. The exception to this rule is when a program service interrupt is pending.

Command Summary

The following is a list and brief description of each of the commands available in the DUI. Some commands are system specific and appear at the end of this list.

Command Name	Description
ABORT	Terminates active diagnostic program or utility.
CI	Provides access to the operating system command interpreter.
EXIT/QUIT	Terminates the DUI and returns control to the operating system.
HARDCOPY	Causes all terminal input/output to be echoed to the system printer or designated disc file.
HELP	Accesses HELP facility for information about the DUI and its commands or for information about any of the diagnostic programs.
LIST	Provides information about any or all of the programs in the diagnostic system.
MODE	Displays and/or alters the current user access mode.
REDO	Displays (for command editing) and replays previous command.
RESUME	Resumes processing of a suspended program.
RUN	Loads and executes a specified program.
SHOWACTIVE	Lists programs which are currently active for the user.
SUSPEND	Suspends processing of a specified program.
USE	Causes commands and program input to be read from the indicated file.
WAIT	Causes DUI to wait for background processes to terminate.
INSTALL	Allows the user to install diagnostic programs. (HP-UX Only)
PURGE	Removes programs from the diagnostic library. (HP-UX Only)
TEST	Provides the ability to test a diagnostic program. (MPE XL Only)
UNLOCK	Releases specified device from lock status. (MPE XL Only)

Note

Installation, modification, and removal of online diagnostic programs on MPE XL systems is accomplished by using the MPE XL Online Installer facility. This program is part of the MPE XL Online Diagnostic subsystem utilities package. Refer to the Online Installer section of the *Online Diagnostics Subsystem Utilities Manual* (P/N 09740-90021) for details on how to use this program.

The following pages provide a detailed description of each of the available DUI commands. The description includes information about syntax, options available for each command, limitations of each command, and examples. These commands are applicable for both MPE XL and HP-UX unless otherwise stated.

ABORT

The ABORT command is used to abort a diagnostic program. Diagnostic programs that are either running in the background or suspended may be aborted with this command. If the process had a device allocated to it, the action to perform concerning the device was previously determined by the program being aborted. ABORT is intended to abort a process created by the current DUI. A list of those processes is available via the SHOWACTIVE command. With level 1 or level 0 security, the user may abort any process associated with the diagnostic system. To view these processes, use the SHOWACTIVE ALL command.

Syntax:

ABORT [<process_id> | MINE]

Optional Parameters:

<Process_id>	The process identification number of the process to abort (required only if more than one process is active).
MINE	Abort all processes run from this DUI.

Examples:

```
DUI > abort 23
   PROCESS ID 23 HAS BEEN TERMINATED (DUIWARN 602).
DUI >
```

CI

The CI command provides access to the operating system command interpreter or shell. The DUI is temporarily suspended. Any active processes created by the DUI are not affected by the CI command.

Syntax:

```
CI    [<command string>]
```

Optional Parameters:

`<command string>`	An optional command string which is passed to and executed by the CI. If this string is present, the CI terminates after executing the command.

Limitations

This command may not be available on all systems. The command string parameter may not be supported on all systems. If "by" or "hello" is typed while in the CI, the current session will be terminated. The DUI running under the session will also terminate.

Examples:

```
DUI >  ci
:     (operating system prompt)
:     Exit
DUI >
```

EXIT

EXIT causes DUI to terminate. If processes are active when EXIT is entered, the user is queried for permission to abort those processes. If the QUIET option has been specified, the processes are aborted without asking. The user cannot exit until all processes have terminated or aborted.

Syntax:

```
EXIT [QUIET]
```

Optional Parameters:

QUIET — This option causes any active programs to be aborted without asking for confirmation.

Examples:

```
DUI > run cs80diag back dev=dsk/c0d0 out=file sec=3
DUI > exit
    *** WARNING: CANNOT EXIT WHILE DIAGNOSTIC PROGRAMS ARE ACTIVE
DUI >
```

Otherwise:

```
DUI > exit
```

HARDCOPY

Turning **HARDCOPY** on causes all input and output to be displayed on the user's terminal screen and echoed to a line printer or designated disc file. When **HARDCOPY** is turned off, the file (or printer) is closed. If neither **ON** or **OFF** is specified, **OFF** is assumed. If the **FILE=** keyword is present along with a valid file name, all interaction is stored in the specified file. The hardcopy command will not accept fully qualified file names and is restricted to user logon group and account (MPE XL Only). The hardcopy command cannot be turned on multiple times with different files. Since this command only produces a copy of whatever is displayed on the user's terminal screen two special cases exist:

- Diagnostic program output that is redirected to a file via the **OUTFILE** option will not appear in the hardcopy output
- Output generated after a use file with the **QUIET** option specified will not appear in the hardcopy output.

Syntax:

```
HARDCOPY [[ON] [FILE = <filename>] | [OFF]]
```

Optional Parameters:

FILE= <file name> is any valid file.

Limitations:

In HP-UX, output from HP-UX commands executed through the CI command is not included in the hardcopy output. Diagnostic programs running in the background will not be affected by subsequent hardcopy commands. If HARDCOPY is on prior to running a program in the background, HARDCOPY will remain on for the entire execution of the program. Likewise, if HARDCOPY is off prior to running a program in the background, HARDCOPY will remain off for the entire execution off the program.

Examples:

```
DUI > hardcopy on
DUI >
```

HELP

HELP may be obtained for DUI commands or for any of the programs in the diagnostic system. The first and second sets of syntax formats show how to get help concerning the DUI commands. The third syntax format enables the user to obtain help for any program in the diagnostic system. If any options are present, they will cause the appropriate information to be printed. Typing HELP by itself causes a summary of the DUI and its commands to be printed.

Syntax:

```
HELP | ?

HELP <DUI command name> [SYNTAX]

HELP <program_name> [COMMANDS] [SECTIONS] [PARMS]
```

Optional Parameters:

<DUI command name>	Any DUI command.
<program name>	Any program in the diagnostic system.
SYNTAX	Causes only the command syntax to be printed.
COMMANDS	Summary of any interactive commands.
SECTIONS	Explains the use of sections and steps.
PARMS	Explains the use of any RUN command options.

INSTALL

This command will install or update programs in the diagnostic system. A program name must always be specified with the install command. If the program is already installed, the DUI will update the information regarding the program but will not modify the user customizable parameters (i.e. mode and security). The available options are summarized below.

Syntax:

```
INSTALL   <program_name>
                                [ SECURITY = <level> ]
                                [ MUM | SUM ]
```

Optional Parameters:

SECURITY	Changes the minimum security level needed to run the program. Legal values are 0, 1, 2, or 3.
MUM	Changes the system mode for this program to MUM. MUM programs can run in either single or multi- user modes.
SUM	Changes the system mode for this program to SUM. SUM programs can only be run in the single-user mode.

Limitations:

This command is implemented only on HP-UX systems and requires security level 0.

Example:

```
DUI >  install  cs80diag
DUI >   list all
```

{OR}

```
DUI >  install  cs80diag  sec=1
DUI >   list all
```

LIST

This command prints out information about a specific program or about all of the software in the diagnostic system. Options include ALL, PRODUCT and TYPE.

Syntax:

```
LIST [<program_name>] [ALL]

LIST [PRODUCT=<product_name> |
          TYPE= DIAGNOSTIC | EXERCISER | VERIFIER | UTILITY] | [ALL]
```

Optional Parameters:

```
ALL                      Provides detailed information about the program.

PRODUCT=<product_name>   List programs which may be run with the indicated product name.

TYPE= DIAGNOSTIC |       List all diagnostics.
      EXERCISER |        List all exercisers.
      VERIFIER |         List all verifiers.
      UTILITY            List all utilities.
```

Examples:

```
DUI >   list

CS80DIAG  DIAG7478

DUI >  list all

Program  Program  Prog          Auto   SUM
Name     Version  Type   Level  Diag   MOD    Diagnosable Products
-------  -------- ----   -----  ----   ----   --------------------------
CS80DIAG  A0.01   DIAG     2     YES    NO     HP7908    HP7912    HP7914
                                               HP7933    HP7935

DIAG7478  A0.01   DIAG     2     YES    NO     HP7974    HP7978
```

An asterisk "*" in front of the product name indicates that the device is Autodiagnosable by the corresponding diagnostic program. Use this table to interpret the above example:

```
PROG Type      -  Program class
                    DIAG = Diagnostic
                    EXER = Exerciser
                    UTIL = Utility
                    VERIF = Verifier

Level          -  Security Level (0-3), zero is the highest.
Auto Diag      -  Is this an auto-diagnostic program?
SUM MOD        -  Module must execute in single user mode
```

```
DUI >   list product=hp7935 all

Program  Program  Prog          Auto   SUM
Name     Version  Type   Level  Diag   MOD    Diagnosable Products
-------  -------- ----   -----  ----   ----   --------------------------
CS80DIAG  A0.01   DIAG     2     YES    NO     HP7908    HP7912    HP7914
                                               HP7933    HP7935
```

MODE

This command displays and/or alters the current operating mode of the diagnostic system. There are two modes available: Single User and Multi-User. The primary use of the single user mode is for testing that may cause destruction or disruption of data. Typically, single user mode is used only in the event of a major system hardware problem. Single disc mode is selectable only at startup and is not accessible through this command.

Syntax:

`MODE [SUM | MUM]`

Optional Parameters:

`SUM`	Causes the system to enter Single User Mode if it is not already in that state. If the user has the capability to perform this command, the diagnostic system does the following logs off all users on the system except the diagnostic user who typed `SUM`.
`MUM`	Causes the diagnostic system to enter Multi-User Mode if it is not already in that state.

Limitations:

The user must have level 0 security to execute environment changes. On HP-UX systems SUM will affect only those programs initiated from the SUM DUI session.

Examples:

```
UI >  mode
   Single User (SUM)

DUI >  mode mum
    Multi User (MUM)

DUI >
```

PURGE

This command removes programs from the diagnostic system.

Syntax:

```
PURGE <program_name>
```

Limitations:

This command is implemented only on HP-UX systems and requires security level 0.

Example:

```
DUI >   list
CS80DIAG
DUI >  purge  cs80diag
DUI >   list
```

REDO

The REDO command allows the user to view, edit, and execute the last few lines of input entered to the DUI. The valid edit characters are:

i/I	Text following this character is inserted at the location just before the location of the I and after the location of the D edit character.
r/R	Text following this character overlays existing text starting at the location of the R and after the location of the D edit character.
d/D	Each D causes the corresponding character to be deleted.

Typing Return without any edit commands prints the edited line and causes the DUI to execute it.

Syntax:

```
REDO  [? | <command number>]
```

Optional Parameters:

?	Displays the last n commands (n is system dependent).
<command number>	Edits the indicated command.

Simply typing REDO enables the user to edit the most recent command.

Limitations:

The resultant string may not be greater than 255 characters. The number of commands stored in the history stack may vary from system to system.

Examples:

```
DUI >  run cs80diag;dev=8.0.0;background;outfile=out1

     *** UNRECOGNIZED TOKEN OR UNEXPECTED CHARACTERS  (DUIERR 510)

DUI >  mode
Multi User (MUM)
DUI >  redo ?
23   list all
24   showactive all
25   help
26   run cs80diag;dev=8.0.0;background;outfile=out1
27   mode

DUI >  redo 26
    >run cs80diag;dev=8.0.0;background;outfile=out1
    >             ipa
    >run cs80diag;padev=8.0.0;background;outfile=out1
    >              d
    >run cs80diag;pdev=8.0.0;background;outfile=out1
CS80DIAG (PIN 48) running in background.
DUI >
```

RESUME

The RESUME command is used to resume a program that has been suspended. The diagnostic program will resume execution from the point at which it was suspended. A diagnostic program can be suspended in three ways:

- via a user command or due to some internal programatic event or condition
- a foreground program can be suspended by typing the user interrupt character
- a background program can be suspended with the SUSPEND command. If more than one foreground program is suspended, the "RESUME MINE" command will produce an error.

Syntax:

```
RESUME [<process_id> | MINE ]
```

Optional Parameters:

<process_id>	The identification number of the process to resume.
MINE	Resume all processes run from this DUI session.

Limitations:

The "MINE" option may not be implemented on all systems.

Examples:

In the following example, an executing CS80DIAG program is suspended and then resumed.

```
CS80DIAG>  suspend
DUI >  resume
CS80DIAG>
```

The following example shows how to suspend and resume a non-interactive process.

```
DUI >  run DIAG7478;pdev=8.2.3;background
DIAG7478 (PIN 65) running in background
DUI >  suspend 65
DUI >  resume 65
```

RUN

The **RUN** command is used to start execution of a program. A number of options are available to perform a variety of functions while executing a diagnostic program. These options are described below. A program name must always be specified. Diagnostic programs are organized by sections and steps to effectively diagnose devices as well as provide consistency across all diagnostic programs. A diagnostic section is a particular test sequence within a diagnostic. A diagnostic step is a particular phase of a diagnostic section sequence. Sections and steps will be executed in ascending numerical order, regardless of the order in which they are specified. When no sections or steps are specified the default sections and steps are run. Default sections and steps are diagnostic program specific. When selecting options only one of the LDEV, PDEV, or DEVFILE options may be chosen.

Syntax:

```
RUN <program_name>
                [ERRCOUNT= <integer>]
                [LOOPCOUNT= <integer>]
                [ERRONLY]
                [ERRPAUSE]
                [SECTIONS= <section_range_list>]
                [STEPS= <steps_range_list>]
                [LDEV= <ldev_specifier> |
                 PDEV= <pdev_specifier> | DEVFILE = <file-path> ]
                [AUTORESTART]
                [BACKGROUND]
                [INFILE= <filename>]
                [OUTFILE= <filename>]
                [MAXRESTARTS= <# of restarts>]
                [RESTARTTIME= <# of minutes>]
                [TRACE = ALL | LIBRARY | PROGRAM ]
                [TRACEFILE = <filename>]
                [TESTFILE = <filename>]
```

Optional Parameters:

ERRCOUNT=	<integer> Number of errors to tolerate before the program terminates. The default is to allow an unlimited number of errors.
LOOPCOUNT=	<integer> Number of iterations for the program to execute its sections and steps. The default is one.
ERRONLY	Causes program to be run in **error only** mode, in which only error messages are printed. The default is off.
ERRPAUSE	Causes program to be run in **error pause** mode. The program pauses after each error and obtains confirmation to continue. The default is off.
LDEV=	<ldev_ specifier> Logical number of device under test in MPE XL.
PDEV=	<pdev_ specifier> Physical path of the device to test in MPE XL.
DEVFILE=	<devfile> Logical name of device under test in HP-UX.

SECTIONS=	<section_ range_ list> Sections to execute. A single section can be selected or several sections can be selected to be executed.
	Example: `sectionS= 1/4, 8, 20, 50/55`
STEPS=	<steps_ range_ list>A single step can be selected or several stepscan be selected to be executed.
	Example: `STEPS= 8/20, 31, 33, 100/120`
AUTORESTART	Causes the program to restart itself and prompts for new runtime options. The options that are valid for a restart are SECTIONS, STEPS, ERRCOUNT, LOOPCOUNT, ERRONLY, and ERRPAUSE. No other options are allowed. The command is echoed equivalent to redo with the above options.
BACKGROUND	Causes the program to be run in the background. The WAIT command is provided to wait for background processes to terminate. The BACKGROUND command cannot be used with the AUTORESTART command.
INFILE=	<input file> Name of the file from which to obtain program input data. Input data may be redirected through the use of this command.
OUTFILE=	<output file>Name of the file where program output is sent. Output may be redirected through the use of this command. An error message is displayed if the file specified already exists.
MAXRESTARTS=	<# of restarts> The maximum number of times to restart the indicated process. The default value is 0.
RESTARTTIME=	<# of minutes> The number of minutes to wait between repeat execution of the indicated process. The default value is 60. Physical path of the device to test.
TRACE=	ALL | LIBRARY | PROGRAM The Trace option supports the following functions respectively: All= trace program and library routines; LIBRARY= trace library routines only; PROGRAM= trace program routines only.
TRACEFILE=	<filename> This filename designates the destination for all information generated by the TRACE option. If no name is specified this destination will be the terminal screen display.
TESTFILE=	<filename> This filename designates the input file which contains test system commands.

Limitations:

On MPE XL, if output is generated by a background process, it will be displayed as it is received by the DUI, but will not overide the reading of commands. This implies that any output received at a particular time is displayed after a carriage return has been entered either by itself or following a command.

Examples:

```
DUI > run DIAG7478 errcount=5 errpause pdev=8.2.3 loop=10
```

SHOWACTIVE

The SHOWACTIVE command prints information concerning current software processes running under the diagnostic system. If no options are specified, this command prints a table of programs that were run by the current DUI process. The ALL option allows the display of diagnostic programs run by all DUI processes or other diagnostic processes.

Syntax:

SHOWACTIVE [ALL] [DETAIL]

Optional Parameters:

ALL Causes information for all programs in the diagnostic system to be displayed.

DETAIL Causes all internal information about all diagnostic processes to be displayed.

Limitations:

The ALL and DETAIL options are implemented only on MPE XL systems.

Examples:

In the following example, the CS80DIAG program is initially active and DIAG7478 was previously started in background mode.

```
CS80DIAG>suspend
    CS80DIAG suspended - [Type RESUME to continue]
DUI >  showactive

Program   Process            Logical OR @Physical
Name      ID#        State   Device
-------   --------   -----   --------------------
CS80DIAG  48         SUS     5
DIAG7478  46         BAK     1

DUI >
```

In the previous example:

State = The state of the process
- BAK = Active background
- ACT = Active foreground
- SUS = Suspended

A device preceded by an * indicates a PDEV.

```
DUI > showactive all

Program  Process   State  Job/    Device   Req    Logical OR @Physical
Name     ID#              Sess#   State    by     Device
-------------------------------------------------------------------------
*DIAG7478   46       ACT    S4    UNLOCK   USER   1
*CS80DIAG   48       ACT    S4    LOCKED   USER   @8.1.1
 CIPERLPD   42       ACT    S5    UNLOCK   USER   4
-------------------------------------------------------------------------
DUI >
```

In the previous example:

State = The process management state of the running program
- ACT = Active process
- SUS = Suspended process

Job/Sess# = Job or Session number "owning" the process

Device State = What is the state of the device
- UNLOCK = Unlocked
- LOCKED = locked for testing
- MALFUNC = Malfunction Lock (broken)
- NA = Does Not Apply

Req By = Who started this process
- USER = A DUI
- PROG = A running diagnostic program
- MON = Diagnostic Monitor
- LLIO = Low Level I/O (auto-diagnostics)

A program name preceded by an * indicates that it was run from this DUI. A device preceded by an * indicates a PDEV.

SHOWACTIVE ALL displays all current diagnostic system activity across all DUI sessions. **SHOWACTIVE** displays activity present under the current DUI session. Because of this, **SHOWACTIVE** and **SHOWACTIVE ALL** output may not appear consistent. For example:

```
DUI > run logtool
LOGTOOL > suspend
DUI > showactive

 Program  Process    St/ Logical or @Physical
 Name     ID #       ate Device
 -------- ---------- --- --------------------
 LOGTOOL  37         SUS
```

The LOGTOOL process is suspended at this point. It is waiting for a resume command from the DUI to continue execution.

```
Program  Process     St- Job/    Device  Req  Logical or @Physical
Name     ID #        ate Sess#  State   by   Device
-------- ----------  --- ------- ------- ---- --------------------
memlogp  18          ACT         N/A     MON
logger   20          ACT         N/A     MON
*logtool 37          ACT S14     UNLOCK  USER
```

The asterisk "*" shows that the LOGTOOL process belongs to the current DUI session and indicates that it has not been suspended by process management. In the following example the SHOWACTIVE DETAIL option is used to display detailed information about a current IOTT process.

```
DUI >  showactive detail

 Program  Process     St- Job/    Device  Req  Logical OR @Physical
 Name     ID #        ate Sess#  State   by   Device
 -------- ----------  --- ------- ------- ---- --------------------
 *IOTT    23          ACT sx      UNLOCK  USER
Requestor IPC Port ID: -169       Subqueue #: 5
Processes IPC Port ID: -178       Subqueue #: 0
Procedure ID: 38 Iteration #:3

I/O Port ID: 0       Subqueue #: 0
Power On ID: 0
Mode:  Multi User (MUM)              System Spooler Info: $0
Launcher Pin: 22
When program terminates mark device as: Not Defined
When program terminates: Not Defined
--------------------------------------------------------------------------------
DUI >
```

Where:

State = The process management state of the running program
- ACT = Active process
- SUS = Suspended process

Job/Sess# = Job or Session number "owning" the process

Device State = What is the state of the device
- UNLOCK = Unlocked
- LOCKED = locked for testing
- MALFUNC = Malfunction Lock (broken)
- NA = Does Not Apply

Req By = Who started this process
- USER = A DUI
- PROG = A running diagnostic program
- MON = Diagnostic Monitor
- LLIO = Low Level I/O (auto-diagnostics)

A program name preceded by an "*" indicates that it was run from this DUI. A device preceded by an "*" indicates a PDEV.

SUSPEND

The SUSPEND command is used to temporarily halt a diagnostic program or utility that is running in the background. The RESUME command can be used to restart the program the point at which it was stopped. Executing this command has no effect on a device locked by a suspended process. SUSPEND is intended to suspend a process created by the current DUI. A list of those processes is available via the SHOWACTIVE command.

Syntax:

```
SUSPEND [<process_id> | MINE ]
```

Optional Parameters:

<Process_id>	The identification number of the process to be suspended.
MINE	Suspend all active processes associated with THIS DUI.

Limitations:

Only processes "owned" by the current DUI may be suspended. The MINE option may not be implemented on all systems.

Examples:

```
DUI > suspend 43
DUI
```

TEST

The TEST command allows users to test diagnostic programs that have been designed to use the Online Diagnostic test package. If no test numbers are given, all tests in the specified file will be run. If the LDEV or PDEV parameters are present, the LDEV/PDEV specified will be used for all run commands encountered in the test file.

Syntax:

```
TEST [<test_range_list>] FILE=<filename>
        [LDEV=<ldev_specifier> | PDEV=<pdev_specifier>]
        [QUIET]
```

Optional Parameters:

`<test_range_list>`	Lists of test numbers to run. If none are specified, all tests in the file will be performed.
`<test_range_list>`	= <test_ range> | <test_ range>, <test_ range_ list>
`<test_range>`	= <test_ number> | <test_ number> / <test_ number>
`<test_number>`	Example: 8/20, 31, 33, 100/120 &= 1.... ... 255
`FILE =`	<filename> Name of the test file.
`LDEV =`	<ldev_ specifier> Logical name of the device to use for all RUN commands encountered in the test file. (Not valid with PDEV.)
`PDEV =`	<pdev_ specifier> Physical name of the device to use for all RUN commands encountered in the test file (Not valid with LDEV.)
`QUIET`	Causes supression of input/output screen display. (Also affects hardcopy.)

Limitations:

This command is only implemented in MPE XL and requires level 1 security or higher to execute.

```
DUI > test 24 file=tcs80
DUI > RUN CS80DIAG LDEV=3 SEC=1,4 TESTFILE=TCS80 TRACE=ALL OUTF=OUT1
DUI > *** END OF USE FILE "TCS80" (DUIWARN 618)
DUI >
```

UNLOCK

The UNLOCK command unlocks a malfunctioning device that has been "hung" (not simply locked for testing) by a diagnostic program or the I/O system.

Syntax:

```
UNLOCK LDEV=<LDEV_Specifier> | PDEV=<PDEV_Specifier>
```

Optional Parameters:

LDEV=	<ldev_ specifier> Logical number of the device to unlock. Not valid with PDEV.
PDEV=	<pdev_ specifier> Physical path of the device to unlock. Not valid with LDEV.

Limitations:

This command is implemented only on MPE XL systems. The user must have level 2 security or higher.

Examples:

```
DUI > unlock pdev=1.3.4
```

USE

The USE command causes DUI commands and program input to be read from the indicated file. Input and output are echoed to the screen, and printer if hardcopy was turned on; unless the QUIET option is supplied. Use files may be nested. If excessive nesting is attempted, a warning message is displayed and the use file processing is continued. Entering a user interrupt while executing a use file will terminate the use file. Neither DUI nor program errors effect the processing of a use file.

Syntax:

USE <file_name> [QUIET]

Optional Parameters:

<file_name>	The name of the file that contains the DUI program input.
QUIET	Causes the input and output to not appear on the screen and disables the printer output.

Limitations:

The nesting limit is implementation dependent. Diagnostic program input cannot be read from the use file on HP-UX systems. (See the INFILE option of the RUN command.)

Examples:

```
DUI > use myfile

      {commands that are read and executed from "myfile"}

DUI > *** END OF USEFILE "MYFILE"
DUI >
```

WAIT

The `WAIT` command causes the DUI to wait for background processes to terminate. When all background programs have either terminated or been suspended, this command returns the user to the DUI prompt. The user interrupt character can also be used to return the user to the DUI prompt.

Syntax:

`WAIT`

Examples:

```
DUI > wait
      <DUI prints messages only from background processes>
```

System Console Messages (MPE XL Only)

The DUI will display non-error messages to the system console whenever the diagnostic system is logically removing a system device or returning it. The possible messages are:

```
Diag monitor removed from system use ldev xx. or pdev x.y.z.

Diag monitor returned to system use ldev xx. or pdev x.y.z.

Diag monitor suspended spooling for ldev xx. or pdev x.y.z.

Diag monitor stopped spooling for ldev xx. or pdev x.y.z.

Diag monitor started spooling for ldev xx. or pdev x.y.z.
```

System Error Messages (MPE XL Only)

System error messages appear on the system console when a catastrophic error is detected by the I/O system and the monitor attempts to execute a diagnostic for more information. The possible messages are:

```
Hard error detected by the I/O system on pdev x.y.z. or ldev xx.

Diagnostic launched by the diagnostic monitor for pdev x.y.z or ldev xx.

Diagnostic program does not exist for pdev x.y.z or ldev xx.

No message port for the diagnostic monitor logging process.

Diag monitor unable to log I/O event for pdev x.y.z. or ldev xx.

Diag monitor returning operational device for pdev x.y.z. or ldev xx.

Diag monitor removing defective device for pdev x.y.z. or ldev xx.

Diag monitor cannot get device info (path and prod. name)

Diag monitor locked/unlocked I/O manager for pdev x.y.z or ldev xx.

Internal diagnostic started by the monitor.

Loopback data error detected.  Data path is questionable.

Selftest error detected.  Device is defective.
```

The PDEV described in the above messages pertains to the physical path where the device or program resides on the system.

MPE XL Warning Messages

The following is a list of warning messages which may appear when using the DUI under the MPE XL operating system. Other diagnostic warning or error messages may appear at any time. Those messages without the (DUIWARN #) trailer are generated by the Online Diagnostic subsystem or the operating system. Listed below each error message are a probable cause and recommended action statement. The actual cause and action may differ from this list depending upon the particular circumstances of a given situation. The "!" indicates that a parameter of some sort will replace the exclamation point when the message is displayed.

601	**! (PIN) HAS JUST TERMINATED ABNORMALLY. (DUIWARN 601)**
CAUSE	
ACTION	
602	**PROCESS ID ! HAS BEEN TERMINATED. (DUIWARN 602)**
CAUSE	
ACTION	
603	**HARDCOPY FILE "!" IS FULL - HARD COPY TURNED OFF. (DUIWARN 603)**
CAUSE	
ACTION	
604	**SINGLE USER MODE HAS BEEN SET OUTSIDE OF THE DIAGNOSTIC SYSTEM ENFORCEMENT OF THE ENVIRONMENT IS NOT GUARANTEED. (DUIWARN 604)**
CAUSE	
ACTION	
605	**INPUT HAS BEEN TRUNCATED TO ! CHARACTERS. (DUIWARN 605)**
CAUSE	
ACTION	
606	**MSG# ! SET# ! HAS BEEN TRUNCATED TO ! CHARACTERS. (DUIWARN 606)**
CAUSE	
ACTION	

607	YOU ARE ALREADY IN THAT MODE. (DUIWARN 607)
CAUSE	
ACTION	
608	NO MODULES ARE CURRENTLY ACTIVE. (DUIWARN 608)
CAUSE	
ACTION	
610	PROCESS ID ! COULD NOT BE TERMINATED. (DUIWARN 610)
CAUSE	
ACTION	
611	MEM/SUM IS NOT AVAILABLE ON THIS SYSTEM. (DUIWARN 611)
CAUSE	
ACTION	
612	THAT COMMAND IS NOT YET IMPLEMENTED - SORRY. (DUIWARN 612)
CAUSE	
ACTION	
616	END OF USE FILE "!". (DUIWARN 616)
CAUSE	
ACTION	
618	! (PIN) TERMINATED [NOT YOUR PROCESS]. (DUIWARN 618)
CAUSE	
ACTION	
619	END OF CURRENT TEST. (DUIWARN 619)
CAUSE	
ACTION	

620	**DIAGNOSTIC LOG FILE IS !% FULL. (DUIWARN 620)**
CAUSE	
ACTION	
621	**SPECIFIED DEVICE IS A !. (DUIWARN 621)**
CAUSE	
ACTION	
623	**PIN ! IS BEING SUSPENDED BY THE DUI. (DUIWARN 623)**
CAUSE	
ACTION	
624	**CANNOT DISABLE SYSTEM BREAK. (DUIWARN 624)**
CAUSE	
ACTION	
625	**! IS FOR DISC DIAGNOSTIC. (DUIWARN 625)**
CAUSE	
ACTION	
626	**! IS FOR TAPE DIAGNOSTIC. (DUIWARN 626)**
CAUSE	
ACTION	
627	**! IS FOR TERMINAL DIAGNOSTIC. (DUIWARN 627)**
CAUSE	
ACTION	
628	**! IS FOR LINE PRINTER DIAGNOSTIC. (DUIWARN 628)**
CAUSE	
ACTION	

629	! IS FOR PLOTTER DIAGNOSTIC. (DUIWARN 629)
CAUSE	
ACTION	
630	! IS FOR HPCIO_CA DIAGNOSTIC. (DUIWARN 630)
CAUSE	
ACTION	
631	! IS FOR HPIB_DA DIAGNOSTIC. (DUIWARN 631)
CAUSE	
ACTION	
632	! IS FOR BUS CONVERTER DIAGNOSTIC. (DUIWARN 632)
CAUSE	
ACTION	
633	! IS FOR PAGE PRINTER DIAGNOSTIC. (DUIWARN 633)
CAUSE	
ACTION	
634	! IS FOR DATA TERMINAL CONCENTRATOR DIAGNOSTIC. (DUIWARN 634)
CAUSE	
ACTION	
635	! IS FOR ALINK_DA DIAGNOSTIC. (DUIWARN 635)
CAUSE	
ACTION	
636	! IS FOR LAN DIAGNOSTIC. (DUIWARN 636)
CAUSE	
ACTION	

637 ! IS FOR TERMINAL MUX DIAGNOSTIC. (DUIWARN 637)

CAUSE

ACTION

---

638 ! IS NOT IN OUR CONFIGURATION TABLE. (DUIWARN 638)

CAUSE

ACTION

---

639 ! THIS COMMAND IS FOR INTERNAL USE ONLY. (DUIWARN 639)

CAUSE

ACTION

MPE XL Error Messages

The following is a list of error messages which may appear when using the DUI under the MPE XL operating system. Other diagnostic error messages may appear at any time. Error messages without the (DUIERR #) trailer are generated by the Online Diagnostic subsystem or the operating system. Listed below each error message are a probable cause and recommended action statement. The actual cause and action may differ from this list depending upon the particular circumstances of a given situation. The "!" indicates that a parameter of some sort will replace the exclamation point when the message is displayed.

201 RECEIVED AN IPC MSG WE COULD NOT DECODE - IGNORED. (DUIERR 201)
CAUSE
ACTION

202 COULD NOT RESUME PROCESS ID !. (DUIERR 202)
CAUSE
ACTION

203 CANNOT SUSPEND PROCESS ID !. (DUIERR 203)
CAUSE
ACTION

204 INSUFFICIENT SECURITY LEVEL TO PERFORM THIS FUNCTION. (DUIERR 204)
CAUSE
ACTION

205 ENVIRONMENT CHANGE NOT ALLOWED - MODULES ARE ACTIVE. (DUIERR 205)
CAUSE
ACTION

206 ERROR CLOSING FILE "!". (DUIERR 206)
CAUSE
ACTION

207	**ERROR CLOSING THE SYSTEM LINE PRINTER. (DUIERR 207)**
CAUSE	
ACTION	

208	**ERROR COPYING RECORD# ! FROM "!". (DUIERR 208)**
CAUSE	
ACTION	

209	**ERROR COPYING RECORD# ! TO "!". (DUIERR 209)**
CAUSE	
ACTION	

210	**DEVICE ! IS ALREADY IN USE. (DUIERR 210)**
CAUSE	
ACTION	

211	**LDEV/PDEV SPECIFIER IS REQUIRED TO RUN THIS MODULE. (DUIERR 211)**
CAUSE	
ACTION	

212	**ERROR READING RECORD ! FROM DIAG DIRECTORY. (DUIERR 212)**
CAUSE	
ACTION	

213	**"!" EXISTS ALREADY - CAN'T BE AN OUTPUT FILE. (DUIERR 213)**
CAUSE	
ACTION	

214	**THERE ARE ! MODULES STILL ACTIVE - CAN'T EXIT. (DUIERR 214)**
CAUSE	
ACTION	

215	COULD NOT READ FROM SET# ! MSG# !. (DUIERR 215)
CAUSE	
ACTION	

216	"!" DOES NOT EXIST. (DUIERR 216)
CAUSE	
ACTION	

217	HARDCOPY MODE IS ALREADY TURNED OFF. (DUIERR 217)
CAUSE	
ACTION	

218	HARDCOPY MODE IS ALREADY TURNED ON. (DUIERR 218)
CAUSE	
ACTION	

219	FOUND PROGRAM MSG WITH UNKNOWN FUNCTION ! - IGNORED. (DUIERR 219)
CAUSE	
ACTION	

220	PROCESS ID ! IS ALREADY ACTIVE - CAN'T RESUME IT. (DUIERR 220)
CAUSE	
ACTION	

221	PROCESS ID ! IS ALREADY SUSPENDED. (DUIERR 221)
CAUSE	
ACTION	

222 CAN NOT DUMP THE DIAGNOSTIC PROCESS TABLE. (DUIERR 222)
CAUSE
ACTION

---

223 NO MODULES FOR "!" COULD BE LOCATED. (DUIERR 223)
CAUSE
ACTION

---

224 THERE ARE NO ACTIVE PROCESSES ACTIVE TO ABORT. (DUIERR 224)
CAUSE
ACTION

---

225 THERE ARE NO SUSPENDED PROCESSES TO RESUME. (DUIERR 225)
CAUSE
ACTION

---

226 THERE ARE NO ACTIVE PROCESSES TO SUSPEND. (DUIERR 226)
CAUSE
ACTION

---

227 PROCESS ID ! IS UNKNOWN BY THIS DUI (ITS NOT YOURS). (DUIERR 227)
CAUSE
ACTION

---

228 ERROR WHILE OPENING "!". (DUIERR 228)
CAUSE
ACTION

---

229 ERROR WHILE OPENING THE SYSTEM LINE PRINTER. (DUIERR 229)
CAUSE
ACTION

---

230 ! PROCESSES ARE RUNNING - NO MORE MAY BE LAUNCHED. (DUIERR 230)
CAUSE
ACTION

231	ERROR IN PROGRAM SERVICE IN PROCEDURE !. (DUIERR 231)
CAUSE	
ACTION	
232	ERROR WRITING TO FILE "!". (DUIERR 232)
CAUSE	
ACTION	
233	COULD NOT RUN "!". (DUIERR 233)
CAUSE	
ACTION	
234	DISPLAYLOG COULD NOT BE TURNED ON. (DUIERR 234)
CAUSE	
ACTION	
235	USE FILE NESTING OVERFLOW - "!" NOT 'USED'. (DUIERR 235)
CAUSE	
ACTION	
236	FOUND UNEXPECTED MSG TYPE !. (DUIERR 236)
CAUSE	
ACTION	
237	RECEIVED MSG FROM UNKNOWN IPC PORT !. (DUIERR 237)
CAUSE	
ACTION	
238	ERROR WRITING TO FILE "!". (DUIERR 238)
CAUSE	
ACTION	

239	ERROR WRITING TO SYSTEM LINE PRINTER. (DUIERR 239)
CAUSE	
ACTION	

240	YOU MUST BE IN SINGLE USER MODE TO RUN THIS MODULE. (DUIERR 240)
CAUSE	
ACTION	

241	SYSTEM SERVICE FAILURE DETECTED. (DUIERR 241)
CAUSE	
ACTION	

242	COULD NOT (RE/) ENABLE USER INTERRUPTS. (DUIERR 242)
CAUSE	
ACTION	

243	NOTHING TO "WAIT" FOR. (DUIERR 243)
CAUSE	
ACTION	

244	COULD NOT START THE CI. (DUIERR 244)
CAUSE	
ACTION	

245	COULD NOT UNLOCK DEVICE !. (DUIERR 245)
CAUSE	
ACTION	

246	NESTING OF "TEST" COMMANDS IN USE FILES IS INVALID. (DUIERR 246)
CAUSE	
ACTION	

247 FAILS TO RETRIEVE I/O INFORMATION WITH SPECIFIED LDEV. (DUIERR 247)
CAUSE
ACTION

---

248 FAILS TO RETRIEVE I/O INFORMATION WITH SPECIFIED PDEV. (DUIERR 248)
CAUSE
ACTION

---

249 FILE ! DOES NOT EXIST. (DUIERR 249)
CAUSE
ACTION

---

250 INVALID FILE REFERENCE NUMBER. (DUIERR 250)
CAUSE
ACTION

---

251 FILE ! TO BE ACCESSED IS CURRENTLY LOCKED. (DUIERR 251)
CAUSE
ACTION

---

252 SECURITY VIOLATION. (DUIERR 252)
CAUSE
ACTION

---

253 SYSTEM DEPENDENT ERROR ENCOUNTERED. (DUIERR 253)
CAUSE
ACTION

---

254 INVALID FILE NAME !. (DUIERR 254)
CAUSE
ACTION

255	**INVALID TEST FILE NAME !. (DUIERR 255)**
CAUSE	
ACTION	
256	**BOTH AUTO RESTART AND BACKGROUND OPTIONS HAVE BEEN SPECIFIED &. (DUIERR 256)**
CAUSE	
ACTION	
257	**SYNTAX ERROR ENCOUNTERED IN THE INPUT STRING. (DUIERR 257)**
CAUSE	
ACTION	
501	**OPTION ALREADY GIVEN OR CONFLICTS WITH ANOTHER. (DUIERR 501)**
CAUSE	
ACTION	
502	**KEYWORD IS INVALID FOR THIS COMMAND. (DUIERR 502)**
CAUSE	
ACTION	
503	**OPTION IS INVALID FOR THIS COMMAND. (DUIERR 503)**
CAUSE	
ACTION	
504	**INVALID PROCESS ID. (DUIERR 504)**
CAUSE	
ACTION	
505	**INVALID RANGE - ENDING VALUE < THAN STARTING VALUE. (DUIERR 505)**
CAUSE	
ACTION	

506 VALUE MUST BE BETWEEN ! AND !. (DUIERR 506)

CAUSE

ACTION

---

507 THIS KEYWORD HAS ALREADY BEEN SPECIFIED. (DUIERR 507)

CAUSE

ACTION

---

508 EXPECTED TYPE SPECIFIER "DIAG/EXER/UTIL/VERIFIER". (DUIERR 508)

CAUSE

ACTION

---

509 COMMAND EXPECTED - TYPE "HELP" FOR ASSISTANCE. (DUIERR 509)

CAUSE

ACTION

---

510 UNRECOGNIZED TOKEN OR UNEXPECTED CHARACTERS. (DUIERR 510)

CAUSE

ACTION

---

511 "TYPE=" AND "PROD=" ARE INVALID TOGETHER. (DUIERR 511)

CAUSE

ACTION

---

512 DUI COMMAND NAME EXPECTED. (DUIERR 512)

CAUSE

ACTION

---

513 FILE NAME EXPECTED. (DUIERR 513)

CAUSE

ACTION

---

514 LDEV SPECIFICATION EXPECTED. (DUIERR 514)
CAUSE
ACTION

515 MODULE NAME EXPECTED HERE. (DUIERR 515)
CAUSE
ACTION

516 NUMERIC PARAMETER EXPECTED HERE. (DUIERR 516)
CAUSE
ACTION

517 "ON" OR "OFF" EXPECTED. (DUIERR 517)
CAUSE
ACTION

518 PDEV SPECIFICATION EXPECTED. (DUIERR 518)
CAUSE
ACTION

519 PROCESS ID EXPECTED HERE. (DUIERR 519)
CAUSE
ACTION

520 PRODUCT NAME IS EXPECTED HERE. (DUIERR 520)
CAUSE
ACTION

521 section/STEP/TEST NUMBER EXPECTED HERE. (DUIERR 521)
CAUSE
ACTION

522	A DEVICE SPECIFICATION HAS ALREADY BEEN GIVEN. (DUIERR 522)
CAUSE	
ACTION	
523	PROCESS ID IS NOT CONTROLLED BY THIS DUI. (DUIERR 523)
CAUSE	
ACTION	
524	EXPECTED TRACE TYPE OF (ALL/PROGRAM/LIBRARY). (DUIERR 524)
CAUSE	
ACTION	
525	FILE NAME ILLEGAL OR MISSING. (DUIERR 525)
CAUSE	
ACTION	
526	A FILE=<FILENAME> PARAMETER IS REQUIRED. (DUIERR 526)
CAUSE	
ACTION	

HP-UX Warning Messages

The following is a list of warning messages which may appear when using the DUI under the HP-UX operating system. Other diagnostic warning or error messages may appear at any time. Those messages without the (DUIWARN #) trailer are generated by the Online Diagnostic subsystem or the operating system. Listed below each error message are a probable cause and recommended action statement. The actual cause and action may differ from this list depending upon the particular circumstances of a given situation. The "!" indicates that a parameter of some sort will replace the exclamation point when the message is displayed.

2601 `Warning: Could not abort "!" (pid "n") (DUIWARN 2601)`
CAUSE
ACTION

2602 `Warning: Could not resume "!" (pid "n"). (DUIWARN 2602)`
CAUSE
ACTION

2603 `Warning: Could not suspend "!" (pid "n"). (DUIWARN 2603)`
CAUSE
ACTION

2604 `Warning: Dui cannot access the program file "!". (DUIWARN 2604)`
CAUSE
ACTION

2605 `Warning: Could not restart "!" (pid "n"). (DUIWARN 2605)`
CAUSE
ACTION

2606 `Warning: Redo command in Use file being ignored. (DUIWARN 2606)`
CAUSE
ACTION

2607 `Warning: PDEV option of run command is unavailable.s (DUIWARN 2607)`
CAUSE
ACTION

HP-UX Error Messages

The following is a list of error messages which may appear while using the DUI under the HP-UX operating system Other diagnostic error messages may appear at any time. Error messages without the (DUIERR #) trailer are generated by the Online Diagnostic Subsystem or the operating system. Listed below each error message are a probable cause and recommended action statement. The actual cause and action may differ from this list depending upon the particular circumstances of a given situation. The "!" indicates that a parameter of some sort will replace the exclamation point when the message is displayed.

2201 `Couldn't read message number "n" from catalog. ( DUIERR 2201 )`
CAUSE
ACTION

2202 `Usage: DUI [FILE] ( DUIERR 2202 )`
CAUSE
ACTION

2203 `Insufficient security level to do installation. ( DUIERR 2203 )`
CAUSE
ACTION

2204 `Can't create install file for this program. ( DUIERR 2204 )`
CAUSE
ACTION

2205 `Program not installed. ( DUIERR 2205 )`
CAUSE
ACTION

2206 `Invalid security level value. ( DUIERR 2206 )`
CAUSE
ACTION

2207 `Invalid number of products diagnosed. ( DUIERR 2207 )`
CAUSE
ACTION

2208 **Bad program type in message file. (DUIERR 2208)**
CAUSE
ACTION

2209 **Bad device required flag in message file. (DUIERR 2209)**
CAUSE
ACTION

2210 **Bad system mode. (DUIERR 2210)**
CAUSE
ACTION

2211 **Can't open the /usr/diag/install directory. (DUIERR 2211)**
CAUSE
ACTION

2212 **Insufficient security level to run this program. (DUIERR 2212)**
CAUSE
ACTION

2213 **No such process. (DUIERR 2213)**
CAUSE
ACTION

2214 **More than one process suspended. (DUIERR 2214)**
CAUSE
ACTION

2215 **No processes currently suspended. (DUIERR 2215)**
CAUSE
ACTION

2216 No processes to abort. (DUIERR 2216)
CAUSE
ACTION

2217 More than one abortable process. (DUIERR 2217)
CAUSE
ACTION

2218 Active processes. Can't exit. (DUIERR 2218)
CAUSE
ACTION

2219 More than one suspendable process. (DUIERR 2219)
CAUSE
ACTION

2220 No processes currently running. (DUIERR 2220)
CAUSE
ACTION

2222 Bad command stack number. (DUIERR 2222)
CAUSE
ACTION

2223 Exceeded use command nesting level. (DUIERR 2223)
CAUSE
ACTION

2224 Couldn't open catalog for "!". (DUIERR 2224)
CAUSE
ACTION

2225 SIGCLD ERROR. ERRNO = "n". (DUIERR 2225)
CAUSE
ACTION

2226 Hardcopy is already on. (DUIERR 2226)
CAUSE
ACTION

2227 Hardcopy is already off. (DUIERR 2227)
CAUSE
ACTION

2228 Can't access line printer spooler for hardcopy. (DUIERR 2228)
CAUSE
ACTION

2229 Couldn't write to install file. (DUIERR 2229)
CAUSE
ACTION

2230 Couldn't read from install file. (DUIERR 2230)
CAUSE
ACTION

2231 Out of memory. (DUIERR 2231)
CAUSE
ACTION

2232 No match. (DUIERR 2232)
CAUSE
ACTION

2234 Program can only be run in Single-User Mode. (DUIERR 2234)
CAUSE
ACTION

2235 No room to add process. (DUIERR 2235)
CAUSE
ACTION

2236 Too many processes. (DUIERR 2236)
CAUSE
ACTION

2237 Bad device type in message file. (DUIERR 2237)
CAUSE
ACTION

2238 No help available for "!". (DUIERR 2238)
CAUSE
ACTION

2239 Cannot read from file "!". (DUIERR 2239)
CAUSE
ACTION

2240 Cannot write to file "!". (DUIERR 2240)
CAUSE
ACTION

2241 No device file found for physical path "!". (DUIERR 2241)
CAUSE
ACTION

2242 Could not access I/O tree. Try using LDEV = .
CAUSE
ACTION

2243 No hardware at address "n". (DUIERR 2243)
CAUSE
ACTION

2244 Physical path too long. (DUIERR 2244)
CAUSE
ACTION

2245 Physical path too short. (DUIERR 2245)
CAUSE
ACTION

2246 Device not an LDM . (DUIERR 2246)
CAUSE
ACTION

2247 Could not open directory "!". (DUIERR 2247)
CAUSE
ACTION

2248 Read permission denied on file "!". (DUIERR 2248)
CAUSE
ACTION

2249 Write permission denied on file "!". (DUIERR 2249)
CAUSE
ACTION

2250	File already exists "!". (DUIERR 2250)
CAUSE	
ACTION	

2251	Autorestart error. Cannot change DUI command. (DUIERR 2251)
CAUSE	
ACTION	

2252	Autorestart error. Cannot change program to run. (DUIERR 2252)
CAUSE	
ACTION	

2253	Autorestart error. Cannot change device to diagnose. (DUIERR 2253)
CAUSE	
ACTION	

2254	Autorestart error. Cannot change input file. (DUIERR 2254)
CAUSE	
ACTION	

2255	Autorestart error. Cannot change output file. (DUIERR 2255)
CAUSE	
ACTION	

2256	DUI internal error in "!". Errno = "n". (DUIERR 2256)
CAUSE	
ACTION	

2257	No device file found for physical path "!". (DUIERR 2257)
CAUSE	
ACTION	

2258 Could not access device file "!". (DUIERR 2258)
CAUSE
ACTION

2259 "!" is not a character special device file. (DUIERR 2259)
CAUSE
ACTION

2260 Could not find a device manager for "!". (DUIERR 2260)
CAUSE
ACTION

2261 Must have level 0 security to change mode. (DUIERR 2261)
CAUSE
ACTION

2262 Could not run "!". Errno = "n". (DUIERR 2262)
CAUSE
ACTION

2263 Corrupt installation file for "!". (DUIERR 2263)S
CAUSE
ACTION

2264 PDEV option in RUN command is unavailable. Use DEVFILE. (DUIERR 2264)
CAUSE
ACTION

2265 Cannot diagnose this mux without redirecting all terminal I/O. (DUIERR 2265)
CAUSE
ACTION

2266	Insufficient security level to purge diagnostic program. (DUIERR 2266)
CAUSE	
ACTION	

2501	Unrecognized command: "!". (DUIERR 2501)
CAUSE	
ACTION	

2502	Illegal, duplicate, or conflicting argument: "!". (DUIERR 2502)
CAUSE	
ACTION	

2503	Expected either all, library, or program here. (DUIERR 2503)
CAUSE	
ACTION	

2504	Expected an equals sign (=) here. (DUIERR 2504)
CAUSE	
ACTION	

2505	Expected a program name here. (DUIERR 2505)
CAUSE	
ACTION	

2506	Program name too long. "!" (DUIERR 2506)
CAUSE	
ACTION	

2507	File path name too long: "!". (DUIERR 2507)
CAUSE	
ACTION	

2508 Product name too long: "!". (DUIERR 2508)
CAUSE
ACTION

2509 Expected a positive integer here. (DUIERR 2509)
CAUSE
ACTION

2510 Expected a number here in the range "x" to "y", inclusive. (DUIERR 2510)
CAUSE
ACTION

2511 Expected a file name here. (DUIERR 2511)
CAUSE
ACTION

2512 Expected a product name here. (DUIERR 2512)
CAUSE
ACTION

2513 Expected a physical device path here. (DUIERR 2513)
CAUSE
ACTION

2514 Expected either diagnostic, exerciser, utility, or verifier here. (DUIERR 2514)
CAUSE
ACTION

2515 End range number smaller than beginning range number. (DUIERR 2515)
CAUSE
ACTION

2516	Unsupported argument: "!". (DUIERR 2516)
CAUSE	
ACTION	

2517	Unsupported command: "!". (DUIERR 2517)
CAUSE	
ACTION	

2518	Illegal physical device path: "!". (DUIERR 2518)
CAUSE	
ACTION	

2519	Steps specified without sections. (DUIERR 2519)
CAUSE	
ACTION	

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3

CIO Channel Adapter Diagnostic

Introduction

The CIO Channel Adapter Diagnostic (CADIAG) is a Diagnostic subsystem program that provides the user with the ability to assess the CIO Channel Adapter functionality. The diagnostic will run under MPE XL on an 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 set parameters to control the handling of error messages and to select the number of test executions to be run. The CIO Channel Adapter diagnostic can also be invoked by the I/O system on catastrophic errors for auto-diagnostic purposes. CIO Channel Adapter functionality is restored by replacing the CIO Channel Adapter PCA which is a Field Replacable Unit (FRU).

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10012.

Auto-Diagnostics

The Channel Adapter diagnostic program can be invoked, by the I/O system on catastrophic errors, for auto-diagnostic purposes. In auto-diagnostic mode, the CADIAG diagnostic program will execute the following section and steps:

Section 3	Identify
Section 5	Selftest
Section 6	Status
Section 9	Rollcall

Minimum Configuration

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

Operating Instructions

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

Default Tests

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

Section 3	Identify
Section 5	Selftest
Section 6	Status
Section 8	Description

RUN Command

To bring up Online Diagnostics, enter the following command to the MPE XL prompt:

```
SYSDIAG
```

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

```
DUI >
```

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

To run the diagnostic, you might enter:

```
DUI > RUN CADIAG pdev=4 <RUN Command Options>
                        |          |
                        |   none required for
                        |   default test suite
                        |
                  insert physical location of
                  channel adapter to be tested here;
                  alternatively, type the ldev number
```

All of the RUN command options are used by the CADIAG Diagnostic. A detailed description can be obtained by referring to the section on DUI.

Test Execution

The diagnostic displays the following header and welcome message:

```
*********************************************************
*****                                                ***
*****        IO CHANNEL ADAPTER DIAGNOSTICS          ***
*****                                                ***
*****    (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, CADIAG will attempt to access the channel adapter that was specified in the RUN command. If the identify is not recognized by CADIAG, the diagnostic terminates and the following message is displayed:

```
THE IDENTIFY FUNCTION OF CHANNEL ADAPTER FAILED (CADERR 5604)
```

If at any time, the number of errors generated reaches the limit specified by the user in the ERRCOUNT parameter of the RUN command, the following message will be displayed:

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

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

If the ERRPAUSE parameter of the RUN command was assigned a value of "on", then the diagnostic steps after each error is generated and asks the user whether the test should continue:

```
CONTINUE (YES/NO) [ Y ]?
```

If the response is "Y" then the test will be resumed, and if the reponse is "N", the diagnostic will terminate. If the user enters a Return the diagnostic defaults to "Y". When the loopcount has completed, the diagnostic terminates and the following message is displayed:

```
CADIAG Exiting ...
```

If the diagnostic terminated prematurely due to ERRPAUSE or exceeding ERRCOUNT, the above message will not be displayed. Control will return to the DUI.

```
DUI >
```

Detailed Test Descriptions

The following sections are available to run from CADIAG:

Section 3	Identify
Section 5	Selftest
Section 6	Status
Section 8	Description
Section 9	Rollcall
Section 10	Subchannel Status

A description of each section and step will be given, along with the expected output from that section and step assuming no errors have occurred.

Section 3 - IDENTIFY

This section displays the HP product number for the channel adapter selected. The following is executed:

```
Section 3 - IDENTIFY
   The identify function for the channel adapter was completed
   successfully.
 End of Section 3 - IDENTIFY
```

Section 5 -SELFTEST

This section invokes the channel adapter's on-board selftests (Series 3000/950 Only).

```
Section 5 - SELFTEST
   CHANNEL ADAPTER Selftests have completed
      { selftest result messages }
 End of Section 5 - SELFTEST
```

Section 6 - DEVICE STATUS

This section obtains and decodes the device status from the channel adapter.

```
Section 6 - DEVICE STATUS
   The status of the channel adapter is:
        { status messages }
End of Section 6 - DEVICE STATUS
```

Section 8 - DESCRIPTION

This section issues a description command to the channel adapter. The model revision, SPA capability, module type, and serial number from IODC ROM will be returned.

```
Section 8 - DESCRIPTION
   The CA hardware model is n.
    { model 4 = NMOS version, model 8 = TTL version }
   The CA hardware model revision is nnn
   The CA Soft Physical Address capability is nnn
   The CA Software module type is nnn
   The CA Software revision number is n.
   The CA model number is nnn
   The CA serial number is nnn
End of Section 8 - DESCRIPTION
```

Section 9 - ROLLCALL

This section issues a rollcall command to the channel adapter. A bit map will be returned to the caller with the occupied field set to true. The following is executed:

```
Section 9 - ROLLCALL
   Device Adapter Address
                        1 1 1 1 1 1
   0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
   --------------------------------
      <<Rollcall array>>
   A '1' under an address number means that a device adapter was found
   at that address.  A '0' means that no device adapter was found at
   that address.
End of Section 9 - ROLLCALL
```

Section 10 - SUBCHANNEL STATUS

This section issues a command to read and decode the CIO subchannel status.

```
Section 10 -- Subchannel Status
   The Status and Control information for subchannel nnn is:
              { status message }
   { list of messages dependent on status }
   The Subchannel blocksize is nnn
End of Section 10 -- Subchannel Status
```

The status message above is repeated for each subchannel.

Error Messages

The following are general error messages which may be encountered during the execution of CADIAG. System dependent error messages may also be displayed by the diagnostic system; error messages without the trailer (CADERR #) are, in general, generated by the diagnostic system. However, please note that many of the following messages are information messages (and so do not have the error trailer); they are included since they do give information about errors within the channel adapter. The CAUSE/ACTION explanations following each error message below are not displayed to the user.

520	**Channel adapter selftests have FAILED**
CAUSE	One of the on-board selftests failed; the failure was not one from which the channel adapter could recover.
ACTION	Replace the channel adapter card.

526	**An error was detected while running selftests on the channel adapter, but the module is still usable.**
CAUSE	When the selftests were run an error occurred - but the channel adapter was able to recover from it.
ACTION	Ignore the error unless it becomes frequent in which case the channel adapter board should be replaced.

530	**An unrecognized status was returned as the result of running selftests on the channel adapter.**
CAUSE	An unrecognized status was returned from the channel adapter board as a result of running selftests.
ACTION	This message is included for coding completeness but should never actually appear; if it does there has probably been a change in the list of possible status return values and the code will need to be modified. Please report the error to support personnel.

2550	**Parity error detected in high data byte.**
CAUSE	The parity of the high data byte coming over the CIO bus is incorrect.
ACTION	Run selftest on the channel adapter. Test the device adapters. The problem could also be caused by a defective channel adapter buffer card or the extender cable between the channel adapter and the channel adapter buffer card. (Note: not all systems have a channel adapter buffer card and extender cable).

2560	**Parity error detected in low data byte.**
CAUSE	The parity of the low data byte coming over the CIO bus is incorrect.
ACTION	Run selftest on the channel adapter. Test the device adapters. The problem could also be caused by a defective channel adapter buffer card or the extender cable between the channel adapter and the channel adapter buffer card. (Note: not all systems have a channel adapter buffer card and extender cable).

2570	**The CIO bus controlled by this channel has no power at this time.**
CAUSE	There is no power on the CIO bus.
ACTION	Check the power supply - if it is functioning correctly the problem may be in the channel adapter buffer card (assuming the system has one). It might be necessary to replace the channel adapter buffer card (rather than test it) to see if the error persists.

2580	**The CIO bus has lost power in the past.**
CAUSE	The CIO bus lost power in the past. This message will appear if power was lost on the CIO bus at any time since the last channel adapter reset or power up.
ACTION	Check the power supply - if it is functioning correctly the problem may be in the channel adapter buffer card (assuming the system has one). It might be necessary to replace the channel adapter buffer card (rather than test it) to see if the error persists.

2600	**An internal catastrophic channel error has occurred.**
CAUSE	A catastrophic error has occurred within the channel adapter.
ACTION	Replace the channel adapter card.

2610	**The bus receiver gets different data than the channel is driving.**
CAUSE	The on-board loopback selftest failed; something is wrong with the channel adapter board circuitry.
ACTION	Replace the channel adapter card.

2620	**A data parity error has occurred.**
CAUSE	The channel adapter detected a parity error; something may be wrong with the Midbus or NIO bus.
ACTION	Test memory; run selftest on the channel adapter. The Midbus or NIO bus bus converters might be defective - test them, if possible, or replace if necessary.

2630	**A protocol error on the bus has occurred.**
CAUSE	This could be caused by almost any component in the system.
ACTION	Diagnose the entire system to whatever extent is possible. In particular, try to test the SPU, memory, and bus converters.

2640	**No slave responded to an address generated by the channel.**
CAUSE	The channel adapter attempted to address memory and was unable to complete the bus transaction.
ACTION	Test memory. The Midbus or NIO bus bus converters might be defective - test them, if possible, or replace if necessary. The problem might also be that the operating system is specifying an invalid memory address for DMA.

2650	**The ARQ line was asserted on the CIO backplane but no card responded to the ARQ poll.**
CAUSE	A device adapter asserted ARQ (asynchronous request) but when the channel adapter polled the device adapters no device adapter responded.
ACTION	Test the CIO bus to whatever extent is possible. If the system has a channel adapter buffer card test it and the attached extender cable (there are no direct tests for these components at this time so they might have to be tested by being replaced to see if the behaviour of the system changes). Test the device adapters.

2660	**The mstat error code is unknown.**
CAUSE	An unrecognized module error value was read from the on-board hardware status (io_status) register.
ACTION	This message is included for coding completeness but should never actually appear; if it does, there might be a problem with the channel adapter itself - run selftest. If the channel adapter card appears to be working correctly there has probably been a change in the list of possible status return values and the code will need to be modified. Please report the error to support personnel.

2670	**The mstat error codes are:**
CAUSE	An error occurred on the channel adapter board itself. The actual error will be printed in the next message.
ACTION	See the action statement associated with the message printed immediately after this one.

2710	**SSTAT code means AES,LCD,ERT, or unknown RTS code.**
CAUSE	An asynchronous event sense, logchannel destroy, error trap, or unknown read transpareut status code has been received.
ACTION	Except for the unknown RTS code these are normal signals for the channel adapter to process - no action is necessary. Nothing can be done about the unknown RTS code - it is included as a status code for completeness, but is unlikely to ever occur.

2720	**SSTAT code means parity error on CIO read data.**
CAUSE	This error can only occur on a system with an ALINK configured in. Either the ALINK is not generating the correct parity or the channel adapter buffer card is garbling the parity the ALINK is generating. (Note: not all systems have a channel adapter buffer card).
ACTION	Test the ALINK card. The problem might also be in then channel adapter buffer card (on those systems which have one) or the extender cable which connects the buffer card to the channel adapter.

2730	**SSTAT code means no MYAD.**
CAUSE	No device adapter completed a handshake with the channel adapter by asserting a 'my address' signal.
ACTION	Test every device adapter connected to the channel adapter (these can be found by performing a rollcall on the channel adapter). If every one of the device adapters appears to be defective and the system contains a channel adapter buffer card the problem is probably in the channel adapter buffer card or its attached extender cable. If testing the channel adapter buffer card is impractical, replace it and retest the device adapters.
2740	**SSTAT code means internal error.**
CAUSE	An unknown error involving a subchannel occurred within the channel adapter board.
ACTION	Replace the channel adapter card.
2750	**SSTAT code means unknown dma command.**
CAUSE	An unknown error involving a subchannel occurred within the channel adapter board.
ACTION	Replace the channel adapter card.
2760	**SSTAT code means srq on inactive subchannel.**
CAUSE	A service request has been received from a subchannel which is not responding (i.e., handshaking).
ACTION	Test all of the device adapters. If the system has a channel adapter buffer card check it and its attached extender cable. If the device adapters and the extender cable are healthy replace the channel adapter buffer card.
2770	**SSTAT code means RTS overrun.**
CAUSE	The channel adapter received more than sixteen bytes of transparent status from a device adapter. The channel adapter can handle a maximum of sixteen bytes of RTS (read transparent status).
ACTION	Test the device adapters connected to the channel adapter. One of the device adapters may have a defective interface chip.
2780	**SSTAT code is unknown.**
CAUSE	An unrecognized status value was read from the on-board subchannel status register.
ACTION	This message is included for coding completeness but should never actually appear; if it does there has probably been a change in the list of possible status return values and the code will need to be modified. Please report the error to support personnel.
5501	***** UNABLE TO SELECT THE DEVICE (CADERR 5501)**
CAUSE	The diagnostic could not obtain access to the channel adapter; 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 message.

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

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

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

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

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

5603	***** THE CHANNEL ADAPTER MODULE TYPE ! IS WRONG (CADERR 5603) VALID MODULE TYPE VALUES ARE 08, 48, 88, AND C8**
CAUSE	The IODC_TYPE byte of the on-board IO_DC_DATA register contained an unexpected value. This may result from a sysgen problem; the actual hardware configuration may not match the operating system's configuration table.
ACTION	Please report the error to support personnel.

5604	***** THE IDENTIFY FUNCTION OF CHANNEL ADAPTER FAILED (CADERR 5604)**
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.

5606	***** THE SELFTEST FUNCTION OF CHANNEL ADAPTER FAILED (CADERR 5606)**
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.

5607	***** THE STATUS FUNCTION OF CHANNEL ADAPTER FAILED (CADERR 5607)**
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.
5609	***** THE DESCRIPTION FUNCTION OF CHANNEL ADAPTER FAILED (CADERR 5609)**
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.
5610	***** THE ROLLCALL FUNCTION OF CHANNEL ADAPTER FAILED (CADERR 5610)**
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.
5611	***** THE MOVE BUFFER FUNCTION FAILED (CADERR 5611)**
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.
6001	***** AN UNEXPECTED STATUS WAS RECEIVED (CADERR 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.

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4

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 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 MPE XL system prompt:

```
SYSDIAG
```

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

```
%/usr/diag/bin/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.
```

The 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:** The 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:** The 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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5

Memory Diagnostic

Introduction

The Memory Diagnostic tests and verifies the memory controllers and memory arrays online from the system console or a remote maintenance terminal. The diagnostic runs under HP-UX on an HP 9000/825, 9000/835, 9000/840, or 9000/850 System Processor Unit.

The Memory Diagnostic provides two diagnostic functions. These diagnostic functions consist of a total pattern test of memory and a partial pattern test of memory.

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing product number 30600-10009.

Minimum Configuration

The hardware required to run the diagnostic comprises the SPU with sufficient memory controller/array combinations to allow the operating system to boot. Also, a terminal whose hardware is interconnected with the system is required. The software required to run the diagnostic are the Diagnostic User Interface (DUI), the Online Diagnostic subsystem, and the HP-UX operating system. The diagnostic requires a memory driver (/dev/dmem) that can allocate and deallocate memory, get/set page status, determine memory configuration, and access memory I/O space.

Operating Instructions

There is no user capability checking mechanism within the Memory Array Diagnostic. The DUI checks the user's security before initiating the Memory Diagnostic. Refer to the section on DUI for a detailed description of system security.

Default Tests

If the user does not specify any sections or steps to be run, the default sections and steps are executed based on the diagnostic mode which has been selected by the Online Diagnostic subsystem. (See the Online Diagnostics Overview discussion of diagnostic modes for details.) The default test is:

Section 10 Full Memory Test

RUN Command

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

```
%/usr/diag/bin/sysdiag
```

The system responds with the following Diagnostic User Interface prompt:

```
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.

To run the diagnostic, enter:

```
DUI >RUN MEMDIAG
```

no parameters required to load test suite (though parameters can be given)

Test Execution

The diagnostic displays the following header and welcome message:

```
*********************************************************
*****                                                ***
*****            MEMORY ARRAY DIAGNOSTIC             ***
*****                                                ***
*****    (C) Copyright Hewlett Packard Co. 1987      ***
*****                All Rights Reserved.            ***
*****                    Version A.00.00             ***
*****                                                ***
*********************************************************

Welcome, Today is MON, May 28, 1987, 9:00
```

Section 10 of the Memory Diagnostic uses specific data pattern tests to test the memory. These data pattern tests are:

1. All Zeros
2. All Ones
3. Alternating Zeros
4. Alternating Ones

   These four patterns are constants that are used to fill the data buffer in memory, and to find bits that are either stuck high, stuck low, or adjacent bits that are stuck together.

5. Address Pattern

   The address pattern takes a location counter initialized to zero and stores its contents into a test location. Then both the location counter and the location address are incremented, with this process continuing through the entire test range.

6. Complement Address Pattern

   The complement address pattern takes a location counter initialized to ones and stores its contents into a test location. Then the location address is incremented and the location counter is decremented. This process continues throughout the entire test range.

7. Checker Board Pattern

   The checker board pattern is achieved by alternately storing the alternating ones pattern with the alternating zeros pattern.

Test Section Descriptions

There are two diagnostic sections available.

Section 10	Full Memory Test
Section 11	Partial Memory Test

A description of each section is given, along with the expected output from that section.

Section 10—Full Memory Test

This section performs all of the data pattern tests over the entire range of user memory. The EDC logic and the memory used to store the check bits are used, but are not explicitly tested. If an error occurs, the testing halts and the error information is displayed. The displayed data is sufficient to isolate a defective FRU. The following is displayed:

```
Section 10 - Full Memory Test
        { display memory page range }
End of Section 10 - Full Memory Test
```

Section 11—Partial Memory Test

This section performs the first four data pattern tests. This is an abbreviated form of Section 10 intended to save time. Although this section is primarily a confidence test, it is capable of isolating a defective FRU. The EDC logic and the memory used to store the check bits are used, but are not explicitly tested. The following is displayed:

```
Section 11 - Partial Memory Test
        { display memory page range }
End of Section 11 - Partial Memory Test
```

Error Messages

This section provides a list and brief description of the most common error messages generated by MEMDIAG. The "!" indicates that a parameter of some sort replaces the exclamation point when the error message is displayed. The following messages are listed in numerical order.

5000	***** SECTION NOT IMPLEMENTED. (MERR 5000)**
CAUSE	MEMDIAG has not implemented the section selected by the user.
ACTION	The section will be available on a future release of MEMDIAG. Please consult the diagnostic user interface **HELP** command for a list of sections available in MEMDIAG.

5001	***** STEP NOT IMPLEMENTED. (MERR 5001)**
CAUSE	MEMDIAG has not implemented the step selected by the user.
ACTION	The step will be available on a future release of MEMDIAG. Please consult the diagnostic user interface **HELP** command for a list of steps available in MEMDIAG.

5002	***** CAN NOT ALLOCATE MEMORY. (MERR 5002)**
CAUSE	MEMDIAG was not able to obtain data space to be used as internal data buffers.
ACTION	Please report all error messages displayed to support personnel.

5004	***** MSG_RETRIEVER FAILED, STATUS UNKNOWN. (MERR 5004) RETURNED STATUS = !**
CAUSE	MEMDIAG was not able to obtain a message from the diagnostic message catalog. This is a software error.
ACTION	Please report all error messages displayed to support personnel.

5005	***** INVALID FUNCTION CODE. (MERR 5005)**
CAUSE	MEMDIAG has encountered an unexpected function code. This is a software error.
ACTION	Please report all error messages displayed to support personnel.

5006	***** ILLEGAL DATA PATTERN, INTERNAL ERROR. (MERR 5006)**
CAUSE	MEMDIAG was not able to generate the data pattern necessary for the current test. This is a software error.
ACTION	Please report all error messages displayed to support personnel.

5007	***** DATA ERROR DETECTED (MERR 5007) \ ERROR FOUND AT PAGE !\ EXPECTED DATA = ! \ ACTUAL DATA = ! \ MEMORY ARRAY IN SLOT !\ *or*\ MEMORY CONTROLLER IN SLOT !\ *or* \ MEMORY ARRAY IN SLOT ! OF CONTROLLER IN SLOT !**
CAUSE	MEMDIAG has found a data error during pattern tests. The data written to memory and the data read back from memory did not match.
ACTION	This error message will display the memory page where the error was discovered, the data byte which did not match, and the location of the memory hardware bein g accessed.
5014	***** SINGLE BIT ERROR DETECTED (MERR 5014) \ MEMORY CONTROLLER IN SLOT ! \ *or*\ MEMORY ARRAY IN SLOT !\ *or*\ MEMORY ARRAY IN SLOT ! OF CONTROLLER ! \ ERROR FOUND IN BANK ! OF CONTROLLER \ *or*\ ERROR FOUND IN BANK ! OF ARRAY \ SYNDROME CODE INDICATES ! BIT ! IS BAD**
CAUSE	MEMDIAG has discovered a single bit error. MEMDIAG will display the location o f the memory hardware which produced the error.
ACTION	Please contact support personnel for correction of the failing mem ory hardware.
5015	***** MULTI-BIT ERROR DETECTED (MERR 5015) \ MEMORY CONTROLLER IN SLOT ! \ *or*\ MEMORY ARRAY IN SLOT ! \ *or*\ MEMORY ARRAY IN SLOT ! OF CONTROLLER !**
CAUSE	MEMDIAG has discovered a multi-bit error. MEMDIAG will display the location of the memory hardware which produced the error.
ACTION	Please contact support personnel for correction of the failing memory hardware.
5016	***** NO MEMORY CONTROLLERS WERE FOUND (MERR 5016)**
CAUSE	MEMDIAG was not able to locate any memory controllers on the system.
ACTION	Please verify that the memory boards are in the correct slots. MEMDIAG is not receiving any response from the memory controllers.
5022	***** UNKNOWN ERROR RETURNED BY DAR (MERR 5022) Value returned = !**
CAUSE	MEMDIAG has encountered an unknown status value from the diagnostic system.
ACTION	Please report all error messages displayed to support personnel.

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6

Six-Channel Mux Diagnostic

Introduction

MUXDIAG is the HP 27140A Asynchronous Six-Channel Multiplexer (MUX card) diagnostic. The diagnostic tests the card's functionality by testing communication from the SPU to the MUX card. MUXDIAG can also initiate the onboard selftests that are resident in the MUX card's EPROM. The MUX card is a Field Replaceable Unit (FRU).

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10010.

Minimum Configuration

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

When running under the HP-UX operating system, the following hardware must be present:

- At least two six-channel MUX cards are needed. The diagnostic is run from a terminal attached to one card to test the other card.
- The system console is usually used to run the diagnostic for the other MUX card. Of course, if the MUX card for the system console appears to be malfunctioning, use a terminal connected to the other MUX card.

When running under the MPE XL operating system, the following hardware is recommended:

- At least one six-channel MUX card
- A configured and functional LAN system
- A configured and functional Distributed Terminal Control system (DTC)

However, MUXDIAG can also be run from a terminal attached to the MUX card being tested. This is useful when running non-destructive test sections, such as State and Identify, or when the user does not have access to a second MUX card. When running MUXDIAG on only one MUX card, input to and output from MUXDIAG should be redirected. An example is shown in the "Examples" Section of this chapter.

Operating Instructions

MUXDIAG is accessible by all users who have obtained a diagnostic security level of 0 or 1. MUXDIAG is only executed in Single User Mode (SUM). The DUI MODE SUM command can be used to change the operating mode of the diagnostic subsystem to Single User Mode. In addition, when running under HP-UX MUXDIAG is a destructive diagnostic and cannot guarantee I/O data integrity of any processes running prior to the MUXDIAG testing. Therefore, all users on the MUX card being tested should complete their terminal I/O processes before entering Single User Mode and before running the diagnostic.

Although the users do not have to be logged off, the devices attached to the MUX card will not be accessible while MUXDIAG is running. Double check and warn the users before running the diagnostic. Refer to the DUI section for a detailed description of user capabilities, diagnostic security levels, and destructive mode. Control will return to the DUI upon completion of the default/specified sections and steps.

Default Tests

Default sections and steps are executed automatically if the user does not specify any RUN Command Options or does not specify the sections and steps to be run. The default sections and steps are:

Section 1 **State:** Displays the current state of the MUX card, loaded and/or broken.

Section 3 **Identify:** Displays identification information about the MUX car card ID, firmware ID, firmware revision, hardware revision, active ports, multiplexing support code, parity support, and data transfer modes.

Section 4 **Loopback:** Performs the backplane loopback test.

Step 1 **Backplane loopback test**

Run Command

To run the Online Diagnostics, enter the following command to the MPE XL system prompt:

```
SYSDIAG
```

To run the Online Diagnostics, enter the following command to the HP-UX system prompt:

```
% /usr/diag/bin/sysdiag
```

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

```
DUI >
```

Typing HELP causes a summary of the DUI and its commands to be displayed. Refer to the DUI Section of this manual for details. Enter the following commands at the DUI prompts:

```
DUI > MODE SUM              {Go into Single User Mode}
Single User Mode (SUM)      {Displayed by SYSDIAG}
```

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 MUXDIAG 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;
            for HP-UX, type the devfile name
```

When running MUXDIAG under HP-UX, it is a good idea to specify an output file to which all diagnostic messages will be sent. There are some messages displaying error codes, revision numbers, and data being written or read. Such information would be helpful to the HP Customer Engineer in determining whether or not to replace the MUX card.

Test Execution

The diagnostic displays the following header and welcome message:

```
*********************************************************
*****                                                ***
*****   HP 27140A Asynchronous 6-Channel Multiplexer ***
*****              (MUX) 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
```

After displaying the header, MUXDIAG calls an internal program service routine to lock the card.

The sections and steps specified in the MUXDIAG run string will be executed. The test sections and steps are described in the "Test Section Descriptions" area of this chapter. If no sections or steps were specified, the default sections will be run by MUXDIAG.

Control returns to the Online Diagnostic Subsystem upon completing the requested or default sections and steps. The following prompt is then displayed:

```
DUI >
```

If the **ERRCOUNT** option of the **RUN** command is specified by the user and the number of errors generated by MUXDIAG has reached that limit, the following message is output:

```
Error count exceeded. count = X
```

where "X" = error count originally specified in the RUN command. The diagnostic then terminates execution and returns control to the Online Diagnostic Subsystem.

If the **ERRPAUSE** option of the **RUN** command is specified by the user, the diagnostic stops after each error is generated and ask the user whether the test should continue:

```
Error pause -- do you wish to continue (y/n) [ y ]?
```

If the response is "y" or Return, then the test resumes. If the response is "n", the diagnostic terminates.

If the **LOOPCOUNT** option of the **RUN** command is specified by the user, MUXDIAG executes a specified number of times. The following message is output before each iteration of the loop.

```
Loop Count = n
```

The value n is the iteration number starting from 1. It is incremented each time through the loop until the LOOPCOUNT has been reached. The above message is not printed if LOOPCOUNT is 1.

Test Section Descriptions

There are six diagnostic program sections available for user selection. The user may also select individual steps to be run for Section 4, which has two steps.

Section 1	**State:** Displays the current state of the MUX card, loaded and/or broken.
Section 2	**Clear:** Clears the MUX card and puts it into a ready-to-use state by executing the internal selftest and by downloading the RAM code.
Section 3	**Identify:** Displays identification information about the MUX car card ID, firmware ID, firmware revision, hardware revision, active ports, multiplexing support code, parity support, and data transfer modes.
Section 4	**Loopback:** Performs the backplane and frontplane loopback tests. These tests verify the data paths in the backplane and/or frontplane interface circuitry.
Step 1	**Backplane Loopback**
Step 2	**Frontplane Loopback**
Section 5	**Selftest:** Executes the internal selftest program on the MUX car
Section 10	**Write/Read:** Writes data to the MUX card RAM, reads the data, and compares it.

Section 1 - STATE

This section displays the current state of the MUX card. Section 1 is one of the default sections that is executed if no parameters are specified in **RUN MUXDIAG**.

```
Section 1 - STATE
   The MUX card RAM code is LOADED.
   The MUX card is marked as NOT BROKEN.
End of Section 1
```

When the RAM code is LOADED, it has been downloaded with the proper information from the operating system. When the RAM code is NOT LOADED, the information may be incorrect and invalid. The integrity of the MUX card and testing the card will not be reliable. In this case, MUXDIAG displays the following message:

```
The MUX card RAM code is NOT LOADED.
```

To load the RAM, run Section 2 - Clear or reboot the operating system.

When the card is marked BROKEN the card is not functional. Either there is a hardware failure or the card has been intentionally set BROKEN to prevent its use. The following message is displayed:

```
The MUX card is marked as BROKEN.
```

To further test the MUX card run Section 4 - Loopback, run Section 5 - Selftest, and/or run Section 10 - Write/Read.

If any of these tests fails, replace the MUX card for it is truly malfunctioning. Refer to the "HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual" for instructions on removing and replacing the MUX card.

Section 2 - CLEAR

This section puts the MUX card into a ready state by executing the card's internal selftest and by downloading the RAM code. CLEAR is destructive, and all users must complete their terminal I/O before running the test.

```
Section 2 - Clear
   The MUX card CLEARED successfully.
End of Section 2
```

It is recommended to run the Clear test before running the Section 4 - Loopback test. The Frontplane Loopback test requires that the MUX card be downloaded first, and the Clear test downloads the RAM code to the MUX card. Refer to Section 4 - Loopback for further explanation.

Section 2 can be executed with the Test Hood which is used by the selftest to also check the Z-80 Serial Communications Controller circuits, line drivers, and line receivers. The Test Hood is part of the CIO Service Kit available to HP Customer Engineers. Refer to Section 5 - Selftest for further information regarding the Test Hood and the selftest itself. If selftest fails, the following message is output:

```
*** SELFTEST OF MUX CARD FAILED. (MUXERR 5008)
```

If the MUXDIAG selftest fails, replace the MUX card. For removal and replacement instructions, refer to the "HP-UX Asynchronous 6-Channel Multiplexer Hardware Reference Manual". Remember to remove the EPROM from the bad card to place it on the replacement board.

When running under HP-UX, if MUXDIAG can not find certain system administration files, the download fails with one of the following messages output (also refer to "Error Messages" at the end of this section):

```
*** DOWNLOAD TO MUX RAM FAILED
    COULD NOT OPEN /etc/file
    AS HP-UX STDIN (DSSERR 2400)
```

where "file" is a download file in the /etc directory.

```
*** DOWNLOAD TO MUX RAM FAILED
    COULD NOT DUP /dev/diag/mux
    AS HP-UX STDOUT, FILE DESCRIPTOR WAS
    fd (DSSERR 2401)
```

where **/dev/diag/mux*** is a MUX card device file name in the **/dev/diag** directory, and "fd" is the file descriptor associated with **/dev/diag/mux***.

```
*** DOWNLOAD TO MUX RAM FAILED
    HP-UX COULD NOT EXEC /etc/download (DSSERR 2402)
```

The **/etc/download** file could not be executed.

Refer to the *HP-UX System Administrator Manual* for file information. Some reasons for not finding or not executing an HP-UX file are:

File does not exist Either the file exists in the wrong directory or it has been renamed accidentally. Contact your System Administrator to install the missing file in the correct directory.

Incorrect permissions Use the HP-UX `ls` or `ll` commands to check the file's permissions. If read/write/execute permissions have been disabled, contact your System Administrator. The System Administrator can change the file permissions.

If the system is having problems, either troubleshoot the system or reboot. Refer to the *HP-UX System Administrator's Manual* and to the Troubleshooting Chapter of the computer's *Hardware Support Manual.*

An internal MUXDIAG error can cause one of the following messages:

```
*** DOWNLOAD TO MUX RAM FAILED
    HP-UX PROCESS EXIT STATUS =
    nnnn (DSSERR 2403)
```

The value "nnnn" is the process exit status returned by the program `/etc/download`.

```
*** DOWNLOAD TO MUX RAM FAILED
    HP-UX ABNORMAL PROCESS EXIT STATUS =
    nnnn (DSSERR 2404)
```

The value "nnnn" is the abnormal process exit status returned by the program `/etc/download`.

Try running MUXDIAG again before calling the HP Sales and Service Office.

Section 3 - IDENTIFY

This section displays identification information about the MUX card. Section 3 is also one of the default sections that is executed if no parameters are specified in **RUN MUXDIAG**.

```
Section 3 - Identify
   Card ID =
   Firmware ID =
   Firmware Revision =
   Hardware Revision =
   Active Ports = 6
   Multiplexing Support Code = 1 - Logchannel Only
   Parity Support = 0 - Not Available
   Data Transfer Mode = 2 - Word and Byte
End of Section 3 -- Identify
```

where the values or messages are defined as follows:

a,b,ccc,d	These numeric values identify the MUX card and are helpful in finding out the "age" of the card.
`Active Ports`	If 6, then the MUX card is downloaded. (HP-UX Only) If 1, then the MUX card is not downloaded. Run Section 2 - CLEAR test to download the RAM code to the MUX card. Under MPE XL, this number may vary and has no significance to the RAM code downloading process.
`Multiplexing Support Code`	The channel architecture supports two protocols with which I/O cards can communicate with the channel. The two protocols are subchannel and logchannel. However, the MUX card uses its own unique protocol. The current release of the downloaded firmware incorrectly returns: `Multiplexing Support Code 1 - Logchannel Only.`
`Parity Support`	Parity data checking between the backplane and the channel is NOT supported. However, parity data checking is supported at the frontplane which is what the HP-UX MUX driver uses to check parity.
`Data Transfer Mode`	Data may be transferred either in one or two byte quantities, or both.

Section 4 - LOOPBACK

This section tests data path between the channel and the device through the card. The test is performed by writing and reading a fixed data pattern. Either one or both of the following two steps can be executed. Step 1 is one of the default steps that is executed if no parameters are specifies in **RUN MUXDIAG**.

```
Section 4 - LOOPBACK
   Step    1 - BACKPLANE LOOPBACK
      Backplane Loopback test completed successfully.
   End of Step 1
   Step    2 - FRONTPLANE LOOPBACK
      Frontplane Loopback test completed successfully.
   End of Step 2
End of Section 4
```

Step 1 **Backplane Loopback:** tests the back interface circuitry, which handles all communication to the CIO backplane. This test is non-destructive (in normal mode) and can be run while data is being sent to and from the MUX card.

Step 2 **Frontplane Loopback:** tests the front plane interface circuitry, which includes the RS-232 receivers and line drivers. This test could destroy user data being sent from the MUX driver and is therefore a destructive test. Users must complete their terminal I/O before running this Step 2 test of Section 4.

The MUX card must be downloaded before running the frontplane loopback test. If the RAM code is not downloaded in the MUX card, the following messages occurs:

```
***WARNING - FRONTPLANE LOOPBACK TEST WAS SKIPPED BECAUSE THE CARD
FIRMWARE WAS NOT LOADED (DSSERR 2405)
```

To assure that the MUX card is downloaded, run the CLEAR section first, especially when running these test sections in a loop (for example, **RUN MUXDIAG d=mux1 loopcount=2 sec=1,2,4 step=1,2**).

If a loopback test fails, the following error messages are displayed depending on the test executed:

```
*** ERROR IN section 4
*** ERROR IN STEP 1
*** BACKPLANE LOOPBACK TEST FAILED.  (MUXERR 5007)
    FAILURE CODE =
    DATA =
    PORT =
*** ERROR IN section 4
*** ERROR IN STEP 2
*** FRONTPLANE LOOPBACK TEST FAILED.  (MUXERR 5006)
    FAILURE CODE =
    DATA =
    PORT =
```

If the FAILURE CODE is 1, the MUX card is bad. For removal and replacement instructions, refer to the *HP27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.* Remember to remove the EPROM from the bad card and place it on the replacement board.

The following message is also displayed if the FAILURE CODE is 2 for either loopback test:

```
*** I/O FAILURE OCCURRED TRYING TO DO LOOPBACK (MUXERR 5005)
```

The MUX card may be bad. Run the channel diagnostics. Check the device access permissions by running Sections 2, 5, 10. If these sections execute without internal errors and if the loopback FAILURE CODE continues to be 2, the MUX card is bad. Replace the card.

Section 5 - SELFTEST

This section executes the selftest program stored in the EPROM chip on the HP 27140A MUX card. The test operates on a GO/NO-GO basis and determines if the card will reliably pass data in both directions through the circuitry.

The selftest can be executed with or without the Test Hood. The Test Hood is part of the CIO Service Kit available to HP Customer Engineers.

Without the Test Hood, the selftest verifies the following:

- On-board circuitry of the EPROM
- RAM
- Operation of the Z-80 microprocessor
- Resident DMA operation
- Timer chip performance

With the Test Hood, the following items are tested in addition to the above items:

- Z-80 Serial Communications Controller (SCC) circuits
- Line drivers
- Line receivers

Selftest (with or without the Test Hood) does not validate the backplane circuitry. The backplane circuitry can be tested in Section 4, Loopback, described above.

If no errors occur, MUXDIAG outputs the following messages:

```
Section 5 - SELFTEST
   Selftest of MUX Card completed successfully.
End of Section 5
```

If selftest fails, the following message is output:

```
*** SELFTEST OF MUX CARD FAILED. (MUXERR 5008)
```

If the I/O channel fails and MUXDIAG cannot function, a LED mounted on the board may be used to interpret the test results. Without the hood, the LED lights up for approximately 2 seconds if the test was executed due to a RESET condition. The DEVICE CLEAR/DEVICE ENABLE sequence turns the LED on for 13 to 15 seconds. If the LED fails to go off, the selftest has failed.

With the optional Test Hood, a second LED mounted on the hood also shows whether the tests were successful. Using the Test Hood does not change the length of time that the selftest takes to run. If the LED fails to go off, the selftest is a NO-GO and has failed.

If the MUXDIAG selftest fails, replace the MUX card. For removal and replacement instructions, refer to the *HP27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.* Remember to remove the EPROM from the bad card and place it on the replacement board.

Section 10 - WRITE/READ

This section writes data to the MUX RAM, reads it back, and then compares the data. (Not available under MPE XL.)

```
Section 10 - WRITE/READ
   Write/Read test of MUX card completed successfully.
End of Section 10
```

If this test fails, one of the following error messages may occur. Also, replace the MUX card. For removal and replacement instructions, refer to the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.* Remember to remove the EPROM from the bad card and place it on the replacement board.

```
*** WRITE/READ TEST FAILED TO WRITE ENOUGH DATA.  (MUXERR 5009)
WROTE xxx BYTES, BUT SHOULD HAVE WRITTEN yyy BYTES.

*** WRITE/READ TEST FAILED TO READ ENOUGH DATA.  (MUXERR 5010)
READ xxx BYTES, BUT SHOULD HAVE READ yyy BYTES.

*** WRITE/READ TEST OF MUX CARD FAILED.  (MUXERR 5011)
BYTE AT BUFFER x WAS y BUT SHOULD HAVE BEEN z.
```

Examples

Example 1: Running the Default Sections

The following example runs the default sections 1, 3, and 4 (Step 1).

```
DUI > mode sum
Single User Mode (SUM).
DUI > run muxdiag d=/dev/diag/mux0

     ************************************************************
     *****                                                  ***
     *****   HP 27140A Asynchronous 6-Channel Multiplexer   ***
     *****               (MUX) 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

Section  1 - STATE
    The MUX card RAM code is LOADED.
    The MUX card is marked as NOT BROKEN.
End of Section 1
Section  3 - IDENTIFY
    Card ID = 7
    Firmware ID = 3
    Firmware Revision = 2539
    Hardware Revision = 0
    Active Ports = 6
    Multiplexing Support Code = 1 - Logchannel Only
    Parity Support = 0 - Not Available
    Data Transfer Mode = 2 - Word and Byte
End of Section 3
Section  4 - LOOPBACK
Step     1 - BACKPLANE LOOPBACK
    Backplane Loopback test completed successfully.
End of Step 1
End of Section 4
muxdiag terminated (pid 829).  Exit status = 0.
```

Example 2: Running MUXDIAG Twice

The following example runs MUXDIAG twice with loop=2.

```
DUI > mode sum
Single User Mode (SUM).
DUI >run muxdiag d=mux1 loop=2

     ********************************************************
     *****                                                  ***
     *****   HP 27140A Asynchronous 6-Channel Multiplexer   ***
     *****              (MUX) 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

Loop count = 1
Section  1 - STATE
    The MUX card RAM code is LOADED.
    The MUX card is marked as NOT BROKEN.
End of Section 1
Section  3 - IDENTIFY
    Card ID = 7
    Firmware ID = 3
    Firmware Revision = 2539
    Hardware Revision = 0
    Active Ports = 6
    Multiplexing Support Code = 1 - Logchannel Only
    Parity Support = 0 - Not Available
    Data Transfer Mode = 2 - Word and Byte
End of Section 3
Section  4 - LOOPBACK
Step     1 - BACKPLANE LOOPBACK
    Backplane Loopback test completed successfully.
End of Step 1
End of Section 4
Loop count = 2    <----------------------start of second loop
Section  1 - STATE
    The MUX card RAM code is LOADED.
    The MUX card is marked as NOT BROKEN.
End of Section 1
```

```
Section  3 - IDENTIFY
    Card ID = 7
    Firmware ID = 3
    Firmware Revision = 2539
    Hardware Revision = 0
    Active Ports = 6
    Multiplexing Support Code = 1 - Logchannel Only
    Parity Support = 0 - Not Available
    Data Transfer Mode = 2 - Word and Byte
End of Section 3
Section  4 - LOOPBACK

Step 1- BACKPLANE LOOPBACK
* and Byte
    Backplane Loopback test completed successfully.
End of Step 1
End of Section 4
muxdiag terminated (pid 841).  Exit status = 0.
```

Example 3: MUXDIAG Sections 1, 2, 3, 5, and 10

The following example runs MUXDIAG sections 1, 2, 3, 5, and 10.

```
DUI > mode sum
Single User Mode (SUM).
DUI > run muxdiag d=mux1 sec=1,2,3,5,10

     ************************************************************
     *****                                                  ***
     *****   HP 27140A Asynchronous 6-Channel Multiplexer   ***
     *****              (MUX) 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

Section  1 - STATE
    The MUX card RAM code is LOADED.
    The MUX card is marked as NOT BROKEN.
End of Section 1
Section  2 - CLEAR
   The MUX card CLEARED successfully.
End of Section 2
Section  3 - IDENTIFY
    Card ID = 7
    Firmware ID = 3
    Firmware Revision = 2539
    Hardware Revision = 0
    Active Ports = 6
    Multiplexing Support Code = 1 - Logchannel Only
    Parity Support = 0 - Not Available
    Data Transfer Mode = 2 - Word and Byte
End of Section 3
Section  5 - SELFTEST
    Selftest of MUX card completed successfully.
End of Section 5
Section 10 - WRITE/READ
    Write/Read test of MUX card completed successfully.
End of Section 10
muxdiag terminated (pid 845).  Exit status = 0.
```

Example 4: MUXDIAG Sections 1, 3, 4 (steps 1 and 2), 5, and 10

The following example runs MUXDIAG sections 1, 3, 4, (steps 1 and 2), 5, and 10.

```
DUI > mode sum
Single User Mode (SUM).
DUI > run muxdiag d=mux1 sec=1,3,4,5,10 step=1,2

     ************************************************************
     *****                                                  ***
     *****   HP 27140A Asynchronous 6-Channel Multiplexer   ***
     *****              (MUX) 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

Section  1 - STATE
    The MUX card RAM code is LOADED.
    The MUX card is marked as NOT BROKEN.
End of Section 1
Section  3 - IDENTIFY
    Card ID = 7
    Firmware ID = 3
    Firmware Revision = 2539
    Hardware Revision = 0
    Active Ports = 6
    Multiplexing Support Code = 1 - Logchannel Only
    Parity Support = 0 - Not Available
    Data Transfer Mode = 2 - Word and Byte
End of Section 3
```

```
Section  4 - LOOPBACK
Step 1-BACKPLANE LOOPBACK
    Backplane Loopback test completed successfully.
End of Step 1
Step 2- FRONTPLANE LOOPBACK
    Frontplane Loopback test completed successfully.
End of Step 2
End of Section 4
Section  5 - SELFTEST
    Selftest of MUX card completed successfully.
End of Section 5
Section 10 - WRITE/READ
    Write/Read test of MUX card completed successfully.
End of Section 10
muxdiag terminated (pid 855).  Exit status = 0.
```

Example 5: MUXDIAG Input and Output Redirected

The following example runs MUXDIAG with its input and output redirected. The output is redirected to a file called **muxdiag.out**. This example shows how to run MUXDIAG with only one MUX card. As superuser and in the C shell (**csh**), type the following commands. The **#** prompt is the shell prompt.

```
# csh                                    <---- go into C shell
echo" mode sum \
run muxdiag dev=mux0" | sysdiag >& /tmp/muxdiag.out  <---- no # appears
# cat /tmp/muxdiag.out                        <---- displays the following

     ********************************************************
     *****                                                  ***
     *****             ONLINE DIAGNOSTIC SYSTEM             ***
     *****                                                  ***
     *****         (C) Copyright Hewlett Packard Co. 1987   ***
     *****               All Rights Reserved.               ***
     *****                Version A.00.00                   ***
     *****                                                  ***
     ********************************************************

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

DUI > mode sum
Single User Mode (SUM).
DUI > run muxdiag d=mux0

     ********************************************************
     *****                                                  ***
     *****   HP 27140A Asynchronous 6-Channel Multiplexer   ***
     *****               (MUX) 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
```

```
Section  1 - STATE
    The MUX card RAM code is LOADED.
    The MUX card is marked as NOT BROKEN.
End of Section 1
Section  3 - IDENTIFY
    Card ID = 7
    Firmware ID = 3
    Firmware Revision = 2539
    Hardware Revision = 0
    Active Ports = 6
    Multiplexing Support Code = 1 - Logchannel Only
    Parity Support = 0 - Not Available
    Data Transfer Mode = 2 - Word and Byte
End of Section 3
Section  4 - LOOPBACK
Step     1 - BACKPLANE LOOPBACK
     Backplane Loopback test completed successfully.
End of Step 1
End of Section 4
muxdiag terminated (pid 861).  Exit status = 0.
```

Error Messages

This section lists all the error messages that may be generated by MUXDIAG along with brief explanations. The messages are listed in numerical order. Listed below each error message are probable cause and recommended action statement. The actual cause and action may differ from this list depending upon the particular circumstances of a given situation.

Error messages without the **MUXERR #** or **DSSERR #** trailer are generated by the Online Diagnostic Subsystem or the operating system. For errors outside of MUXDIAG, consult the DUI section of this manual and the operating system manuals.

The following error messages with the **DSSERR #** trailer are displayed by MUXDIAG.

2400 ***** DOWNLOAD TO MUX RAM FAILED COULD NOT OPEN /etc/*file* AS HP-UX STDIN (DSSERR 2400)**

CAUSE The HP-UX download file, **/etc/*file*** could not be found (file does not exist, incorrect file, incorrect permissions, incorrect file name, and/or incorrect location).

ACTION Obtain the download file with the correct name and permissions; make sure it is placed in the correct location. Refer to the *HP-UX System Administrator Manual.*

2401 ***** DOWNLOAD TO MUX RAM FAILED COULD NOT DUP /dev/diag/*mux** AS HP-UX STDOUT, FILE DESCRIPTOR WAS *fd* (DSSERR 2401)**

CAUSE The file descriptor of the MUX card device file **/dev/diag/*mux*** could not be duplicated by the HP-UX **dup(2)** system call. **Dup(2)** returned the value *fd*. The problem could be due to one or more of the following reasons:

/dev/diag/*mux* is being used by another program.
/dev/diag/*mux* could not be found (does not exist, incorrect permissions, incorrect file name, and/or incorrect location).

ACTION There is a system problem causing the operating system to execute incorrectly.
Obtain the **/dev/diag/*mux*** and permissions; make sure it is placed in the correct location. Refer to the *HP-UX System Administrator Manual.* If the system is having problems, either troubleshoot the system or reboot.
Refer to the Troubleshooting Chapter of the computer's *Hardware Support Manual.*

2402 ***** DOWNLOAD TO MUX RAM FAILED HP-UX COULD NOT EXEC /etc/download (DSSERR 2402)**

CAUSE The HP-UX program **/etc/download** could not be executed (does not exist, incorrect file, incorrect permissions, incorrect file name, and/or incorrect location).
There is a system problem causing the operating system to execute incorrectly.

ACTION Obtain the **/etc/download** program file with the correct name and permissions; make sure it is placed in the correct location.
Refer to the *HP-UX System Administrator Manual.* If the system is having problems, either troubleshoot the system or reboot.
Refer to the Troubleshooting Chapter of the computer's *Hardware Support Manual.*

2403	***** DOWNLOAD TO MUX RAM FAILED = || HP-UX PROCESS EXIT STATUS *nnnn* (DSSERR 2403)**
CAUSE	The value *nnnn* There may be an internal error in **/etc/download**.
ACTION	Try running MUXDIAG again before calling the HP Sales and Service Office.

2404	***** DOWNLOAD TO MUX RAM FAILED = || = HP-UX ABNORMAL PROCESS EXIT STATUS = *nnnn* (DSSERR 2404)**
CAUSE	The value *nnnn* **/etc/download**. There may be a system problem or system crash.
ACTION	Try running MUXDIAG again before calling the HP Sales and Service Office.

2405	***** WARNING - FRONTPLANE LOOPBACK TEST WAS SKIPPED BECAUSE THE CARD FIRMWARE WAS NOT LOADED (DSSERR 2405)**
CAUSE	The RAM code in the MUX card has not been downloaded.
ACTION	Download the RAM code by running the Section 2 - CLEAR test of MUXDIAG.

2406	***** THE MUX CARD SPECIAL FILE WAS NOT OPENED BECAUSE A DEADLOCK WOULD HAVE OCCURRED; RUN THE MUX DIAGNOSTIC FROM A TERMINAL CONNECTED TO ANOTHER MUX CARD. (DSSERR 2406)**
CAUSE	The user attempted to run MUXDIAG from a terminal connected to the card being tested.
ACTION	Run MUXDIAG from a terminal connected to another MUX card. Although it is not recommended to run MUXDIAG from a terminal on a MUX card being tested, it is possible to do so. An example of re-directing HP-UX input and output with an HP-UX command is shown below. As superuser and in the C shell (**csh**), type the following commands. The **#** prompt is the shell prompt. **# csh** **# echo "mode sum ** **run muxdiag dev=mux0" | sysdiag >& /tmp/muxdiag.out** **# cat /tmp/muxdiag.out** Remember that MUXDIAG is a destructive test and the integrity of the data can not be guaranteed.

5001	**INVALID PARAMETER (MUXERR 5001)**
CAUSE	Invalid parameter or command was entered.
ACTION	Check the list of RUN Command Options and rerun MUXDIAG.

5002	**INTERNAL DIAGNOSTIC ERROR (MUXERR 5002)**
CAUSE	An internal error has occurred within the diagnostic.
ACTION	Note the occurence of the error and call your HP Sales and Service Office.

5003	**NO HELP ON** *aaaa*
CAUSE	An invalid command was entered in the **RUN MUXDIAG** runstring.
ACTION	Check the list of RUN Command Options and rerun MUXDIAG.

5004	**TEST FAILED. (MUXERR 5004) DATA =**
CAUSE	
ACTION	

The following error messages with the **MUXERR #** trailer are displayed by specific sections of MUXDIAG.

5005	**I/O FAILURE OCCURRED TRYING TO DO LOOPBACK (MUXERR 5005)**
CAUSE	This message occurs when the FAILURE CODE is 2 on either loopback test from Section 4 - LOOPBACK.
ACTION	The MUX card may be bad. Perhaps run the channel diagnostics. Check the device access permissions by running Sections 2, 5, 10. If these sections execute without internal errors and if the loopback FAILURE CODE continues to be 2, the MUX card is bad. Remove and replace the card by following instructions in the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.*

5006	**FRONTPLANE LOOPBACK TEST FAILED. (MUXERR 5006)** **FAILURE CODE =** *x* **where** *x* **is 1=data error, 2=I/O error** **DATA = 0xyy where yy is a hexadecimal number for the data** **PORT =** *z* **where** *z* **is the port number 0-5**
CAUSE	The Section 4 - LOOPBACK test failed when the Step 2 - FRONTPLANE LOOPBACK test executed.
ACTION	If the FAILURE CODE is 1, the MUX card is bad. Remove and replace the card by following instructions in the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.* If the FAILURE CODE is 2, refer to the ACTION in MESSAGE 5005.

5007	**BACKPLANE LOOPBACK TEST FAILED. (MUXERR 5007)** **FAILURE CODE =** *x* **where** *x* **is 1=data error, 2=I/O error** **DATA = 0xyy where yy is a hexadecimal number for the data** **PORT =** *z* **where** *z* **is the port number 0-5**
CAUSE	The Section 4 - LOOPBACK test failed when the Step 1 - BACKPLANE LOOPBACK test executed.
ACTION	If the FAILURE CODE is 1, the MUX card is bad. Remove and replace the card by following instructions in the *HP-UX 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.* If the FAILURE CODE is 2, refer to the ACTION in MESSAGE 5005.

5008	**SELFTEST OF MUX CARD FAILED. (MUXERR 5008)**
CAUSE	The Section 5 - SELFTEST or Section 2 - CLEAR (selftest) test failed.
ACTION	The MUX card is bad. Remove and replace the card by following instructions in the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.*
5009	**WRITE/READ TEST FAILED TO WRITE ENOUGH DATA. (MUXERR 5009) WROTE** *zzz* **BYTES, BUT SHOULD HAVE WRITTEN** *yyy* **BYTES.**
CAUSE	The Section 10 - WRITE/READ test failed.
ACTION	The MUX card is bad. Remove and replace the card by following instructions in the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.*
5010	**WRITE/READ TEST FAILED TO READ ENOUGH DATA. (MUXERR 5010) READ** *zzz* **BYTES, BUT SHOULD HAVE READ** *yyy* **BYTES.**
CAUSE	The Section 10 - WRITE/READ test failed.
ACTION	The MUX card is bad. Remove and replace the card by following instructions in the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.*
5011	**WRITE/READ TEST OF THE MUX CARD FAILED. (MUXERR 5011) BYTE AT BUFFER** *x* **was** *y*, **BUT SHOULD HAVE BEEN** *z*.
CAUSE	The Section 10 - WRITE/READ test failed.
ACTION	The MUX card is bad. Remove and replace the card by following instructions in the *HP 27140A Asynchronous 6-Channel Multiplexer Hardware Reference Manual.*

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7

LAN Diagnostic

Introduction

The LAN Diagnostic (Local Area Network Device Adapter Diagnostic, LANDAD) tests the local area network interface controller (LANIC), part number 27125-60201. The diagnostic will run on any HP Precision Architecture computer system which supports the Online Diagnostic subsystem. LANDAD is capable of detecting a failure in one or more field replaceable units (FRUs). For LANDAD, an FRU is considered to be the LAN interface controller (LANIC) card, the LANIC connector cable, the attachment unit interface (AUI) cable, the medium attachment unit (MAU), and the coaxial tap or BNC tee. LANDAD will accomplish the following:

- Identify the product type and node address of the LANIC
- Report the status of the LANIC
- Report the link statistics of the LANIC
- Reset the LANIC
- Perform selftest on the LANIC
- Execute a local or external loopback
- Send TEST or XID (exchange identification) packets to a remote node and interpret the results
- Perform AUI cable and MAU fault tests

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing Product Number 30600-10013.

Minimum Configuration

The minimum required hardware and software consists of the following:

- A functional HP Precision Architecture computer system.
- LAN interface controller, (LANIC) part number 27125-60201.
- Connector cable (stub cable), part number 27125-63009.
- HP 92254A 6-Meter AUI Cable (only used with the HP 30241A MAU)
- HP 30241A Medium Attachment Unit ("known good MAU") for use on thick LAN cable
- HP 92257B MAU Test Fixture for use with the HP 30241A MAU,
- HP 24861A ThinMAU ("known good MAU") for use on ThinLAN cable
- HP 92227Q ThinMAU Test Fixture for use with the HP 24861A ThinMAU
- MPE XL or HP-UX operating system
- Online Diagnostic subsystem (includes LANDAD)

Operating Instructions

Before attempting to run the diagnostic, ensure that all LAN components are installed, connected, and that all LAN links have been configured.

Note

As of MPE XL 1.2, LANDAD can no longer verify the LAN card hardware, before the software is installed and configured. Specifically, the network interface must be configured, and the `NETCONTROL START;NET=LAN` command must be issued, before LANDAD can verify the hardware.

Default Tests

If you do not specify sections and steps to be run, the following default sections and steps will be executed:

Section 3	Identify
Section 4	Local Loopback
Section 6	Status

RUN Command

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

```
SYSDIAG
```

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

```
%/usr/diag/bin/sysdiag
```

The system responds with the following prompt indicating that access has been gained to the Online Diagnostic User Interface (DUI).

```
DUI>
```

Typing **HELP** causes a summary of the DUI and its commands to be printed. Refer to the DUI chapter 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 in an MPE XL environment, you might enter:

```
DUI > RUN LANDAD pdev=4.4 <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
```

Test Execution

If the LANIC is already in use by the diagnostic system, the system will not grant access to it and the following message will be returned:

```
*** ERROR -- LANIC ALREADY IN USE BY DIAGNOSTIC SYSTEM (LANDADERR 5000)
*** Someone is already diagnosing the LANIC that you requested.
*** It is illegal to have two copies of LANDAD diagnosing the same LANIC
*** at the same time.
```

The diagnostic terminates after outputting this error message. Control will return to the Online Diagnostic subsystem upon completion of the requested/default sections and steps.

If the user specifies a destructive section among those requested, the security level of the user is checked to verify that it is adequate to perform the test (Level 0 or Level 1). If the security level is not adequate, the following error message is printed and the user is returned to the DUI prompt.

```
*** INSUFFICIENT SECURITY LEVEL.  (LANDADERR 5043)
```

If the user specified destructive sections, the following message is printed and the user is prompted for a yes or no answer.

```
A destructive section has been selected.
Do you wish to continue (Y/N) [ N ]?
```

If the user types "no", the diagnostic is terminated and the user is returned to the DUI prompt.

On MPE XL systems, when the diagnostic is invoked, it checks if the user is at a terminal that is connected to the computer via a Distributed Terminal Controller (DTC) port that uses the LANIC that is to be diagnosed. If the terminal is not connected via such a port, the diagnostic proceeds normally. If the user is at a port of this type, the diagnostic checks to see if any destructive sections are specified. If not, the diagnostic proceeds normally. If there are, the following message is displayed:

```
*** WARNING -- DESTRUCTIVE SECTIONS CAN NOT BE RUN FROM YOUR TERMINAL.
*** DESTRUCTIVE SECTIONS MAY ONLY BE RUN FROM A TERMINAL THAT IS NOT
*** CONNECTED THROUGH THE LANIC TO BE DIAGNOSED.  THE FOLLOWING
*** SECTIONS CAN BE PERFORMED FROM YOUR TERMINAL: 1,3,4,6,7,9,10.
*** NO OTHER SECTIONS CAN BE SPECIFIED. (LANDADWARN 6000)
```

If at any time the number of errors generated reaches the limit specified by you in the ERRCOUNT parameter, the following message will be output:

```
*** THE MAXIMUM NUMBER OF ERROR MESSAGES HAS BEEN EXCEEDED.
    (LANDADERR 99)
```

The diagnostic will then terminate. If the ERRPAUSE parameter of the **RUN** command was assigned to "on", the diagnostic will stop after each error is generated and ask if the test should be continued:

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

If the response is "Y", the test will resume (if possible); if the response is "N", the diagnostic will terminate. If the sections and steps specified by you 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 for information, you may enter "exit" to terminate the diagnostic. Either the entire word or only the first letter of the word 'exit' need be entered, in either upper or lower case. If you exit in this manner, the following message is displayed:

```
Exiting LANDAD per user request ...
```

Any time that the diagnostic is not prompting for information, you may enter an interrupt character (CTRL Y for MPE XL and usually CTRL C for HP-UX). When the diagnostic detects the interrupt, one of two actions will occur. If the diagnostic is at a point where it can suspend, it will print the following message and return control to the Online Diagnostic subsystem.

```
LANDAD suspended per user request ...
```

You may then either resume or abort the diagnostic. If the diagnostic cannot suspend at this point, the following message will be printed:

```
Unable to suspend in current state, Aborting LANDAD ...
```

At this point, LANDAD will be aborted and control will be returned to the Online Diagnostic subsystem.

Caution

On MPE XL, you should never abort LANDAD when sections 3, 4, 9, or 10 are specified. This can cause the diagnostic to lose functionality the next time the diagnostic is run.

Upon termination of the diagnostic, control will return to the Online Diagnostic subsystem.

Test Execution

The following example illustrates running sections 1 through 12 of the diagnostic on an HP-UX system, using the CIO LANIC number 27125.

All user input appears to the right of any system, subsystem, or diagnostic program prompt. Section 1—More Help pauses after printing the first paragraph. If you need information about other sections, enter the appropriate section number. If you want to continue to section 2, merely press Return (see the example below).

```
%/usr/diag/bin/sysdiag

      ********************************************************************
      ******                                                        ******
      ******              ONLINE DIAGNOSTIC SUBSYSTEM               ******
      ******                                                        ******
      ******            (C) Hewlett Packard Co. 1987                ******
      ******                 All Rights Reserved.                   ******
      ******                   DUI version 1.0                      ******
      ******                                                        ******
      ********************************************************************

DUI 1>run landad pdev=8.4 sec=1/12

      ********************************************************************
      ******                                                        ******
      ******       LANDAD LAN Device Adapter Diagnostic             ******
      ******                                                        ******
      ******            (C) Hewlett Packard Co. 1986,1987,1988      ******
      ******                All Rights Reserved.                    ******
      ******                  Version A.01.00                       ******
      ******                                                        ******
      ********************************************************************

      Welcome, Today is Wed Nov 04 11:01:19 1987

      A destructive section has been selected.
      Do you wish to continue (Y/N) [ N ]? y
```

```
Section 1 -- More Help

   This Section allows you to get more information on all of the
   sections [1..12] 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

End of Section 2 -- Reset

Section 3 -- Identify

   ID byte  = $06 (CIO LANIC).
   Hardware revcode  = 2.
   CIO firmware datecode = 2716.
   CIO firmware ID   = 1.
   NOVRAM (permanent) station address     = $08-00-09-00-AE-5B.
   RAM (currently active) station address = $08-00-09-00-AE-5B.

End of Section 3 -- Identify

Section 4 -- Local Loopback

    Logging SSAP with driver ...
    Sending data to LANIC ...
    Receiving data from LANIC ...
    A frame has been successfully transmitted onto the network media.
    Path to LANIC is functional.

End of Section 4 -- Local Loopback

Section 5 -- Selftest

    Selftest Completed Successfully.
    The LANIC is functional.

End of Section 5 -- Selftest
```

```
Section 6 -- Status

    LANIC status has been read successfully.
    LANIC passed selftest.
    LANIC is online.
    MAU power fuse is OK.
    Free transmit buffers =     4; Maximum =     4.
    Full receive buffers  =     0; Maximum =    16.
    Read data ARQ frame threshold =     1.
    Read data ARQ timeout limit   =     1.
                              RAM value            NOVRAM value
    ==========================(Current)===========(Default)=========
    Station address           $08-00-09-00-AE-5B  $08-00-09-00-AE-5B
    Receive bad frames        Disabled            Disabled
    Receive multicast frames  Enabled             Disabled
    Receive broadcast frames  Enabled             Disabled
    Receive all frames        Disabled            Disabled
    ================================================================
    The following multicast addresses are recognized:
    $09-00-09-00-00-01

End of Section 6 -- Status

Section 7 -- Link Statistics

   Step 71 - Read and Display Link Statistics
      Link level statistics have been read successfully.

      Transmit Statistics=====================================

      TOTAL frames transmitted without error.................0
        Deferred transmits...................................0
        One collision transmits..............................0
        More than one collision transmits....................0
      TOTAL frames NOT transmitted...........................0
        Retry errors.........................................0
        Late collisions......................................0
        Loss of carrier during transmit......................0
      No heartbeat detected after transmission...............0
      No free transmit buffers...............................0
      TDR of last retry error................................0
      Infinite deferral errors...............................0
    Receive Statistics======================================
      TOTAL frames received without error....................0
      Frames rejected by address filter......................0
      Frames rejected due to CRC errors......................0
      Frames rejected due to alignment errors................0
      Frames rejected due to oversize length.................0
      LANCE indicated one or more frames lost................0
      No free receive buffers................................0
   End of Step 71 - Read and Display Link Statistics
```

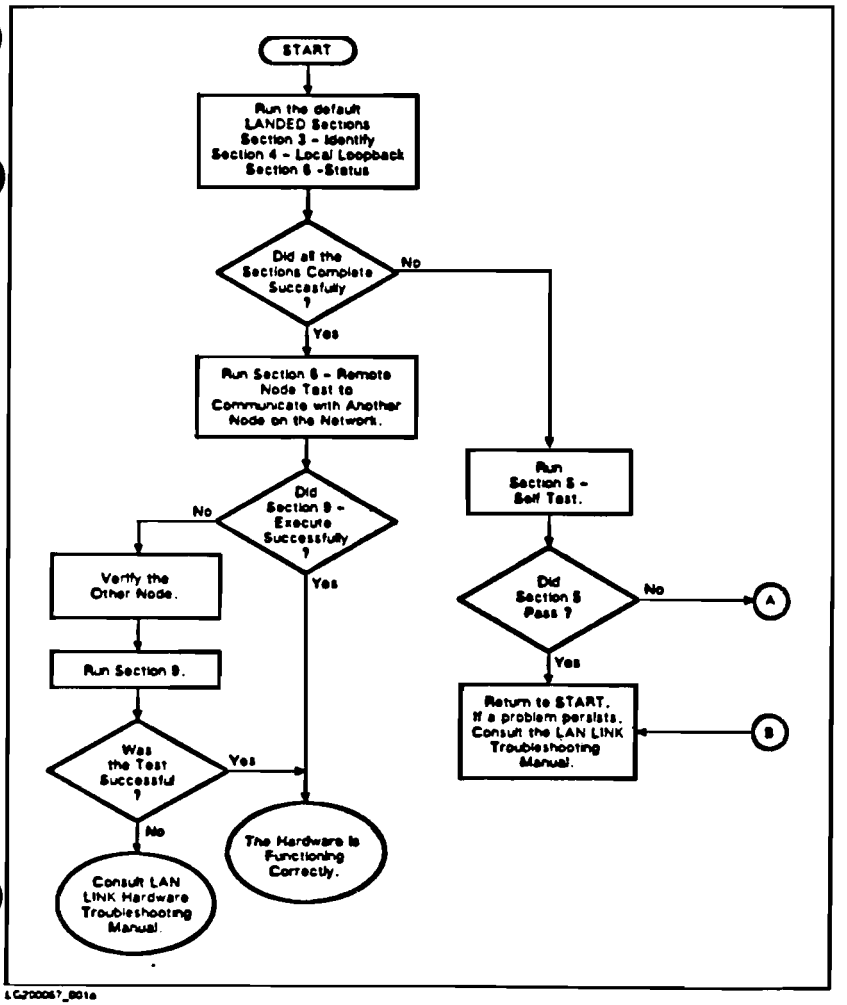
```
End of Section 7 -- Link Statistics

Section 8 -- External Loopback

   A link frame has been successfully transmitted
   and received from the network cable.

End of Section 8 -- External Loopback

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 (Six HEX bytes) => 08000900ae5b
   Number of test frames to send ("0" for infinite) [10] =>
   Length of test frames in bytes (60..1514) [500] =>

   Press the interrupt character (usually <Control-C>)
   to prematurely stop the test.

.... .... ..
   10 out of 10 TEST frames echoed successfully (100%).

End of Section 9 -- Remote Node Test

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 (Six HEX bytes) => 08000900ae5b
   Remote DSAP Address (one even hex byte between $00 and $FE) [$00] =>
   Sending XID command frame ...
   Received XID response frame ...

   Remote DSAP $00 has class I service.

End of Section 10 -- Remote XID Test
```

```
Section 11 -- AUI Cable Fault Isolation

   This section sends a number of external loopback frames out to a
   MAU (HP30241A) connected to a terminated loopback fixture (HP92257B)
   to form a loopback hood.  The status from each frame is displayed on the
   screen.  By moving the MAU and loopback fixture to various AUI cable
   connector junctions, faults in the AUI cable can be located.

   The following activity indicators are used:
   "P" = External loopback was successful.
   "L" = Loss of carrier detected.
   "R" = Retry fault detected.  (Check loopback MAU and loopback fixture.)
   "I" = Infinite deferral detected.  (Check terminators.)
   A new indicator is posted after each frame is sent.

   Press the interrupt character (usually <Control-C>)
   to stop the test.

   PPPPPInterrupt

P

   Type <return> after the AUI cable has been replaced:

End of Section 11 -- AUI Cable Fault Isolation
  Section 12 -- Offline MAU Test

     This section requires that the MAU be removed from the LAN
     cable and connected to a terminated loopback fixture.

     Please input type of MAU that this LANIC is connected to:
     Choices are:
     1) HP30241A (MAU)
     2) HP28641A (ThinMAU)
     3) OTHER
     Please select MAU type (1-3) => 1
     Step 121 - Two Terminator Test

       Please connect the HP30241A MAU to a HP92257B terminated
       loopback fixture.  Be certain that both 50-ohm terminators are
       firmly attached.

       Type <return> when loopback hood is connected:

       The following activity indicators are used:
       "P" = External loopback was successful.
       "R" = Retry fault detected.
       "L" = Loss of carrier detected.  (Check AUI cable connections.)
       "I" = Infinite deferral detected.  (Check terminators.)
```

```
        A healthy MAU should show 8 "P"'s ...
        PPPPPPPP
      End of Step 121 - Two Terminator Test

      Step 122 - One Terminator Test

         Please connect the HP30241A MAU to a HP92257B terminated
         loopback fixture.  Remove one 50-ohm terminator from the
         loopback fixture.
         Type <return> after terminator has been removed:

         The following activity indicators are used:
           "P" = External loopback was successful.
           "R" = Retry fault detected.
           "L" = Loss of carrier detected.  (Check AUI cable connections.)
           "I" = Infinite deferral detected.  (Check terminators.)

         A healthy MAU should show 8 "R"'s ...

           RRRRRRRR
         Type <return> after the terminator has been replaced:

       End of Step 122 - One Terminator Test

    End of Section 12 -- Offline MAU Test

    landad terminated (pid 7495).  Exit status = 0.
DUI 2>exit #
```

Troubleshooting With LANDAD

Figures 7-1 and 7-2 contain flowcharts which demonstrate the LANDAD troubleshooting sequence.



LCJ700057_801a

Figure 7-1. Troubleshooting with LANDAD (1 of 2)

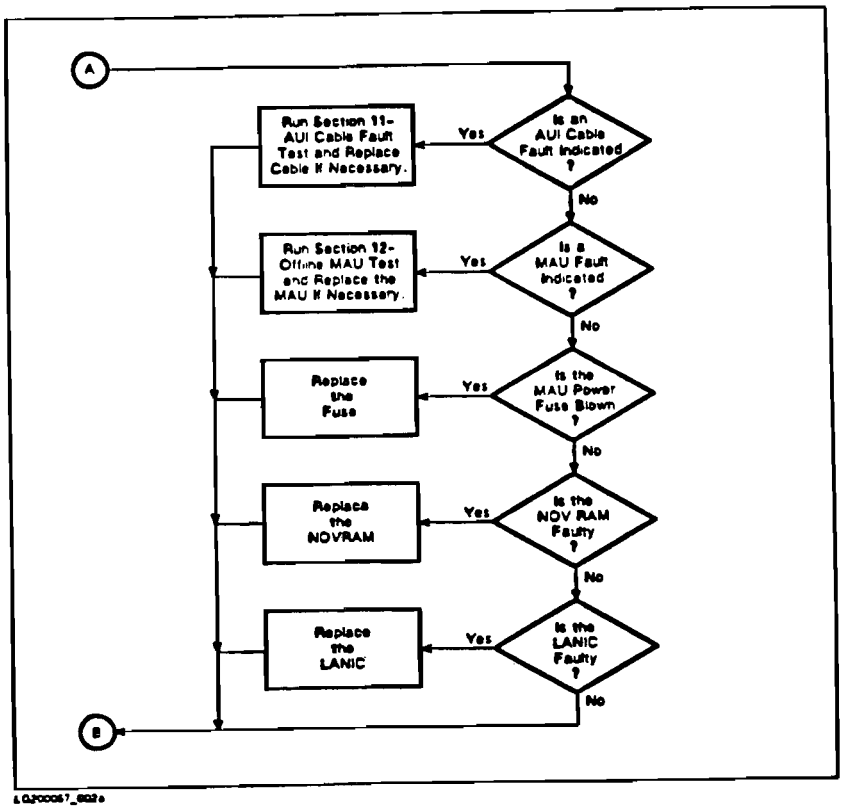


Figure 7-2. Troubleshooting with LANDAD (2 of 2)

Test Section Descriptions

There are twelve diagnostic program sections available with LANDAD. You may also select individual steps to be run for sections 7 and 12. LANDAD's sections and steps are summarized below.

Section 1	More Help
Section 2	Reset
Section 3	Identify
Section 4	Local Loopback (to LANIC and back)
Section 5	Selftest
Section 6	Status
Section 7	Link Statistics
Step 71	Read and decode link statistics
Step 72	Reset link statistics
Section 8	External Loopback
Section 9	Remote Node Test
Section 10	Remote XID Test
Section 11	AUI Cable Fault Isolation Test
Section 12	Offline MAU Test
Step 121	Two Terminator Test
Step 122	One Terminator Test

Section 1—MORE HELP

More Help is an interactive section which allows you to obtain more information about each of the sections or steps. If no errors are generated, the diagnostic will output the following message:

```
Section 1 -- More Help

   This Section allows you to get more information on all of the
   Sections [1..12] 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 >><Return>

End of Section 1 -- More Help
```

If you had entered a section number to the prompt, the message from the message catalog for the specified section would be displayed.

If you input a number of a test that is not present (i.e., not 1 through 12), the following message is displayed:

```
There is no Section n. Valid Sections are [1..12].
More Help >>
```

You are prompted again for input.

Section 2—RESET

Reset causes a reset of the LANIC to its power on state. All pertinent data needed by the LANIC to operate properly will then be downloaded to the LANIC. If, after a reset of a LANIC that is offline due to bad hardware, the LANIC indicates that it passed its selftest, the system will put the LANIC into the online state.

Note

It is better to do a SELFTEST command (Section 5) to bring the LANIC back online because it checks status of the LANIC and displays what has failed if the LANIC is really broken.

If Section 2 completes successfully, it will put the LANIC into the online state, even if it is in the offline state when Section 2 is called.

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

```
Section 2 -- Reset

End of Section 2 -- Reset
```

Section 3—IDENTIFY

Identify tells the system to issue a Status command to the LANIC. This command then decodes the information obtained and displays it in a manner that is informative to the user. This section can be used to determine what the LANIC hardware and firmware datecodes are. It is also useful in that if it executes successfully, the path from the diagnostic to the LANIC is at least partially functional.

Output:

If you are diagnosing a CIO LANIC:

```
Section 3 -- Identify

ID byte                = $06 (CIO LANIC).
Hardware revcode       = !.
CIO firmware datecode  = !.
CIO firmware ID        = !.
NOVRAM (permanent) station address     = !.
RAM (currently active) station address = !.
Driver revcode         = !.

End of Section 3 -- Identify
```

If the "NO SQE" jumper is configured, the following message will be displayed:

```
"NO SQE" (ETHERNET 1.0) jumper is configured.
```

If the CIO card ID byte is not $06, the following message is displayed:

```
*** CIO card ID byte = ! (UNKNOWN PRODUCT); EXPECTING $06 (LANIC)
```

If the LANIC has previously issued a Protocol ERror (PER) or a Dead Or Dying (DOD) AES status message, the following message will be printed:

```
Last failure code = $n
```

The datecodes are displayed in decimal; the station addresses are displayed as 6 hex bytes.

Note

Although Identify does not send an external loopback frame onto the network cable, it does report the status of the last external loopback that was performed. It is possible that an error could be reported for an error condition that has already been fixed. If this is the case, an external loopback (Section 8) should be performed. This sends out an external loopback frame and will clear the error (assuming that the problem has been fixed).

If an application has previously logged SSAP $F4, LANDAD will give the user three chances to enter a new SSAP to log. If SSAP $F4 is currently in use, the following message is displayed:

```
*** WARNING -- SSAP n ALREADY IN USE BY ANOTHER PROCESS
    (LANDADWARN 6006)

Please enter a different SSAP to log to (one hex byte) =>
```

If you enter the same SSAP, the following error message is displayed and the question is asked again:

```
** New SSAP must be different from old SSAP.
```

If you enter a non-valid SSAP address, the following error message is displayed and the question is asked again:

```
** n is not a valid SSAP.  A valid SSAP is an even number
** between $02 and $FE.  The SSAP must be entered in hex.
** The leading '$' is optional.
```

If you enter a Return, the following error message is displayed and the question is asked again:

```
** There is no default for this question.
```

If you try three times and none of these is successful, the following message is displayed and the rest of this section is not executed:

```
*** WARNING -- DIAGNOSTIC SSAP IN USE BY ANOTHER PROCESS (LANDADWARN 6004)
*** Another process has logged to the diagnostic SSAP.
*** This section can only be run after the other process finishes.
```

Note

Once a good SSAP has been found to log, the diagnostic will use that same SSAP when logging within the same instance of the diagnostic. It is possible that between the time that the diagnostic has terminated and when it is run again, another process will come along and log to that SSAP. If that is the case, the diagnostic will ask the above question again.

Section 4—LOCAL LOOPBACK

Local Loopback opens up the system for normal use and transmits a frame addressed to itself. The LANIC will loop this frame back on the card and send it back to the diagnostic. This test will test the data path from the diagnostic to the card and back. The data in the frame is known and a byte-for-byte comparison of the data is made to be certain that the data was not corrupted. Since the LANIC only loops back the frame if the transmission onto the network medium is successful, this test also checks all components from the network medium to the driver. If the transmission is not successful, LANDAD prints out what it thinks the problem was with the transmission. If no errors are generated, the diagnostic will output the following message:

```
Section 4 -- Local Loopback

   Binding to DAM ... (MPE XL) or Logging SSAP with driver ... (HP-UX)
   Sending data to LANIC ...
   Receiving data from LANIC ...
   A frame was successfully transmitted onto the network media.
   Path to LANIC is functional.
   Unbinding from DAM ... (MPE XL)

End of Section 4 -- Local Loopback
```

If an application has previously logged SSAP $F4, LANDAD will give the user three chances to enter a new SSAP to log. If SSAP $F4 is currently in use, the following message is displayed:

```
*** WARNING -- SSAP n ALREADY IN USE BY ANOTHER PROCESS
    (LANDADWARN 6006)

       Please enter a different SSAP to log to (one hex byte) =>
```

If you enter the same SSAP, the following error message is displayed and the question is asked again:

```
** New SSAP must be different from old SSAP.
```

If you enter a non-valid SSAP address, the following error message is displayed and the question is asked again:

```
** n is not a valid SSAP.  A valid SSAP is an even number
** between $02 and $FE.  The SSAP must be entered in hex.
** The leading '$' is optional.
```

If you enter a Return, the following error message is displayed and the question is asked again:

```
** There is no default for this question.
```

If you try three times and none of these is successful, the following message is displayed and the rest of this section is not executed:

```
*** WARNING -- DIAGNOSTIC SSAP IN USE BY ANOTHER PROCESS (LANDADWARN 6004)
*** Another process has logged to the diagnostic SSAP.
*** This section can only be run after the other process finishes.
```

Note

Once a good SSAP has been found to log, the diagnostic will use that same SSAP when logging within the same instance of the diagnostic. It is possible that between the time that the diagnostic has terminated and when it is run again, another process will come along and log to that SSAP. If that is the case, the diagnostic will ask the above question again.

Section 5—SELFTEST

Selftest tells the LANIC to perform a hardware selftest. If the returned selftest status is abnormal, messages indicating the problem are displayed. Since selftest brings the card offline and aborts all current information transfers, it should only be done when necessary. If selftest passes, it will put the LANIC into the online state. If message LANDADWARN 6005 is ever displayed, Section 6 (Status) should be executed to see why the card went offline and then selftest should be performed to determine if the problem is still present.

Note

If this section completes successfully, it will put the LANIC into the online state, even if it is in the offline state when the section is called.

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

```
Section 5 -- Selftest

   Selftest completed successfully.
   The LANIC is functional.

End of Section 5 -- Selftest
```

Section 6—STATUS

Status is used to obtain information about the current state of the LANIC. If no errors are generated, the diagnostic will output the following message:

If you are diagnosing a CIO LANIC:

```
Section 6 -- Status

     LANIC status has been read successfully.
     LANIC passed selftest.
     LANIC is online.
     MAU power fuse is OK.
     Free transmit buffers = n; Maximum = n.
     Full receive buffers  = n; Maximum = nn.
     Read data ARQ frame threshold = n.
     Read data ARQ timeout limit  n.
                          RAM value              NOVRAM value
=========================(Current)=============(Default)========
Station address           $nn-nn-nn-nn-nn-nn$nn-nn-nn-nn-nn-nn
Receive bad frames        Disabled               Disabled
Receive multicast frames  Enabled                Enabled
Receive broadcast frames  Enabled                Enabled
Receive all frames        Disabled               Disabled
=================================================================
The following multicast addresses are recognized:
$09-00-09-00-00-01
$09-00-09-00-00-02

   End of Section 6 -- Status
```

If the LANIC failed selftest, the following message will replace the LANIC Passed Selftest message:

```
*** LANIC failed selftest. *** REPLACE THE LANIC ***
```

If the LANIC's power fuse is blown, the following message is displayed:

```
*** MAU power fuse is BLOWN. *** REPLACE FUSE ***
```

If the LANIC is offline, the following message replaces the LANIC is online message:

```
LANIC is offline.
```

The entire multicast list is printed. If no multicast addresses are in the multicast list, the following message is printed:

```
NO multicast addresses were found.
```

If the no SQE jumper is installed, the following message is printed:

```
"NO SQE" (Ethernet 1.0) jumper is configured.
```

Explanation of Status Values for CIO LANIC

This is a line by line explanation of the fields that the status command returns. The following is a listing of a typical status display with line numbers added. This listing is used to show which line number is being explained.

```
 1 =>   Section 6 -- Status
 2 =>
 3 =>   LANIC status has been read successfully.
 4 =>   LANIC passed selftest.
 5 =>   LANIC is online.
 6 =>   MAU power fuse is OK.
 7 =>   Free transmit buffers =     4; Maximum =     4.
 8 =>   Full receive buffers  =     0, Maximum =    16.
 9 =>   Read data ARQ frame threshold =     1.
10 =>   Read data ARQ timeout limit   =     1.
11 =>                            RAM value              NOVRAM value
12 =>   ========================(Current)============(Default)========
13 =>   Station address          $08-00-09-00-14-01   $08-00-09-00-14-01
14 =>   Receive bad frames       Disabled              Disabled
15 =>   Receive multicast frames Enabled               Enabled
16 =>   Receive broadcast frames Enabled               Enabled
17 =>   Receive all frames       Disabled              Disabled
18 =>   ================================================================
19 =>   The following multicast addresses are recognized:
20 =>   $09-00-09-00-00-01
21 =>   $09-00-09-00-00-02
22 =>
23 =>   End of Section 6 -- Status
```

LANIC selftest status (line 4) This line indicates whether the LANIC passed or failed selftest. If the LAN passed selftest, the following message will be displayed:

```
LANIC passed selftest.
```

If it failed selftest, the following message will be printed:

```
*** LANIC failed selftest. *** REPLACE THE LANIC ***
```

If this message is displayed, the LANIC interface card should be replaced. Note also that the rest of the information may or may not be valid.

LANIC online or offline status (line 5) This indicates if the LANIC is online or offline. Online means that the LANIC is ready to transmit and receive frames from the network media.

MAU power fuse status (line 6) This line indicates the status of the MAU power fuse. If the fuse is OK, the following message is displayed:

```
MAU power fuse is OK.
```

If the fuse is blown, the following message is printed:

```
*** MAU power fuse is BLOWN. *** REPLACE FUSE ***
```

Free transmit buffers (line 7)

This is the number of buffers that the LANIC has currently available for transmit frames. There is a one for one correspondence between frames and buffers. The maximum will equal 4 for the current CIO LANIC. It is normal for this number to vary between 0 and the maximum during normal network usage.

Full receive buffers (line 8)

This is the number of buffers that the LANIC has received from the network media that have yet to be read by the driver. There is a one for on correspondence between frames and buffers. The maximum will equal 16 for the current CIO LANIC. It is normal for this number to vary between 0 and the maximum during normal network usage.

Read data ARQ frame threshold (line 9)

This is the number of frames that must be received before the CIO LANIC will interrupt the host. If this value is non-zero and the read data ARQ timeout limit is zero, the CIO LANIC will interrupt as soon as a frame arrives.

Read data ARQ timeout limit (line 10)

This is the number of 10 millisecond periods that the CIO LANIC will interrupt the host after receiving a frame from the link but not receiving read ARQ frame threshold frames from the network media. If this value is non-zero and the frame threshold is zero, the CIO LANIC will interrupt as soon as a frame arrives.

Parameters in lines 13 through 17 have two values. The first is the RAM value. This is the value that the LANIC is currently using. The second is the NOVRAM value. This is the default value for that parameter that the LANIC will use when it is initially powered up.

Station address (line 13)

This is the six byte address that the LANIC will respond to. This address will also be used when sending out frames to the network media.

Receive bad frames (line 14)

This is either enabled or disabled. When enabled, the CIO LANIC will save bad frames that it receives and pass them up to the driver. When disabled, bad frames will be counted in statistics, but will be discarded.

Receive multicast frames (line 15)

This is either enabled or disabled. When enabled, the LANIC will receive frames sent to multicast addresses that it has been set up to receive. A list of up to 64 multicast addresses can be downloaded to the LANIC.

Receive broadcast frames (line 16)

This is either enabled or disabled. When enabled, the LANIC will receive frames sent to the broadcast address.

Receive all frames (line 17)

This is either enabled or disabled. When enabled, the CIO LANIC will attempt to receive all frames from the network media. When disabled, the LANIC will only receive frames sent to it's address and if receive broadcast frames is enabled, also frames sent to the broadcast address.

The following multicast addresses are recognized (line 19)

This is a list of all multicast addresses that the LANIC will respond to.

Note On HP-UX, only the first 16 multicast addresses can be displayed.

Section 7—LINK STATISTICS

Link Statistics allows you to read and display link statistics that the LANIC keeps. It also allows you to reset these link statistics.

This function has two steps: Step 71 is the default step. It reads link statistics from the LANIC and decodes them. To invoke this step, enter:

```
DUI > run landad devfile=/dev/diag/lan0 section=7
```

Alternatively, you may enter:

```
DUI > run landad devfile=lan0 section=7
```

The second function is the reset statistics function, Step 72. This function is disruptive since it modifies data on the LANIC. Since it is not a default step, you must specify step=72 in the RUN command, as follows:

```
DUI > run landad devfile=/dev/diag/lan0 section=7 step=72
```

Alternatively, you may enter:

```
DUI > run landad devfile=lan0 section=7 step=72
```

Step 71 - Read and Display Link Statistics

This step requests link level statistics from the LANIC through the system and displays the statistics. If no errors are generated, the diagnostic will output the following message:

```
Section 7 -- Link Statistics

   Step 71 - Read and Display Link Statistics
   Link level statistics have been read successfully.

   Transmit Statistics ================================
     TOTAL frames transmitted without error.....n
        Deferred transmits.....n
        One collision transmits.....n
        More than one collision transmits.....n
     TOTAL frames NOT transmitted.....n
        Retry errors.....n
        Late collision.....n
        Loss of carrier during transmit.....n
     No heartbeat detected after transmission.....n
     No free transmit buffers.....n
     TDR of last retry error.....n
     Indefinite deferral errors.....n
   Receive Statistics=================================
     TOTAL frames received without error.....n
     Frames rejected by address filter.....n
     Frames rejected due to CRC errors.....n
     Frames rejected due to alignment errors.....n
     Frames rejected due to oversize length.....n
     LANCE indicated one or more frames lost.....n
     No free receive buffers.....n
   End of Step 71 - Read and Display Link Statistics
```

```
End of Section 7 -- Link Statistics
```

Step 72 - Reset Link Statistics

This section resets the link statistics on the LANIC. If no errors are generated, the diagnostic will output the following message:

```
Section 7 -- Link Statistics

   Step 72 - Reset Link Statistics
   Link statistics reset successfully.
   Link level statistics have been read successfully

   Transmit Statistics ================================

     TOTAL frames transmitted without error.....0
        Deferred transmits.....0
        One collision transmits.....0
        More than one collision transmits.....0
     TOTAL frames NOT transmitted.....0
        Retry errors.....0
        Late collision.....0
        Loss of carrier during transmit.....0
     No heartbeat detected after transmission.....0
     No free transmit buffers.....0
     TDR of last retry error.....0
     Indefinite deferral errors.....0
   Receive Statistics==================================
     TOTAL frames received without error.....0
     Frames rejected by address filter.....0
     Frames rejected due to CRC errors.....0
     Frames rejected due to alignment errors.....0
     Frames rejected due to oversize length.....0
     LANCE indicated one or more frames lost.....0
     No free receive buffers.....0
   End of Step 72 - Reset Link Statistics
End of Section 7 -- Link Statistics
```

Section 8—EXTERNAL LOOPBACK

External Loopback first takes the card offline and then tells the LANIC to perform an external loopback test. This test transmits and receives a frame from the network cable. If this test passes, the following things have a high probability of being functional:

- This Network Cable Segment
- Both 50 ohm terminators
- This node's MAU Tap
- This node's MAU
- This node's AUI cable(s)
- This node's stub cable
- This node's LANIC

Note

If this section completes successfully, it will put the LANIC into the online state, even if it is in the offline state when the section is called.

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

```
Section 8 -- External Loopback

   A link frame has been successfully transmitted
   and received from the network cable.

End of Section 8 -- External Loopback
```

Section 9—REMOTE NODE TEST

Remote Node tests the ability of this node to bounce a packet 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 illustrates that the node can communicate with a remote node. Second, it can point to upper level software problems. If a frame can be bounced off another node using the diagnostic, but normal NS communications do not work, the problem is not the hardware, it's the upper level software.

This section sends an IEEE 802.2 test frame. This test frame can be any length from 60 bytes (a minimum 802.3 frame) to 1514 bytes (a maximum length 802.3 frame). The default is 500 bytes. 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 -0/+1. 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 you input a broadcast or multicast address as a response to the Remote Node Address prompt, an error message will be issued and you will be prompted again for a valid remote node address.

Note

Part of what this section tests is the receive threshold of the MAUs at the two nodes involved in the test. The worst case for this is when the two nodes are the maximum 500 meters (185 meters for ThinLAN) apart. Therefore, it is best if you attempt to bounce frames off a distant node.

Caution

The remote node MUST be capable of responding to IEEE 802.2 test frames, and that node must be in a state to answer those frames. For example, most systems must have the LANIC device driver installed and operating before test frames will be answered.

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

```
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 (Six HEX bytes) => 0800 0900 1401
   Number of test frames to send ("0" for infinite) [10] =>
   Length of test frames in bytes (60..1514) [500] =>
   Press <CTRL-Y> to prematurely stop the test.

.....

! out of ! TEST frames echoed successfully (!%).

End of Section 9 -- Remote Node Test
```

If the test is being run on an HP-UX system, the message is:

```
Press the interrupt character (usually <CTRL-C>)
to stop the test.
```

If you input an invalid remote node address, the following message will be displayed and you will be prompted again:

```
Address must be 12 hexadecimal digits with any combination of delimiters
Hexadecimal digits are in the set:
['0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F'].
Hexadecimal digits may be either upper or lower case.

Delimiters are in the set: [' ','-','$']
Examples:
  080009123ABC
  08-00-09-12-3A-BC
  $0800-0912-3ABC
  08 00    09 12   3a Bc
  0-$ 800--$-09-1$2--3abc
```

Only the first twelve digits are read including zeros. Since the address must be an individual address, the low bit of the high byte of the address is checked to see if it is set. If it is, the following message is displayed and you are re-prompted for the address:

```
Address must be an individual address i.e. the most significant byte
of the address must be even.  (An odd first byte indicates a group
address.)
Examples:
  Correct:
    08 00 09 00 12 AB

Incorrect:
  FF FF FF FF FF FF
  09 00 09 00 00 01
  01 02 03 04 05 06
```

If an application has previously logged SSAP $F4, LANDAD will give you three chances to enter a new SSAP to log to. If SSAP $F4 is currently in use, the following message is displayed:

```
*** WARNING -- SSAP n ALREADY IN USE BY ANOTHER PROCESS
    (LANDADWARN 6006)

    Please enter a different SSAP to bind to =>
```

If you enter the same SSAP, the following error message is displayed and the question is asked again:

```
** New SSAP must be different from old SSAP.
```

If you enter a non-valid SSAP address, the following error message is displayed and the question is asked again:

```
** n is not a valid SSAP.  A valid SSAP is an even number
** between $02 and $FE.  The SSAP must be entered in hex.
```

```
** The leading '$' is optional.
```

If you enter a Return, the following error message is displayed and the question is asked again.

```
** There is no default for this question.
```

If you try three times and none of these is successful, the following message is displayed and the rest of this section is not executed:

```
*** WARNING -- DIAGNOSTIC SSAP IN USE BY ANOTHER PROCESS (LANDADWARN 6004)
*** Another process has logged to the diagnostic SSAP.
*** This section can only be run after the other process finishes.
```

Note

Once a good SSAP has been found to log, the diagnostic will use that same SSAP when logging within the same instance of the diagnostic. It is possible that between the time that the diagnostic has terminated and when it is run again, another process will come along and log to that SSAP. If that is the case, the diagnostic will ask the above question again.

Section 10—REMOTE XID TEST

Remote XID Test allows you to send IEEE 802.2 XID command frames to a specified remote node and receive the response frame from the remote node. This section also decodes the response and displays what type of service is available at the remote node.

You are prompted for both the 6-byte remote node address and the 1-byte DSAP of the service on the remote system to which the XID frame should be sent. The addresses that you give must be individual addresses, i.e., they cannot be broadcast or multicast. Should you input one of these illegal addresses, an error message will be issued and you will be prompted again for a valid address. If no errors are generated, the diagnostic will output the following message:

```
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 (Six HEX bytes) => 0800 0900 1401
  Remote DSAP Address (one even hex byte between $00 and $FE) [$00] =>
  Sending XID command frame ...
  Received XID response frame ...

  Remote DSAP n has class I service.

End of Section 10 -- Remote XID Test
```

If the remote DSAP has class II service, the following message is displayed:

```
Remote DSAP n has class II service, window size = n.
```

If the remote DSAP has class III service, the following message is displayed:

```
Remote DSAP n has class III service.
```

If the remote DSAP has class IV service, the following message is displayed:

```
Remote DSAP n 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.
```

If you input an invalid remote node address, the following message will be displayed and you will be prompted again:

```
Address must be 12 hexadecimal digits with any combination of delimiters
Hexadecimal digits are in the set:
['0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F'].
Hexadecimal digits may be either upper or lower case.
Delimiters are in the set: [' ','-','$']
Examples:
  080009123ABC
  08-00-09-12-3A-BC
  $0800-0912-3ABC
  08 00    09 12   3a Bc
  0-$ 800--$-09-1$2--3abc
```

Since the address must be an individual address, the low bit of the high byte of the address is checked to see if it is set. If it is, the following message is displayed and you are re-prompted for the address:

```
Address must be an individual address i.e. the most significant byte
of the address must be even.  (An odd first byte indicates a group address.)
Examples:
  Correct:
   08 00 09 00 12 AB

  Incorrect:
    FF FF FF FF FF FF
    09 00 09 00 00 01
    01 02 03 04 05 06
```

If an application has previously logged SSAP $F4, LANDAD will give you three chances to enter a new SSAP to log to. If SSAP $F4 is currently in use, the following message is displayed:

```
*** WARNING -- SSAP n ALREADY IN USE BY ANOTHER PROCESS
    (LANDADWARN 6006)

Please enter a different SSAP to bind to =>
```

If you enter the same SSAP, the following error message is displayed and the question is asked again:

```
** New SSAP must be different from old SSAP.
```

If you enter a non-valid SSAP address, the following error message is displayed and the question is asked again:

```
** n is not a valid SSAP.  A valid SSAP is an even number
**  between $02 and $FE.  The SSAP must be entered in hex.
**  The leading '$' is optional.
```

If you enter a Return, the following error message is displayed and the question is asked again:

```
** There is no default for this question.
```

If you try three times and none of these is successful, the following message is displayed and the rest of this section is not executed:

```
*** WARNING -- DIAGNOSTIC SSAP IN USE BY ANOTHER PROCESS (LANDADWARN 6004)
*** Another process has logged to the diagnostic SSAP.
*** This section can only be run after the other process finishes.
```

Note

Once a good SSAP has been found to log to, the diagnostic will use that same SSAP when logging within the same instance of the diagnostic. It is possible that between the time that the diagnostic has terminated and when it is run again, another process will come along and log to that SSAP. If that is the case, the diagnostic will ask the above question again.

Section 11—AUI CABLE FAULT ISOLATION

AUI Cable Fault Isolation isolates a broken cable in the AUI cable segment. This is done by repeatedly sending external loopback frames and checking to see if the frame loopback was successful. If it was successful, a "P" is printed. If it was not, the reason that it was not is given on the screen. If the reason was loss of carrier error, an "L" is printed. This might indicate a broken AUI cable. If the reason is retry fault, an "R" is printed. This may indicate that the problem is a bad loopback hood.

To run this section, you first connect a terminated loopback fixture to the end of the stub cable. Then the test is started. Next, you disconnect the loopback hood at the stub cable, reconnect the stub cable to the AUI cable, and connect the loopback fixture to the opposite end of the AUI cable. If there are multiple AUI cables, you continue to do this until you get to the AUI cable which connects to the MAU. After doing all of this, the test is stopped (via CTRL-C on HP-UX or CTRL-Y on MPE XL) and the pattern of activity indicators is analyzed. If the pattern looks like this:

```
LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
```

The problem is most likely a bad stub cable. If the pattern looks like this:

```
PPPPLLLLPPPPLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
```

The problem is most likely the second AUI cable, or if there is only a single AUI cable, then the MAU. (This may not be obvious. The first set of Ps is where the stub cable passed the test. The next set of Ls is where the loopback hood was disconnected to connect it back to the AUI cable. The next set of Ps is where the first AUI cable passed. At this point, the problem is beyond the first AUI cable.)

Note: The last thing that this section does is reset the LANIC and the system. If the reset is successful, the LANIC is put into the online state, even if it is in the offline state when the section is started.

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

```
Section 11 -- AUI Cable Fault Isolation

   This section sends a number of external loopback frames out to a
   MAU (HP30241A) connected to a terminated loopback fixture (HP92257B)
   to form a loopback hood.  The status from each frame is displayed on the
   screen.  By moving the MAU and loopback fixture to various AUI cable
   connector junctions, faults in the AUI cable can be located.

   The following Activity indicators are used:
   "P" = External loopback was successful.
   "L" = Loss of carrier detected.
   "R" = Retry fault detected. (Check loopback MAU and loopback fixture.)
   "I" = Indefinite deferral detected. (Check terminators.)
   A new indicator is posted after each frame is sent.

   Press <control-Y> to stop the test.

   PPPPLLLLPPPPLLLLLLLLLL CTRL-Y
   Type <Return> after the AUI cable has been replaced.
End of Section 11 -- AUI Cable Fault Isolation
```

If the diagnostic is being run on an HP-UX machine, the "<CTRL-Y> to stop" message is replaced by the following message:

```
Press the interrupt character (usually <CTRL-C>) to stop the test.
```

Section 12—OFFLINE MAU TEST

Offline MAU Test provides a way to verify that a MAU is operating properly. In order to run this test, the MAU should be taken off the network cable and a terminated loopback hood (HP 92257B or HP 92257Q should be attached to it. You then run the first step of the test. This step expects that the loopback hood has both 50-ohm terminators attached. The test sends out a group of eight external loopback frames to the MAU. These frames should be transmitted and received successfully.

The next step of this test asks you to take one of the 50-ohm terminators off the loopback hood. It then sends eight external loopback frames to the MAU. These should all fail, indicating that Retry Errors have occurred. This test uses the same activity indicators as the AUI Fault Isolation Section.

Note

The last thing that this section does is to reset the LANIC and the DAM or driver. If the reset is successful, the LANIC is put into the online state, even if it was in the offline state when the section was called.

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

```
Section 12 -- Offline MAU Test

   This section requires that the MAU be removed from the LAN
   cable and connected to a terminated loopback fixture.

   Please input type of MAU that this LANIC is connected to:
   Choices are:
   1) HP30241A (MAU)
   2) HP28641A (ThinMAU)
   3) OTHER
   Please select MAU type (1-3) => 1

   Step 121 - Two Terminator Test

      Please connect the HP30241A MAU to a HP92257B terminated
      loopback fixture.  Be certain that both 50-ohm terminators are
      firmly attached.
      Type <return> when loopback hood is connected:

      The following activity indicators are used:
      "P" = External loopback was successful.
      "R" = Retry fault detected.
      "L" = Loss of carrier detected. (Check AUI cable connections.)
      "I" = Indefinite deferral detected. (Check terminators.)

      A healthy MAU should show 8 "P"s ...

      PPPPPPPP

   End of Step 121 - Two Terminator Test
```

```
Step 122 - One Terminator Test

  Please connect the HP30241A MAU to a HP92257B terminated
  loopback fixture.  Remove one 50-ohm terminator from the loopback
  fixture.
  Type <return> after terminator has been removed:

  The following activity indicators are used:
  "P" = External loopback was successful.
  "R" = Retry fault detected.
  "L" = Loss of Carrier detected. (Check AUI cable connections.)
  "I" = Indefinite deferral detected. (Check terminators.)

  A healthy MAU should show 8 "R"s ...

  RRRRRRRR
  Type <Return> after the terminator has been replaced.
End of Step 122 - One Terminator Test

End of Section 12 -- Offline MAU Test
```

If you respond to the MAU type question with a "2", you are told to use the test hood for the HP28641A ThinMAU (HP 92257Q). If you respond to this question with a "3", the diagnostic indicates that it cannot test a MAU in the other category and terminates the test.

Error Messages

The following is a list of error messages which may appear when using LANDAD. The messages are listed in numerical order, and, where applicable, the probable cause and recommended action are part of the message. The wording of some messages is slightly different for HP-UX and MPE XL. Where this is the case, it is pointed out by enclosing the MPE XL version in square brackets. Only those errors which are defined by LANDAD are shown here; however, other error messages may also be displayed. For other errors, consult the DUI section of this manual and the operating system manuals.

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

407	***** ERROR -- LENGTH OF RECEIVED FRAME <> LENGTH OF SENT FRAME. (LANDADERR 407)**
CAUSE	Length of actual frame sent = n. Length of actual frame received = n.
ACTION	

920	***** ERROR -- REMOTE RESPONDED, BUT SSAP IS WRONG. (LANDADERR 920)**
CAUSE	Expected response SSAP = $01; received SSAP = n. Probably logged [bound] over another application.
ACTION	

921	***** ERROR -- REMOTE RESPONDED, BUT CONTROL FIELD IS WRONG. (LANDADERR 921)**
CAUSE	Expected control field = $F3; received control field = n. Probably logged [bound] over another application.
ACTION	

922	***** ERROR -- REMOTE RESPONDED, BUT LENGTH FIELD IS WRONG. (LANDADERR 922)**
CAUSE	Expected length field is one of n or $0003. Received length field = n.
ACTION	

923	*****ERROR -- REMOTE RESPONDED, BUT ACTUAL LENGTH <> LENGTH FIELD. (LANDADERR 923)**
CAUSE	Frame length field = n; frame actual length = n.
ACTION	

924	***** ERROR -- REMOTE RESPONDED, BUT SEQUENCE NUMBER WRONG. (LANDADERR 924)**
CAUSE	Expected sequence number = n; received sequence number = n.
ACTION	

1020	***** ERROR -- REMOTE RESPONDED, BUT SSAP IS WRONG. (LANDADERR 1020)**
CAUSE	Expected response SSAP = n; received SSAP = n. Probably logged [bound] over another application.
ACTION	

1021	***** ERROR -- REMOTE RESPONDED, BUT FRAME IS TOO SHORT. (LANDADERR 1021)**
CAUSE	Expected frame length > 20 bytes; received frame length = n.
ACTION	

1022	***** ERROR -- REMOTE RESPONDED, BUT LENGTH FIELD IS WRONG. (LANDADERR 1022)**
CAUSE	Expected length field = 6; received length field = n.
ACTION	

1023	***** ERROR -- REMOTE RESPONDED, BUT CONTROL FIELD IS WRONG. (LANDADERR 1023)**
CAUSE	Expected control field = $BF; received control field = n. Probably logged [bound] over another application.
ACTION	

1024	***** ERROR -- REMOTE RESPONDED, BUT FORMAT IDENTIFIER IS WRONG. (LANDADERR 1024)**
CAUSE	Expected format identifier = $81; received format identifier = n.
ACTION	

1025	***** ERROR -- REMOTE RESPONDED, BUT UNKNOWN CLASS OF SERVICE. (LANDADERR 1025)**
CAUSE	Expected either $01, $03, $05, or $07; received n.
ACTION	

5000	***** ERROR -- LANIC ALREADY IN USE BY DIAGNOSTIC SYSTEM. (LANDADERR 5000)**
CAUSE	Someone is already diagnosing the LANIC that you requested. It is illegal to have two copies of LANDAD diagnosing the same LANIC at the same time.
ACTION	

5001	***** ERROR -- LANIC DID NOT PASS SELFTEST. (LANDADERR 5001)**
CAUSE	The LANIC failed its internal selftest.
ACTION	Please replace the LANIC.

5002	***** ERROR -- LANIC DOES NOT RESPOND. (LANDADERR 5002)**
CAUSE	[HP-UX] The problem may be one of the following: 1) The driver may not be configured properly. 2) The device is not a LANIC (LAN Inter-face Card). 3) The LANIC is completely inoperable. 4) There is no LANIC in the proper slot of the card cage. [MPE XL] The problem may be one of the following: 1) The LANIC is completely inoperable. 2) There is no LANIC in the proper slot of the card cage. 3) The DAM may not be configured properly.
ACTION	

5004	***** INTERNAL ERROR -- BAD SOFTWARE STATUS RECEIVED FROM LAN_DAR. (LANDADERR 5004)**
CAUSE	
ACTION	

5005	***** INTERNAL ERROR -- LAN_DAR INITIALIZATION FAILED. (LANDADERR 5005)**
CAUSE	
ACTION	

5006	***** ERROR -- MAU POWER FUSE BLOWN ON LANIC. (LANDADERR 5006)**
CAUSE	
ACTION	Replace Fuse on the LANIC. Beware of these other possible problems: 1) Broken MAU. 2) Shorted power lines in cabling to the MAU (AUI cable or stub connector cable). 3) Broken LANIC.

5007	***** ERROR -- DATA COMPARE ERRORS. (LANDADERR 5007)**
CAUSE	
ACTION	

5008 ***** ERROR -- RETRY FAULT DURING TRANSMIT. (LANDADERR 5008)**

CAUSE Time Domain Reflectometer (TDR) = n.

ACTION Check the following:

1) Unterminated NETWORK CABLE; check terminators.
2) Open or shorted terminator; check terminator resistance.
3) MAU not connected to NETWORK CABLE; check MAU tee or tap.
4) NETWORK CABLE open or shorted.
5) Faulty MAU.

5009 *****ERROR -- LOSS OF CARRIER DETECTED DURING TRANSMIT. (LANDADERR 5009)**

CAUSE

ACTION Check the following:

1)AUI cable not connected to frontplane connector.
2)AUI cable not connected to MAU.
3)Broken MAU.
4)Broken AUI cable.
5)MAU TAP shorted.
6)NETWORK CABLE shorted.
7)INT/EXT MAU jumper block defective.
8)LANIC broken.

5010 ***** ERROR -- LOSS OF CARRIER DETECTED DURING TRANSMIT. (LANDADERR 5010)**

CAUSE

ACTION Check the following:

1)Stub cable not connected to frontplane connector.
2) AUI cable not connected to stub cable.
3) AUI cable not connected to MAU.
4) Broken MAU.
5) Broken AUI cable.
6) Broken stub connector cable.
7) MAU TAP shorted.
8) NETWORK CABLE shorted.
9) LANIC broken.

5011 **ERROR -- LOSS OF CARRIER DETECTED DURING TRANSMIT. (LANDADERR 5011)**

CAUSE

ACTION Check the following:

1)MAU TEE shorted.
2)NETWORK CABLE shorted.
3)INT/EXT MAU jumper block defective.
4)LANIC broken.

5012	***** ERROR -- LATE COLLISION DETECTED DURING TRANSMISSION. (LANDADERR 5012)**
CAUSE	
ACTION	

5013	***** ERROR -- LANIC FAILED SELFTEST. (LANDADERR 5013)**
CAUSE	Internal Status: Interface Exception Status = n. Miscellaneous Status = n. Selftest/loopback Status = n n.
ACTION	Replace LANIC

5014	***** ERROR -- LOOPBACK FRAME WAS TRANSMITTED SUCCESSFULLY BUT WAS NOT RECEIVED BEFORE THE TIMEOUT. (LANDADERR 5014)**
CAUSE	This problem is probably a software routing problem.
ACTION	

5015	***** ERROR -- STATUS CALL FAILED. (LANDADERR 5015)**
CAUSE	
ACTION	

5016	***** ERROR -- BIND CALL FAILED. (LANDADERR 5016)**
CAUSE	
ACTION	

5017	***** ERROR -- UNBIND CALL FAILED. (LANDADERR 5017)**
CAUSE	
ACTION	

5018	***** ERROR -- TRANSMIT CALL FAILED. (LANDADERR 5018)**
CAUSE	
ACTION	

5019	***** ERROR -- RESET CALL FAILED. (LANDADERR 5019)**
CAUSE	
ACTION	

5020	***** ERROR -- SELFTEST CALL FAILED. (LANDADERR 5020)**
CAUSE	
ACTION	

5021	***** ERROR -- TRANSMIT ERROR, BUT CANNOT DETERMINE CAUSE. (LANDADERR 5021)**
CAUSE	A transmission error has occurred which caused the transmitted frame not to reach the NETWORK CABLE. For some reason (probably "sticky" statistic counters that have reached their maximum count) the actual error can not be determined.
ACTION	

5022	***** ERROR -- EXTERNAL LOOPBACK CALL FAILED. (LANDADERR 5022)**
CAUSE	
ACTION	

5023	***** ERROR -- BABBLE ERROR DURING EXTERNAL LOOPBACK. (LANDADERR 5023)**
CAUSE	This error is caused by out of date hardware.
ACTION	Please replace LANIC.

5024	***** ERROR -- FRAMING ERROR DURING EXTERNAL LOOPBACK. (LANDADERR 5024)**
CAUSE	
ACTION	

5025	***** ERROR -- OVERFLOW ERROR DURING EXTERNAL LOOPBACK. (LANDADERR 5025)**
CAUSE	
ACTION	

5026	***** ERROR -- CRC ERROR DURING EXTERNAL LOOPBACK. (LANDADERR 5026)**
CAUSE	
ACTION	

5027	***** ERROR -- UNDERFLOW ERROR DURING EXTERNAL LOOPBACK. (LANDADERR 5027)**
CAUSE	
ACTION	

5028	***** ERROR -- INCORRECT DEVICE TYPE. (LANDADERR 5028)**
CAUSE	The following may be the cause: 1) The device specified is not a LANIC. 2) There is a software configuration problem. Even though the device is a LANIC, the system thinks that it is some other type of device.
ACTION	

5029	***** ERROR -- EXTERNAL LOOPBACK FAILURE BUT CANNOT ISOLATE TO A CAUSE (LANDADERR 5029)**
CAUSE	
ACTION	Check the following: 1) The MAU is connected to the MAU TAP. 2) The network cable is terminated at both ends. 3) The network cable is shorted. 4) The MAU that the LANIC is connected to has jabbed the LANIC. Cycle power to the MAU to reset it. 5) Broken cabling to the MAU (AUI cable or stub connector cable). 6) Some other node on the network is babbling (sending data onto the network cable continually). If other nodes on the network exhibit this same failure, this is probably the cause.

5030	***** ERROR -- POWERFAIL MESSAGE RECEIVED FROM DRIVER [DAM]. (LANDADERR 5030)**
CAUSE	
ACTION	Please run diagnostic again. LANDAD Aborting.

5031	***** ERROR -- RECEIVE CALL FAILED. (LANDADERR 5031)**
CAUSE	
ACTION	

5032	***** ERROR -- RESET STATISTICS CALL FAILED. (LANDADERR 5032)**
CAUSE	
ACTION	

5033	***** ERROR -- THE NOVRAM IC ON THE LANIC HAS FAILED. (LANDADERR 5033)**
CAUSE	
ACTION	Please replace either the NOVRAM or the LANIC. The NOVRAM is HP part number n or equivalent. It is the socketed 18 pin Integrated Circuit (IC) on the LANIC. IMPORTANT NOTE: When you replace the NOVRAM or replace the LANIC, your station address will change.

5034	***** INTERNAL ERROR -- TRANSFER_COUNT WRONG ON GET_LAN_DA_STATUS CALL (LANDADERR 5034)**
CAUSE	transfer_ count = n; expecting between 96 and 480 inclusive.
ACTION	

5035	***** INTERNAL ERROR -- TRANSFER_COUNT WRONG ON BIND_TO_DAM CALL. (LANDADERR 5035)**
CAUSE	transfer_ count = n; expecting 12.
ACTION	

5036	***** INTERNAL ERROR -- TRANSFER_COUNT WRONG ON TRANSMIT_FRAME CALL. (LANDADERR 5036)**
CAUSE	transfer_ count = n; expecting n.
ACTION	

5037	***** INTERNAL ERROR -- TRANSFER_COUNT WRONG ON RECEIVE_FRAME CALL. (LANDADERR 5037)**
CAUSE	transfer_ count = n; expecting between 17 and 1514 inclusive.
ACTION	

5038	***** ERROR -- THE LANIC HAS ISSUED A PER EVENT AND TURNED ITSELF OFF. (LANDADERR 5038)**
CAUSE	The LANIC has sent an event to the driver indicating that a Protocol ERror (PER) has occurred. The actual ARQ status byte received by the driver was n.
ACTION	Please report this to your Hewlett-Packard Service Representative. Reset the LANIC.

5039	***** ERROR -- THE LANIC HAS ISSUED A DOD EVENT AND TURNED ITSELF OFF. (LANDADERR 5039)**
CAUSE	The LANIC has sent an event to the driver indicating that it was Dead or Dying (DOD). The actual ARQ status byte received by the driver was n.
ACTION	Please report this to your Hewlett-Packard Service Representative. Reset the LANIC.

5040	*****ERROR -- THE CIO LANIC HAS ISSUED A DOD EVENT AND TURNED ITSELF OFF INDICATING THAT IT TRIED 128 CONSECUTIVE TIMES TO TRANSMIT A FRAME ONTO THE NETWORK MEDIA BUT COULD NOT BECAUSE IT WAS DEFERRING TO CARRIER. (LANDADERR 5040)**
CAUSE	
ACTION	Check that both terminators are connected to the LAN cable and run LANDAD Section 5 (Selftest). Also, one of the following may be at fault: 1) The MAU that the LANIC is connected to has jabbed the LANIC. Cycle power to the MAU to reset it. 2) Some other MAU on the network is jabbering. 3) Broken cabling to the MAU (AUI cable or stub connector cable). 4) There is a DC voltage level on the LAN cable that is causing the MAU to assert its collision signal. 5) If the MAU is not an HP MAU, both terminators are not connected to the LAN cable. 6) The LANIC is broken.

5041	***** ERROR -- THE DRIVER REPORTS LOSS OF COMMUNICATION WITH LANIC. (LANDADERR 5041)**
CAUSE	The actual ARQ status byte reported by the driver was n. If this byte is $00 or $10, this indicates an I/O system error. Any other value indicates a LANIC error.
ACTION	Please report the state of the LEDs on the LANIC card and the ARQ status value to your Hewlett-Packard Service Representative.

5042	***** ERROR -- THE LANIC INDICATES THAT INFINITE DEFERRAL HAS BEEN DETECTED. (LANDADERR 5042)**
CAUSE	
ACTION	Check that both terminators are connected to the LAN cable and run LANDAD Section 5 (Selftest). Otherwise, one of the following may be at fault: 1) The MAU that the LANIC is connected to has jabbed the LANIC. Cycle power to the MAU to reset it. 2) Some other MAU on the network is jabbering. 3) Broken cabling to the MAU (AUI cable or stub connector cable). 4) There is a DC voltage level on the LAN cable that is causing the MAU to assert its collision signal. 5) If the MAU is not an HP MAU, both terminators are not connected to the LAN cable. 6) The LANIC is broken.

5043	***** INSUFFICIENT SECURITY LEVEL. (LANDADERR 5043)**
CAUSE	
ACTION	

5044	*****INT/EXT MAU JUMPER IS MISSING OR MISALIGNED (LANDADERR 5044)**
CAUSE	The jumper that determines if you are using the internal ThinMAU or external AUI connector is either missing or misaligned.
ACTION	

5045	**ERROR -- THE LANIC HAS ISSUED A STF EVENT AND TURNED ITSELF OFF. (LANDADERR 5045)**
CAUSE	The LANIC has sent an event to the driver indicating that its Selftest Failed (STF). The actual ARQ status byte received by the driver was n.
ACTION	Please report this to your Hewlett-Packard Service Representative. Please replace the LANIC.

5046	**ERROR -- THE LANIC HAS ISSUED A WTF EVENT AND GONE OFFLINE. (LANDADERR 5046)**
CAUSE	The LANIC has sent an event to the driver indicating that a Warning Test Failed (WTF) occurred. The actual ARQ status byte received by the driver was n.

6000	** WARNING -- DESTRUCTIVE SECTIONS CAN NOT BE RUN FROM YOUR TERMINAL. DESTRUCTIVE SECTIONS MAY ONLY BE RUN FROM A TERMINAL THAT IS NOT CONNECTED THROUGH THE LANIC TO BE DIAGNOSED. THE FOLLOWING SECTIONS CAN BE PERFORMED FROM YOUR TERMINAL: 1,3,4,6,7,9,10. NO OTHER SECTIONS CAN BE SPECIFIED. (LANDADWARN 6000)
CAUSE	
ACTION	

6002	*** WARNING -- NO SQE HEARTBEAT DETECTED WHEN USING "SQE" JUMPER CONFIGURATION. (LANDADWARN 6002)
CAUSE	The No SQE Heartbeat condition was detected.
ACTION	Run Section 7 Step 72 (Reset Link Statistics). Then run Section 4 (Local Loopback) with LOOPCOUNT=10. Next run Section 7 (Link Statistics). If six or more of the transmit attempts have caused the "No heartbeat detected after transmission" statistic to increment, a hardware fault exists. Possible sources are: 1) An Ethernet 1.0 MAU is connected. This is an illegal configuration. The MAU should be replaced with an IEEE 802.3 compatible MAU (HP30241A or HP28641A). 2) The MAU is broken. 3) The AUI cable is broken. 4) The stub connector cable is broken. 5) The LANIC is broken.

6003	*** WARNING -- LANDAD CAN ONLY TEST HP MAUs. (LANDADWARN 6003)
CAUSE	The diagnostic does not know how non HP MAUs react to stimuli and results may not be as expected.
ACTION	If you really want to run this section on a non HP MAU, answer 1 to the question and proceed at your own risk.

6004	*** WARNING -- DIAGNOSTIC SSAP IN USE BY ANOTHER PROCESS. (LANDADWARN 6004)
CAUSE	Another process has logged to the diagnostic SSAP. This section can only be run after the other process finishes.
ACTION	

6005	***** WARNING -- LANIC IS OFFLINE. (LANDADWARN 6005)**
CAUSE	The LANIC must be online to perform this test. This indicates that you may have a bad LANIC.
ACTION	Run Section 5 (selftest) to determine if your LANIC is defective. If selftest passes, the LANIC will be returned to the online state.

6006	***** WARNING -- SAP n ALREADY IN USE BY ANOTHER PROCESS. (LANDADWARN 6006)**
CAUSE	
ACTION	

2001	*** THE DRIVER HAS REPORTED A SOFTWARE PROBLEM. (DSSERR 2001)
CAUSE	
ACTION	
2002	*** THE DRIVER HAS REPORTED A HARDWARE PROBLEM. (DSSERR 2002)
CAUSE	
ACTION	
2003	*** THE USER HAS NOT LOGGED THE SPECIFIED SAP ADDRESS. (DSSERR 2003)
CAUSE	
ACTION	
2004	*** THE BUFFER LENGTH SPECIFIED IS INVALID FOR THE REQUESTED OPERATION. (DSSERR 2004)
CAUSE	
ACTION	
2005	*** AN INVALID TIMEOUT VALUE WAS SPECIFIED. (DSSERR 2005)
CAUSE	
ACTION	

2006	*** THE USER TERMINAL IS NOT CONNECTED THROUGH THE LAN CARD BEING DIAGNOSED. (DSSINFO 2006)
CAUSE	
ACTION	
2007	*** THE USER TERMINAL IS CONNECTED THROUGH THE LAN CARD BEING DIAGNOSED. (DSSINFO 2007)
CAUSE	
ACTION	
2008	*** THE USER HAS ALREADY LOGGED A SAP. (DSSERR 2008)
CAUSE	
ACTION	
2009	*** THE USER HAS NOT LOGGED A SAP. (DSSERR 2009)
CAUSE	
ACTION	
2010	*** THE SSAP IN THE PACKET TO WRITE DOES NOT MATCH THE LOGGED SSAP. (DSSERR 2010)
CAUSE	
ACTION	
2011	*** THE LENGTH FIELD IN THE PACKET DOES NOT CORRESPOND WITH THE BUFFER LENGTH OF THE PACKET TO WRITE. (DSSERR 2011)
CAUSE	
ACTION	

2012	*** THE CONTROL FIELD IN THE PACKET TO WRITE IS INVALID. (DSSERR 2012)
CAUSE	
ACTION	

2013	*** A LOG SSAP HAS BEEN ATTEMPTED TO A SAP WHICH IS IN USE. (DSSERR 2013)
CAUSE	
ACTION	

2014	*** THE OPERATION WAS PERFORMED AS REQUESTED, BUT AN INTERNAL WARNING WAS ISSUED. (DSSWARN 2014)
CAUSE	
ACTION	

2020	*** A SOFTWARE ERROR OCCURRED IN THE *** PROGRAM SERVICE "MOVE_TO_BUFFER". (DSSERR 2020)
CAUSE	
ACTION	

2021	*** A SOFTWARE ERROR OCCURRED IN THE *** PROGRAM SERVICE "MOVE_FROM_BUFFER". (DSSERR 2021)
CAUSE	
ACTION	

2022	*** A SOFTWARE ERROR CODE n WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "IOCTL". (DSSERR 2022)
CAUSE	
ACTION	

2023	***** A SOFTWARE ERROR CODE n WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "SIGNAL". (DSSERR 2023)**
CAUSE	
ACTION	

2024	***** A SOFTWARE ERROR CODE n WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "SELECT". (DSSERR 2024)**
CAUSE	
ACTION	

2025	***** A SOFTWARE ERROR CODE n WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "WRITE". (DSSERR 2025)**
CAUSE	
ACTION	

2026	***** A SOFTWARE ERROR CODE n WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "READ". (DSSERR 2026)**
CAUSE	
ACTION	

2027	***** A SOFTWARE ERROR CODE n WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "SETTIMER". (DSSERR 2027)**
CAUSE	
ACTION	

2028	*** AN UNEXPECTED TYPE WAS RETURNED FROM THE *** HP-UX KERNEL UTILITY "IOCTL". (DSSERR 2028)
CAUSE	
ACTION	

2029	*** TRANSMIT ATTEMPT FAILED BECAUSE DRIVER IS IN DOWN STATE. (DSSERR 2029) *** You must up the driver (lan0) to transmit a frame. *** This is done with the IFCONFIG command.
CAUSE	
ACTION	

2030	*** ERROR -- MUST USE IEEE802.2 DEVICE FILE. (DSSERR 2030) *** To do the requested operation, the device file specified must *** support IEEE802.2 services. The specified device file supports *** ETHERNET services. Please specify a device file that supports *** IEEE802.2 services.
CAUSE	
ACTION	

2001	*** THE DAM HAS REPORTED A SOFTWARE PROBLEM. (DSSERR 2001)
CAUSE	
ACTION	
2002	*** THE LAN CARD IS DEAD. (DSSERR 2002)
CAUSE	
ACTION	
2003	*** THE USER IS NOT BOUND TO THE SPECIFIED SAP ADDRESS. (DSSERR 2003)
CAUSE	
ACTION	
2004	*** THE BUFFER LENGTH SPECIFIED IS INVALID FOR THE REQUESTED OPERATION. (DSSERR 2004)
CAUSE	
ACTION	
2005	*** AN INVALID TIMEOUT VALUE WAS SPECIFIED. (DSSERR 2005)
CAUSE	
ACTION	

2006	***** THE USER TERMINAL IS NOT CONNECTED THROUGH THE LAN CARD BEING DIAGNOSED. (DSSINFO 2006)**
CAUSE	
ACTION	
2007	***** THE USER TERMINAL IS CONNECTED THROUGH THE LAN CARD BEING DIAGNOSED. (DSSINFO 2007)**
CAUSE	
ACTION	
2008	***** THE USER HAS ALREADY BOUND TO A SAP. (DSSERR 2008)**
CAUSE	
ACTION	
2009	***** THE USER IS NOT BOUND TO A SAP. (DSSERR 2009)**
CAUSE	
ACTION	
2010	***** THE SSAP IN THE PACKET TO WRITE IS NOT THE SAP TO WHICH THE USER IS BOUND. (DSSERR 2010)**
CAUSE	
ACTION	
2011	***** THE LENGTH FIELD IN THE PACKET DOES NOT CORRESPOND WITH THE BUFFER LENGTH OF THE PACKET TO WRITE. (DSSERR 2011)**
CAUSE	
ACTION	

2012	***** THE CONTROL FIELD IN THE PACKET TO WRITE IS INVALID. (DSSERR 2012)**
CAUSE	
ACTION	
2013	***** A BIND HAS BEEN ATTEMPTED TO A SAP WHICH IS IN USE. (DSSERR 2013)**
CAUSE	
ACTION	
2014	***** THE OPERATION WAS PERFORMED AS REQUESTED, BUT AN INTERNAL WARNING WAS ISSUED. (DSSWARN 2014)**
CAUSE	
ACTION	
2051	***** UNEXPECTED MESSAGE RECEIVED AND DISCARDED. (DSSINFO 2051)**
CAUSE	
ACTION	
2052	***** UNABLE TO OBTAIN A BUFFER TO STORE PACKET TO BE WRITTEN. (DSSERR 2052)**
CAUSE	
ACTION	
2053	***** DAM REQUESTS ARE OUTSTANDING. NO UNBIND PERFORMED. (DSSERR 2053)**
CAUSE	
ACTION	

2054	*** THE LINK IS NOT CURRENTLY OPEN -- MAY HAVE BEEN CLOSED DUE TO A HARDWARE PROBLEM. (DSSWARN 2054)
CAUSE	
ACTION	
2055	*** THE DAM RETURNED THE FOLLOWING UNEXPECTED ERROR (DSSERR 2055)
CAUSE	
ACTION	
2057	*** UNABLE TO UNFREEZE AND RELEASE BUFFER CONTAINING PACKET RECEIVED. (DSSWARN 2057)
CAUSE	
ACTION	
2058	*** THE DAM HAS REPORTED A HARDWARE PROBLEM. (DSSERR 2058)
CAUSE	
ACTION	
2059	*** THE REQUEST HAS BEEN ABORTED. (DSSWARN 2059)
CAUSE	
ACTION	
2060	*** THE REQUEST HAS BEEN FLUSHED. (DSSWARN 2060)
CAUSE	
ACTION	

2061	***** THE REQUEST WAS NOT UNDERSTOOD. (DSSERR 2061)**
CAUSE	
ACTION	
2062	***** THE DAM MUST BE LOCKED. (DSSERR 2062)**
CAUSE	
ACTION	
2063	***** THE REQUEST WAS SENT TO THE WRONG SUBQUEUE. (DSSERR 2063)**
CAUSE	
ACTION	
2064	***** THE DAM REPORTS THAT IT IS IN A PROBLEM STATE. (DSSERR 2064)**
CAUSE	
ACTION	
2065	***** THE DAM REPORTS THAT IT IS IN A PROBLEM STATE OR REQUESTS HAVE BEEN GIVEN IN AN IMPROPER SEQUENCE. (DSSERR 2065)**
CAUSE	
ACTION	
2066	***** A BAD PARAMETER HAS BEEN GIVEN IN A DAM REQUEST. (DSSERR 2066)**
CAUSE	
ACTION	

2067	***** BAD DATA HAS BEEN GIVEN IN A DAM REQUEST. (DSSERR 2067)**
CAUSE	
ACTION	
2068	***** THE DAM REPORTS AN UNKNOWN ADDRESS HAS BEEN GIVEN. (DSSERR 2068)**
CAUSE	
ACTION	
2069	***** THE DAM REPORTS AN OVERSIZE PACKET WAS REQUESTED TO BE WRITTEN. (DSSERR 2069)**
CAUSE	
ACTION	
2070	***** THE DAM REPORTS AN UNDERSIZE PACKET WAS REQUESTED TO BE WRITTEN. (DSSERR 2070)**
CAUSE	
ACTION	
2071	***** THE DAM REPORTS AN UNKNOWN OPTION WAS SPECIFIED. (DSSERR 2071)**
CAUSE	
ACTION	
2072	***** THE DAM REPORTS THAT IT IS EXPERIENCING A RESOURCE PROBLEM. (DSSERR 2072)**
CAUSE	
ACTION	
2073	***** THE DAM HAS REPORTED A BACKPLANE PROBLEM. (DSSERR 2073)**
CAUSE	
ACTION	

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8

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:

```
% /usr/diag/bin/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	Control

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 all of the
   sections [1..7] of this diagnostic.  Please indicate the number
   of the section which you need more information.
   Entering a <return> to the prompt exits this section.

   More Help >>  {[[Return]] entered here}

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
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 (HP27114)
   Hardware Revcode  = 0
   DAM Revcode       = 0

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

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

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 clear.
  ARQ interrupt is enabled.
  Parity feature is disabled.
  Test hood is not present
  FIFO has room for data
  FIFO has no data in it
  PFLG is asserted
  PCTL is de-asserted
  State of status lines STS0, STS1, STS2 (in that order):
      De-asserted
      De-asserted
      Asserted

End of Section 6 -- Status
```

Section 7—CONTROL

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 -- Control & Status
```

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 AFIDADERR # 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	

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9

HP-FL Adapter Diagnostic

Introduction

The HP-FL Diagnostic (HPFLDIAG) tests the HP-FL Adapter card on any HP Precision Architecture (HPPA) 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 HPPA 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 MPE XL system prompt:

```
SYSDIAG
```

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

```
% /usr/diag/bin/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        ***
*****                  All Rights Reserved.             ***
*****                      Version A.00.00              ***
*****                                                   ***
*************************************************************

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 HP-FL 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  (HP-FLWARN ####).
```

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 HP-FL interface card. Whether or not IO_PATH_TEST reported an error, the diagnostic will continue.

Several of the tests available in HPFLDIAG can be directed to a particular HP-FL controller card connected to the HP-FL interface card (e.g. step 12, step 22, section 10, etc.). The user will be prompted to input the controller (specified by drive number) to which these tests will be directed:

```
Please select a target drive to test (<CR> for none) >>
```

If the user desires to test the link drive, which is the drive directly connected to the host via a fiber optic cable, only a carriage return is necessary. In this case, HPFLDIAG will determine

which drive is the link drive via an identify command. 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 suspect drive controller will not be executed.

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

```
The link drive (number nn) will be used as the target drive.
```

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

If the user enters a target drive number at the prompt, all subsequent operations that require a target drive number will use that value.

Note

Currently on HP-UX, a target drive number is required in the RUN command. Use the same target drive number you specified in the RUN command throughout HPFLDIAG. Specifying different target drive numbers will result in misleading output.

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 in 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 HP-FL controller. If no target drive was selected, this step will not execute and an error message will be displayed to the user. 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 Target Drive:** Issues a reset clear command to the target HP-FL controller. no target drive was selected, this step will not execute and an error message will be displayed to the user. 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 HP-FL interface card. Power-on selftest will be run on the HP-FL interface card and the results displayed if not successful.

Output:

```
Section 2 -- Clear
   Step 6 - Configure Clear Target Drive Completed
   Step 7 - Reset Clear Target Drive Completed
   Step 8 - Reset Interface Completed
End of Section 2 -- Clear
```

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 **HP-FL Controller Identify:** Issues an identify command to the target HP-FL controller, and then decodes and displays the returned information. If no target drive was selected and none could be identified, this step will not execute and an error message will be displayed to the user.

Step 13 **Link Controller Identify:** Issues an identify command to the well-known virtual circuit of the link HP-FL controller (i.e. the controller connected directly to the host via a fiber optic cable), and then decodes and displays the returned information.

Step 14 **HP-FL Interface Identify:** Issues an identify command to the selected HP-FL interface card, decodes and displays the returned information.

Output:

```
Section 3 -- Identify

   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

   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
      Selected drive(nn) is the link drive.
                  or
      Selected drive(nn) is not the link drive.
```

```
Step 13 - HPFL Interface 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)
```

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	**CIO Loopback:** Issues a CIO loopback to the selected HP-FL 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 HP-FL controller connected to the host (i.e. the link controller). This test will verify that the data path from the HP-FL interface adapter RAM to the HP-FL 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 HP-FL controller. If no target drive was selected and none could be identified, this step will not execute and an error message will be displayed to the user. This test will verify that the data path from the HP-FL Interface card RAM to the DMA on the specified HP-FL 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 HP-FL interface card. This test is completely internal to the card. It verifies that the data path within the HP-FL 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 **HP-FL External Loopback:** Issues an external loopback command to the selected HP-FL interface card. This test covers the same paths that step 23 does with the addition of the optical components of the HP-FL controller card. This loopback will be 256 bytes in length and requires that a loopback fiber be installed on the HP-FL 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 SINGLE 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 will 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
   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 preceding 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)

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

Scenario 2:

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

Scenario 3:

```
CIO loopback to HPFL interface card passed.
Loopback to link HPFL controller passed.
Identification of the target HPFL controller passed.
Loopback to target HPFL controller passed.
```

No problems have been detected in the sub-system from the host to the selected HPFL controller. If you still suspect that there may be problems, please follow the recommended further action given below.

```
Recommended Further Action:
   Run FLEXDIAG on target drive
```

Scenario 4:

```
CIO loopback to HPFL interface card passed.
Loopback to link HPFL controller passed.
Identification of the target HPFL controller failed.
   Suspected failing FRU(s) are (in order of probability):
      Link drive may be at the wrong address.
      Link HPFL controller.
      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
```

Scenario 5:

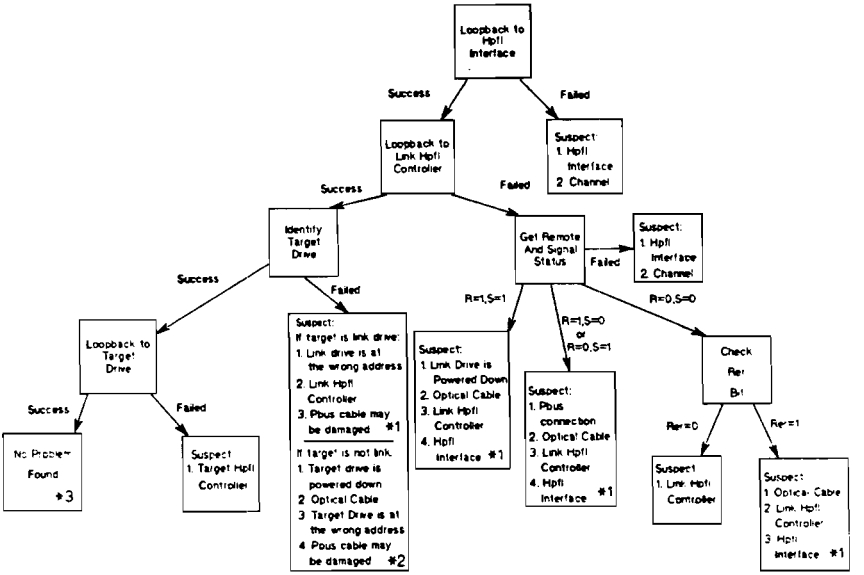
```
  CIO loopback to HPFL interface card passed.
  Loopback to link HPFL controller failed.
     Suspected failing FRU(s) are (in order of probability):
        Link drive may be powered down.
        Optical cable may be damaged or disconnected.
        Link HPFL controller.
        HPFL interface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

Figure 9-1 contains the HPFLDIAG Section 10 (non-destructive) Trouble-Tree.



Recommended Further Action:
*1 — Run On-Site section (12) on Link Drive
*2 -- Run HPFLDIAG on Link Drive
*3 -- Run FLEXDIAG on Target Drive

Figure 9-1. HPFLDIAG Section 10—Non-Destructive 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 HPFL interface card failed.
   Suspected failing FRU(s) are (in order of probability):
      HPFL interface card
      CIO channel adapter.
```

Scenario 2:

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

Scenario 3:

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

Scenario 4:

```
Reset of HPFL interface card passed.
CIO loopback to HPFL interface card passed.
Loopback to link HPFL controller passed.
Identification of the target HPFL controller failed.

   Suspected failing FRU(s) are (in order of probability):
      Link drive may be at the wrong address.
      Link HPFL controller.
      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
```

Scenario 5:

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

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

Figure 9-2 contains the HPFLDIAG Section 11 (destructive) Trouble-Tree.

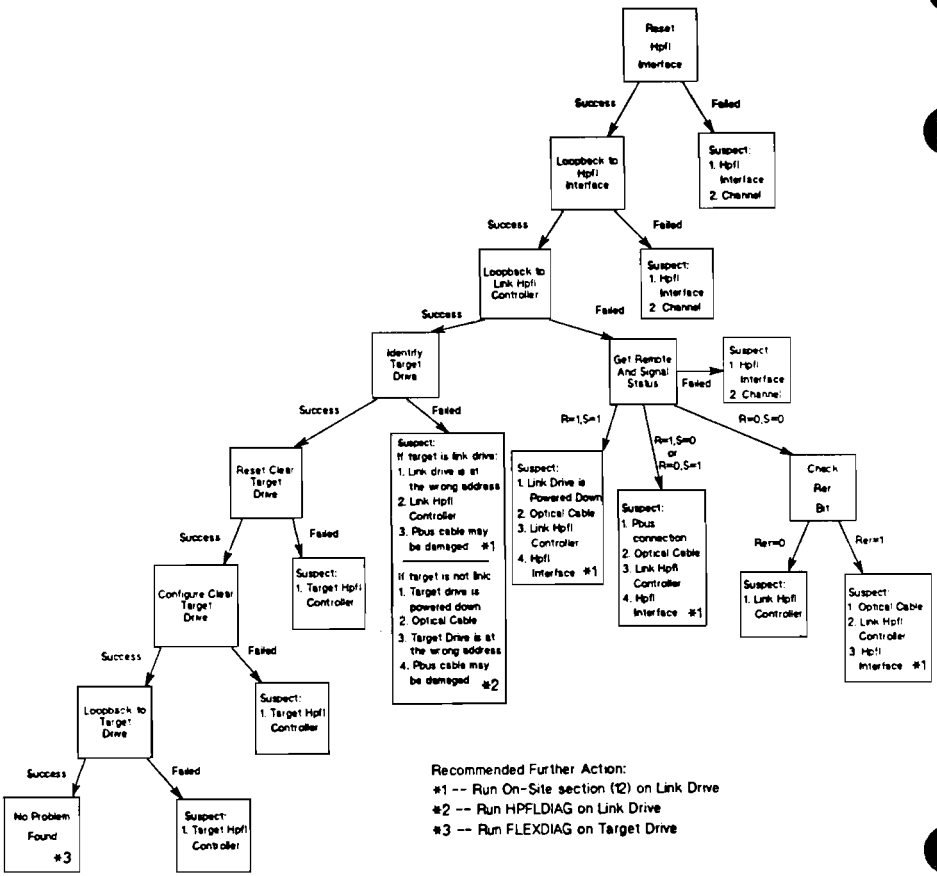


Figure 9-2. HPFLDIAG Section 11—Destructive Trouble-Tree

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) >>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)>>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 HP793XFL
     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
```

Figure 9-3 contains the Trouble-Tree for HPFLDIAG Section 12 (non-destructive) controller card LED check.

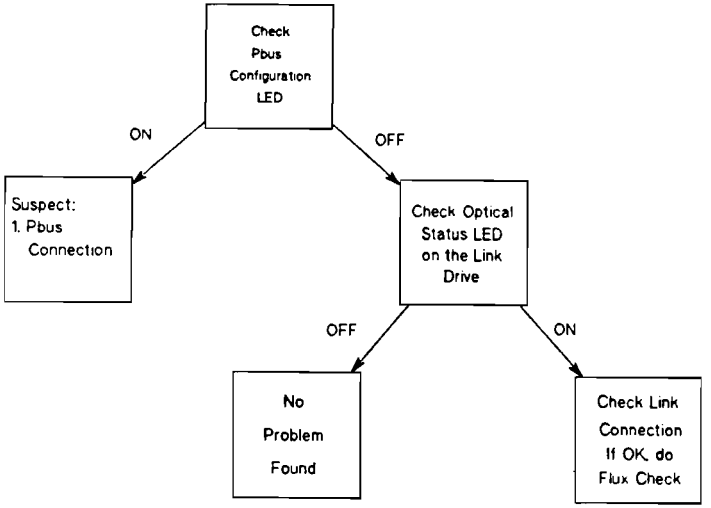


Figure 9-3. HPFLDIAG Section 12—Non-Destructive Controller Card Trouble-Tree

Figure 9-4 contains the Trouble-Tree for HPFLDIAG Section 12 (non-destructive) front panel LED check.

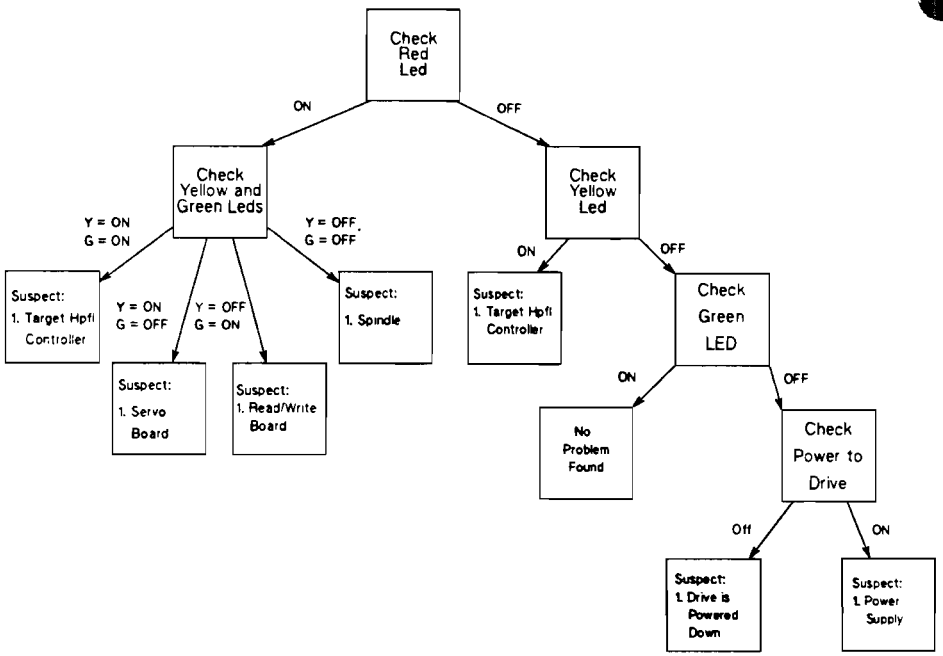


Figure 9-4. HPFLDIAG Section 12—Non-Destructive Front Panel Trouble-Tree

Figure 9-5 contains the Trouble-Tree for HPFLDIAG Section 12 (non-destructive) interface card LED check.

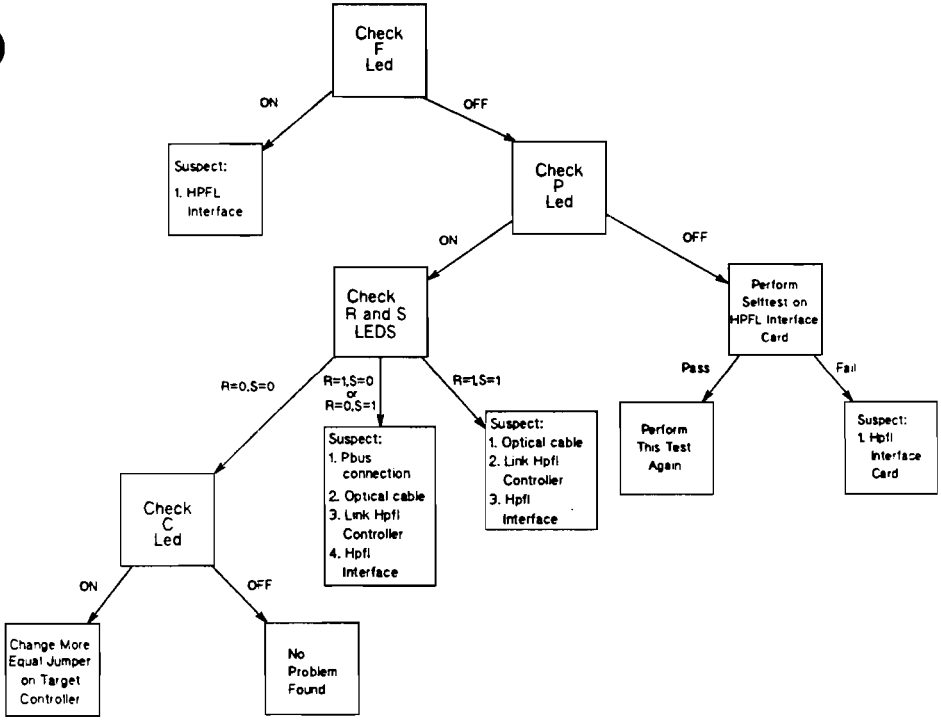


Figure 9-5. HPFLDIAG Section 12—Non-Destructive Interface Card Trouble-Tree

Figure 9-6 contains the Trouble-Tree for HPFLDIAG Section 12 (non-destructive) HP-FL flux check.

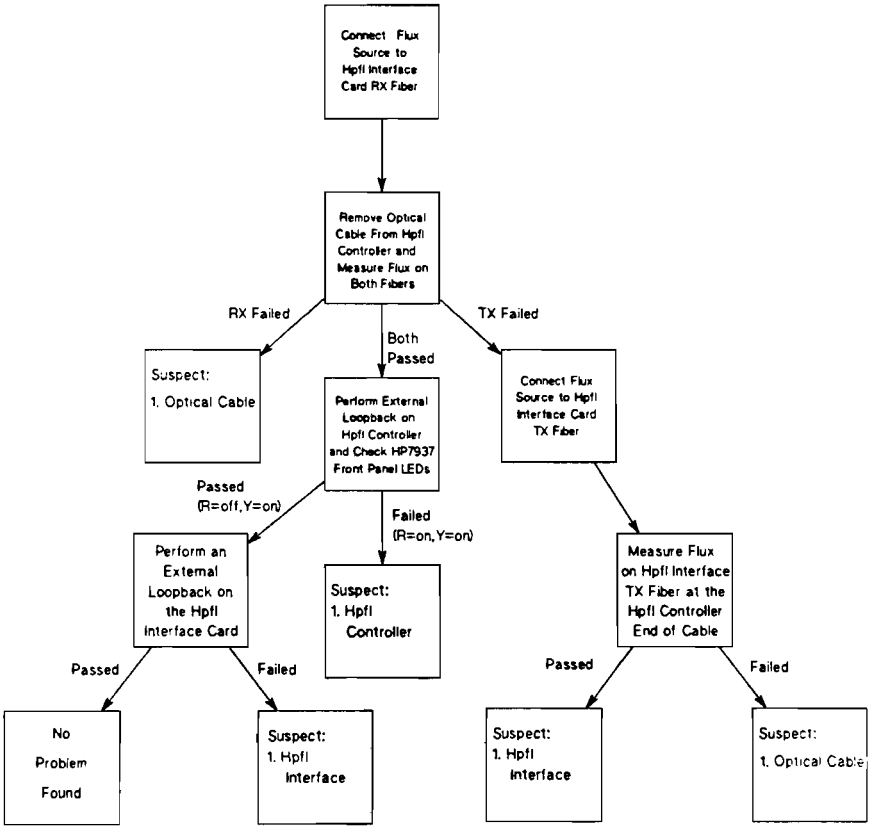


Figure 9-6. HPFLDIAG Section 12—Non-Destructive HP-FL Flux Trouble-Tree

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) n**

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. Report this set of error messages to support personnel.

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	
ACTION	

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. Report to support personnel.

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 TARG 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.

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12

PSI Device Adapter Diagnostic

Introduction

PSIDAD tests Programmable Serial Interface cards on an HP Precision Architecture (HPPA) 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 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 MPE XL system prompt:

```
SYSDIAG
```

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

```
%/usr/diag/bin/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
```

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

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 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.

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:

```
Section 5 -- 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
```

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: 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 Master circuitry test - Chain execution: Tests the hardware required for normal chain execution and exercises the completion list and interrupt mechanism.

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 4 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.

   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
```

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: 4 data bytes, baud rate 64000, cable type depends on what the firmware sees, 1 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. The dot activity indicators are only printed if the repeat count > 1.

```
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
   ----------------
   50             1200           7200
   75             1800           9600
   110            2000           19200
   134 (=134.5)   2400           38400
   150            3600           56000
   300            4800           64000
   600            0 external timing (with modem)

   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.

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       e,exit,<return> - EXIT
   103 - POKE        106 - DUMP
   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      e,exit,<return> - EXIT
        103 - POKE       106 - DUMP
        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       e,exit,<return> - EXIT
103 - POKE        106 - DUMP
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       e,exit,<return> - EXIT
103 - POKE        106 - DUMP
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      e,exit,<return> - EXIT
103 - POKE       106 - DUMP
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      e,exit,<return> - EXIT
103 - POKE       106 - DUMP
Step number =>106

Step 106 - Dump

End of Step 106 - Dump
```

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

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

812	***** ERROR -- UNEXPECTED IO_DMA_LINK CONTENTS. (PSIDADERR 812)**
	*****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

813	***** ERROR -- TRS IO_COMMAND WRITE/READ FAILED. (PSIDADERR 813)**
	*****Write of CMD_CLEAR to TRS IO_COMMAND does not match read.**
CAUSE	Probable PSI Card failure
ACTION	Replace PSI Card and reexecute PSIDAD

814	*** ERROR -- CMD_CLEAR FAILURE. (PSIDADERR 814) ***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

815	*** ERROR -- TRS TEST FAILURE. (PSIDADERR 815) ***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 IO_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 821)
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**

Manual Update

Manual Identification

Online Diagnostics Subsystem Manual
Volume I: SPU and I/O
Part Number: 09740-90028
Edition 2: December 1988

Update Identification

Update Number: 1
Part Number: 09740-90028 U0189
Update Date: January 1989
Previous Updates included: None

How to Use This Update

The purpose of this manual update is to accumulate all of the changes applicable to this edition of the manual. This update package consists of two parts. The *current update* follows this cover sheet. All unincorporated *earlier updates* to this edition have been consolidated and placed behind the current update. A blank yellow sheet separates the two parts if they are both present. Duplicate and superseded pages have been removed from the earlier updates.

Changed pages have the update number at the bottom of the page. Changes are marked with a vertical bar in the margin. A change bar opposite a blank line indicates deleted text. A page with an update number but no change bars has text that has moved without being changed.

To update your manual, determine if the *earlier updates* (if present) at the back of this package have been incorporated into your manual. If not, insert the earlier update by replacing existing pages with the corresponding pages from the update. Also insert new pages from the update. After the earlier updates have been incorporated (if necessary), follow the some procedure to incorporate the *current update*. Destroy all replaced pages.

HEWLETT
PACKARD
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Edition 2
Update 1 U0189
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