

Online Diagnostics Subsystem Manual, Volume V: Tapes

HP 3000 Series 900 Computers
HP 9000 Series 800 Computers



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Printing History

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List of Effective Pages

The List of Effective Pages gives the date of the current edition and of any pages changed in updates to that edition. Within the manual, any page changed since the last edition is indicated by printing the date the changes were made on the bottom of the page. No information is incorporated into a reprinting unless it appears as a prior update.

All March 1991

Safety and Regulatory Information

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

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

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Japanese Radio Frequency Notice

Safety Considerations

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

SAFETY SYMBOLS



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



Indicates hazardous voltages.



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

Warning



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

Caution



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

Preface

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

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Direct Access Secondary Storage Diagnostic

Introduction

DASSDIAG is designed to execute diagnostics on DASS (Direct Access Secondary Storage) devices. In addition to running diagnostics, DASSDIAG allows for the reading of log files and the decoding of device status. The aforementioned applies to both the C1700A AC (Autochanger) and the C1701A MO (Magneto Optical) drives.

DASSDIAG does the following:

- Provides an extensive fault isolating diagnostic trouble tree on both the Autochanger and MO (Magneto Optical) drives. Defects are displayed to the user.
- Verifies that the data path to the device is confirmed.
- Identifies the product types.
- Performs internal self-test on both the Autochanger and MO drives.
- Obtains and decodes status messages from the devices under test.

In addition, there is an external exerciser which provides an interactive environment through which the user can access internal device diagnostics, logs and utilities.

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing Product Number 30600-10035.

Minimum Configuration

In order to run DASSDIAG, the online diagnostics subsystem must be installed and running on the system. The computer that is operating beneath DASSDIAG is of no concern to the diagnostic. As long as the online diagnostics subsystem is supported and there is at least one HPC1700A and HPC17001A configured on the system, DASSDIAG will run. The device that is to be tested must contain internal self-tests that are capable of determining failing Field Replaceable Units in the disk.

Operating Instructions

DASSDIAG is part of the online diagnostics subsystem. It is designed to provide the user with an online means of thoroughly testing any HPC1700A Autochanger and any HPC1701A MO drive that uses SCSI (Small Computer System Interface) as a host interface, on the system.

Default Tests

If the user does not specify the section(s) and/or step(s) to be run, the following default tests will be run:

Section 10 Diagnostic Trouble Tree

Section 17 External Exerciser

RUN Command

DASSDIAG can be accessed by the user via the Diagnostic User Interface. It is initiated using the `run dassdiag` command. Please refer to the DUI chapter of this manual set for details concerning this command and its parameters. All parameters available in the `run` command are acceptable as parameters when running this diagnostic. Note that if the `ERRONLY` parameter is set "on", only error messages will be output by this diagnostic. Error messages can be distinguished from other messages by three *'s preceding the text of the message (i.e., ***** MESSAGE** is an error message whereas **Message** is not). Also, note that error messages are in all capital letters and other messages use some lower case. As noted in the previous section, certain modes are required in order to do certain tests.

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Test Execution

When DASSDIAG is run, the following header and welcome message will be displayed:

```
*****  
*****  
*****          DASSDIAG          *****  
*****  
*****          (C) Hewlett Packard Corporation          *****  
*****          Version A.nn.nn          *****  
*****  
*****
```

Welcome, Today is FRI, Apr 14, 1989 at 12:03 PM

At this point, the diagnostic calls IO_Path_Test, which is a diagnostic procedure that tests the I/O path to the device. If the status returned from this procedure call is fail, the following message will be displayed:

```
*** WARNING -- THE I/O PATH TO THE DISK MAY NOT BE FUNCTIONING  
PROPERLY (DASSERR 127)
```

Otherwise, the diagnostic issues an identify to the specified device to determine whether or not it is a HPC1700A or an HPC17001A. If the device does not respond to the identify command, the following message will be displayed:

```
*** FAILED ATTEMPTING TO IDENTIFY DEVICE (DASSERR 129)
```

If a response was obtained, then the returned status is examined to determine if the device is a DASS AC (Autochanger) or DASS MO (Magneto Optical) disk.

At this point, the sections specified by the user will be executed and the results displayed. If the user did not specify sections to be run, the default section will be executed. Upon termination of this diagnostic, control will return to the online diagnostics subsystem.

Autochanger and MO Controller/Drive Tests

This section provides information about available autochanger internal diagnostic tests and logging mechanisms, as well as information about MO controller/drive internal diagnostic tests.

AUTOCHANGER

The autochanger provides several internal diagnostic tests that may aid the user in identifying problems within the autochanger. The tests are partitioned as follows.

- (1-9) Sequence Tests - This group is comprised of a sequence of tests within the range of 10/69. These tests may be used to test many portions of the Autochanger, or as an Autochanger exerciser. When a sequence is selected, the Autochanger will execute the tests in sequence until an error occurs or the sequence completes.
- (10-29) Exerciser Tests - This group performs simple mechanism moves for the purpose of checking out elementary functions.
- (30-49) Electronics Core Tests - This group contains basic tests related to the functions of the controller board.
- (50-69) Mechanism Core Tests - This group consists of basic tests related to the functions of the mechanism. They perform combinations of moves which can help to detect the source of failures.

The autochanger, or the Disk Library System as it is sometimes referred to, provides information about the autochanger's operation and error history. This is done by providing several types of logging mechanisms. For the autochanger, there is a SCSI command called `log sense`, that is used to retrieve and access the logs. Here is a list and brief description of the logs that are available:

- ERROR LOG** - This is a log of all of the past diagnostic test errors that have occurred within the Autochanger, together with a time stamp of when they occurred. The error message maintained for each error indicates the failure and the possible FRU which may have caused the error.
- MOVE SUCCESS LOG** - This is a log of the cumulative number of move recoveries and a total move count. The last 10 hard errors are marked in this log by indicating how many good moves occurred since the last hard error.
- RECOVERY LOG** - This is a record of recoverable soft errors and related information on error recovery methods used and their success or failure.
- DRIVE LOG** - This log indicates the number of times each drive is used by the autochanger.
- RUN TIME LOG** - This is a log of each time an error occurs which requires any form of recovery. The type of error, the method of recovery, and the number of moves to that point are recorded.
- ODOMETER** - This value indicates the total number of moves executed since the non-volatile RAM was first initialized. Power-on hours are also logged.

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MO CONTROLLER/DRIVE

The MO controller provides several internal diagnostic tests that may aid the user in identifying problems within the MO controller or the MO drives. The tests are partitioned as follows:

Controller Self Diagnostics :

- Test 0 - ROM Test
- Test 1 - RAM Test
- Test 2 - HIC Chip Test
- Test 3 - BMM Chip Test
- Test 4 - DIC Chip Test
- Test 5 - ECP Chip Test
- Test 6 - Buffer Memory Test
- Test 7 - Reserved

Drive Self Diagnostics :

- Test 0 - Stop Spindle Test
- Test 1 - DCN Test
- Test 2 - ACN Test
- Test 3 - BCN Test
- Test 4 / Test 7 - Reserved

Drive Functional Diagnostics :

- Test 0 - Stop Spindle Test
- Test 1 - Start Spindle Test
- Test 2 - Select ROM Mode Test
- Test 3 - Select MO Mode Test
- Test 4 - High Order Seek Test
- Test 5 - Seek Test
- Test 6 - Magnet Erase Mode Test
- Test 7 - Magnet Erase Mode Test

Disk Access Diagnostics :

- Test 0 - Inner SFP Read Test
- Test 1 - Inner Manufacturer Zone Erase/Write/Read Test
- Test 2 / Test 7 - Reserved

Test Section Descriptions

This section is devoted to explaining each section of DASSDIAG. For each section, this explanation will consist of a description of the section, including the actions performed therein, the expected output from that section, and any error messages that may be generated that are worth noting. All possible error messages that may be generated are not listed. The only error messages that are listed are those that are considered to be of special significance. When a hardware error is detected by DASSDIAG, one of the following messages will be issued:

*** I/O TIMED OUT. I/O WAS ABORTED (DASSERR 153)

*** THE I/O REQUEST FAILED (DASSERR 154)

*** I/O ABORTED DUE TO PREVIOUS I/O ERROR (DASSERR 155)

*** A POWER FAILURE WAS DETECTED. ALL I/O'S ABORTED (DASSERR 156)

If the I/O request failed, additional information will be given identifying the specific reason for the hardware failure. The text of this additional error information matches the error descriptions provided in the *Rewritable Optical Disk Library System Technical Reference Manual (part no. 5959-3540)*.

FOR HP INTERNAL USE ONLY

.DASSDIAG Trouble Trees—Autochanger

This section documents the trouble trees available for diagnosing the HPC1700A Autochanger. The trouble trees provided in DASSDIAG test the I/O path, the electrical and mechanical circuitry, and drive I/O tests. Different elements of the trouble trees are presented here as sections of this chapter for clarity.

If an MO drive is selected (active PDEV), then the entire trouble tree will be run for that drive. If the current access mode is non-exclusive, then the trouble tree will conclude with this message:

```
*** PRIOR TESTING COMPLETED SUCCESSFULLY, ADDITIONAL MO DRIVE TESTS
REQUIRE EXCLUSIVE/DESTRUCTIVE ACCESS PERMISSION. THESE TESTS CAN
NOT BE ATTEMPTED WITH YOUR CURRENT TEST MODE AND ACCESS LEVEL
(DASSWARN 6773)
```

If the current mode is exclusive access, then the entire tree will be run. Before destructive (write) operations commence, DASSDIAG will prompt for permission to proceed as follows:

```
WARNING: SUBSEQUENT TESTING PERFORMS DATA WRITES TO THE DISK,
EXISTING DATA WILL BE OVER-WRITTEN.
DO YOU WISH TO CONTINUE? (Y/N)>
```

Testing will continue after proper verification.

If an autochanger is the currently selected device (PDEV), the autochanger trouble tree will be run, and then the trouble tree for each available drive will be run. The diagnostic will always prompt for permission before commencing destructive (write) operations to a disk. Trouble trees can also be run for a single device from the interactive exerciser section of DASSDIAG.

FOR HP INTERNAL USE ONLY

Section 1—I/O PATH TROUBLE TREE

This section will execute the I/O path diagnostic trouble tree. It is non-destructive and requires no on-site assistance. The algorithm follows:

```
Call IO_Path_Test to test the I/O path to the device.
If any failures encountered
  Display failing module to user
Else
  Issue an IDENTIFY command to ensure device is responding.
  If TIMEOUT failure
    Display FRUs {1. Power Fail
                 2. Drive not at specified ID
                 3. SCSI Cable/Connect
                 4. Autochanger Controller FRU 01
                 5. SCSI Adapter
                 6. Bad Channel}
  Else if any other failure
    Display suspect FRUs {1. Autochanger Controller FRU 01
                        2. Bad Channel}
  Else
    Perform a Write Loopback followed by a Read Loopback
    If the Loopback succeeds
      Recommend user run the Electronics/Mechanical Trouble Tree
    Else if Loopback failed with a Data Comparison Failure then
      Display FRUs {1. SCSI Cabled
                  2. Autochanger Controller FRU 01
                  3. Channel Adapter }
```

FOR HP INTERNAL USE ONLY

Section 2—ELECTRONICS/MECHANICAL TROUBLE TREE

This section will execute the electronic/mechanical diagnostic trouble tree. This trouble tree may be destructive in nature and it does not require any on-site assistance. The algorithm follows:

```
Call IO_Path_Test to test the I/O path to the device
  If any failures encountered
    Display failing module to user
  Else
    Begin {IO_Path_Test call successful}
    Issue an IDENTIFY command to ensure device is responding.
    If timeout failure
      Begin {Timeout failure}
      Clear Re-Identify
      If timeout failure
        Display FRUs {1. Power fail
          2. Drive not at specified ID.
          3. SCSI Cable/Connect
          4. Autochanger Controller FRU 1
          5. Bad Channel}
      Else if any other failure
        Display FRUs {1. Autochanger Controller FRU 01
          2. Bad Channel}
      Else if successful
        Continue trouble tree execution starting at Loopback
        test.
      End {Timeout failure}
    Else if IDENTIFY successful then
      Begin {Identify successful}
      Perform Loopback test
      If data comparison failure
        Display FRUs {1. SCSI Cable
          2. Autochanger Controller FRU 01
          3. Channel Adapter}
      Else if Loopback successful then
        Begin {Successful Loopback}
        Invoke Internal Selftests 1,3,6,2
        If Selftests failure
          Display failing FRU
          If command failure
            Display FRU {1. Autochanger Controller FRU 01}
            If Selftest successful
              Reccmd user 1. Read Logs
                2. Run Media Trouble Tree
                3. Use excersicer to run specific test for log
                problems.
            End {Successful Loopback}
          End {Successful Identify}
        End {Successful IO_Path_Test call}
```

FOR HP INTERNAL USE ONLY

Section 3—DRIVE I/O TROUBLE TREE

This section will execute the drive I/O diagnostic trouble tree. This trouble tree may be destructive in nature and it requires on-site assistance for test preparation. This trouble tree requires that both MO drives be empty, and that at least one MO cartridge be loaded into the autochanger. The algorithm follows:

```
Call IO_Path_Test to test the I/O path to the device.
If any failures encountered
  Display failing module to user
Else
  Begin
  Invoke autochanger internal Poweron (Selftest 1)
  If Selftest failure then
  Display failing FRU
  Else if command failure then
  Display failing FRU {1. Path Failure
    2. A/C controller
    3. Recommend run I/O Trouble Tree}
  Else if selftest successful then
  Begin {Selftest Successful}
  Perform Tests 10,11-{Init Element Status, Mechanism Exercise}
  If any Failures then
  If FRU isolated then
  Display FRU list
  Else
  Display list of Suspects {1. FRU 27
    2. FRU 40
    3. FRU 32
    4. Belts
    5. Sensors
    6. A/C Controller}
  If Test 10,11 successful then
  Begin {Test 10,11 Successful}
  Perform Test 16 - {Drive I/O Test}
  If Test 16 successful then
  Recommend Run Media Trouble
  Else
  Display FRUs {1. FRU 20 - MO Drive
    2. FRU 05 - MO Drive
    3. FRU 01 - Autochanger}
  End {Test 10,11 Successful}
  End {Selftest Successful}
  End
```

FOR HP INTERNAL USE ONLY

DASSDIAG Trouble Trees—MO Controller/Drive

This section documents the trouble trees available for diagnosing the HPC1701A MO drive. Four trouble trees are provided in DASSDIAG, which test the I/O path, the electronic circuitry, drive I/O, and media.

FOR HP INTERNAL USE ONLY

Section 4—I/O PATH TROUBLE TREE

This section will execute the I/O path diagnostic trouble tree. It is non-destructive and requires no on-site assistance. The algorithm follows:

```
Call IO_Path_Test to test the I/O path to the device.
If any failures encountered
  Display failing module to user
Else
  Issue an IDENTIFY command to ensure device is responding.
  If TIMEOUT failure
    Display FRUs {1. Power Fail
                  2. Drive not at specified ID
                  3. SCSI Cable/Connect
                  4. MO Controller FRU 05
                  5. SCSI Adapter
                  6. Bad Channel
                  7. ESDI/MO Controller
                  8. Power/Data Cables}
  Else if any other failure
    Display suspect FRUs {1. MO Drive Controller FRU 05
                          2. Bad Channel
                          3. ESDI/MO Controller
                          4. Power/Data Cables}
  Else
    Perform a Write Loopback followed by a Read Loopback
    If the Loopback succeeds
      Recommend user run the Electronics Trouble Tree
    Else if Loopback failed with a Data Comparison Failure then
      Display FRUs {1. SCSI Cabled
                    2. MO Controller FRU 05
                    3. Channel Adapter
                    4. ESDI/MO Data Cable }
```

FOR HP INTERNAL USE ONLY

Section 5—ELECTRONICS/MECHANICAL TROUBLE TREE

This section will execute the electronic/mechanical diagnostic trouble tree. This trouble tree may be destructive in nature and it does not require any on-site assistance. The algorithm follows:

```
    Call IO_Path_Test to test the I/O path to the device
    If any failures encountered
Display failing module to user
    Else
Begin {IO_Path_Test call successful}
Issue an IDENTIFY command to ensure device is responding.
If timeout failure
    Begin {Timeout failure}
    Clear Re-Identify
    If timeout failure
        Display FRUs {1. Power fail
2. Drive not at specified ID.
3. SCSI Cable/Connect
4. MO Drive
5. Bad Channel
6. ESDI/MO Controller power/data cables}
    Else if any other failure
        Display FRUs {1. MO drive Controller FRU 05
2. Bad Channel
3. ESDI/MO Controller power/data cables}
    Else if successful
        Continue trouble tree execution starting at Loopback
        test.
    End {Timeout failure}
Else if IDENTIFY successful then
    Begin {Identify successful}
    Perform Loopback test
    If data comparison failure
        Display FRUs {1. SCSI Cable
2. MO Drive Controller FRU 05
3. Channel Adapter
4. ESDI/MO Data Cable}
    Else if Loopback successful then
        Begin {Successful Loopback}
        Invoke Internal Selftests 1
        If Selftests failure
Display failing FRU
            If command failure
Display FRU {1. MO Controller FRU 05
2. ESDI/MO Controller power/data cable
3. MO drive}
            If Selftest successful
Recommend user 1. Read Logs
2. Run Media Trouble Tree
3. Use exerciser to run specific test for log
problems.
```



FOR HP INTERNAL USE ONLY

```
End {Successful Loopback}  
End {Successful Identify}  
End {Successful IO_Path_Test call}
```

FOR HP INTERNAL USE ONLY

Section 6—DRIVE I/O TROUBLE TREE

This section will execute the drive I/O diagnostic trouble tree. This trouble tree may be destructive in nature and it requires on-site assistance for test preparation. This trouble tree requires that a spare MO cartridge be loaded into the drive. The algorithm follows:

```
Call IO_Path_Test to test the I/O path to the device.
If any failures encountered
  Display failing module to user
Else
  Begin
    Invoke MO Controller internal Poweron (Selftest 1)
    If Selftest failure then
      Display failing FRU
    Else if command failure then
      Display failing FRU {1. Path Failure
        2. MO Drive/Controller
        3. ESDI/MO Cables}
    Else if Selftest Successful then
      Recommend user run Media Trouble Tree
  End
```

FOR HP INTERNAL USE ONLY

Section 7—MEDIA TROUBLE TREE

This section will execute the media diagnostic trouble tree. This trouble tree may be destructive in nature and it requires on-site assistance for test preparation. This trouble tree requires that a spare MO cartridge be loaded into the drive. It also requires that ECC and error counting be turned off. The algorithm follows:

```
Call IO_Path_Test to test the I/O path to the device.
If any failures encountered
  Display failing module to user
Else
  Begin
  Load Cartridge
  If Load fails then
Display FRUs {1. Human error
2. MO Drive
3. MO Controller
4. Autochanger
5. Medium}
  Perform Write Test
  If Write Test fails then
Display FRUS {1. Medium
2. MO Drive
3. MO Controller
4. ESDI/MO Controller Power/Data Cables}
  Perform Read/Verify
  If Read/Verify fails then
Display FRUS {1. Medium
2. MO Drive
3. MO Controller
4. ESDI/MO Controller Power/Data Cables}
  End
```

Section 8—EXTERNAL EXERCISER SPECIFICATIONS

The DASSDIAG External Exerciser is an interactive program which provides the user with access to the set of internal diagnostics, logs and utilities within a DASS device. The purpose of the exerciser is to aid service-trained personnel in troubleshooting DASS devices to a field replaceable unit level.

The External Exerciser, as discussed earlier, is an interactive program that provides the user with access to the set of internal diagnostics, logs, and utilities within a DASS device.

The complete documentation of the SCSI autochanger command set and the SCSI MO controller can be found in the *Optical Disk Library System OEM/ISV Technical Reference Manual*.

When the external exerciser is invoked, the following prompt will be displayed to the user:

DASSDIAG>

When the prompt appears, the exerciser is waiting for a command from the user. The available commands are listed in this section in alphabetical order accompanied by descriptions. In addition to alphabetical order the commands are partitioned as those applying to the overall diagnostic environment, the autochanger and the MO controller and drives. Each command description is in the following format:

COMMAND NAME

SHORT DEFINITION

Explanation of what the command does and when it should be used.

INPUT FORMAT:

DASSDIAG> <COMMAND NAME>

Note that the prompt for this exerciser is DASSDIAG>. The appearance of this prompt indicates that the exerciser is waiting for the user to input a command.

DASSDIAG will allow the user to abbreviate all input as long as the abbreviated form remains distinctive from other possible user input. For example, if a user wished to enter **access** as a desired command, this could be done by entering **acce**, **acc**, or even **ac**, as long as the characters typed can distinguish the command from other similar commands. Also, uppercase and lowercase letters are treated as equal. The user should follow all input with a carriage return. In this document all user input will be underlined.

OUTPUT FORMAT:

Information printed as a result of this command being executed

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POSSIBLE ERROR MESSAGES:

Any error messages worth noting that may be generated as a result of this command. Note that this does not imply that all possible error messages that may be generated are listed here, but rather, only those that are especially worth mentioning in relation to the command.

There are several conventions used throughout this section in the command formats. They are as follows:

- nnnn** - refers to a decimal number of any magnitude that is output by the diagnostic.
- vvvv** - refers to a decimal number of variable magnitude that must be input by the user.
- H** - refers to a hexadecimal digit (0-F).
- O** - refers to an octal digit (0-8).
- B** - refers to a binary digit (0-1).

Any text enclosed in parentheses indicates that the user is expected to input that text in response to a query from the diagnostic. Text enclosed in square brackets indicates the default response that will be assumed if the user simply hits <CR> in response to the query. For example, the user may be asked if the program should continue:

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

The text enclosed in the parentheses (i.e., Y / N) indicates that the user is to type either a Y or an N in response to the question. Each option is separated by a /. The default response in this case would be N, as indicated by the [N] prior to the question mark. If there is no default response listed (enclosed in square brackets), the user will not be allowed to default the input by only entering a <CR>.

Items within angle brackets, <> will be replaced with user supplied information. Note, do NOT type the angle brackets.

Items within brackets [], on a command line indicates that this is an optional parameter.

Comments in the input and output sequences are enclosed in curly brackets and are not output by the program. For example, following the question in the previous example, the input sequence would probably look something like the following:

{if response was N this command will terminate}

Error messages will be preceded by three asterisks (***) and will be in all upper case letters. Other messages will not be all upper case and will not be preceded by the asterisks.

FOR HP INTERNAL USE ONLY

If the user enters a command in response to a prompt and that command is not recognized as an exerciser command, the following message will be displayed:

```
*** UNRECOGNIZED COMMAND --  
    TYPE "HELP" FOR A LIST OF VALID COMMANDS (DASSERR 122)
```

DASSDIAG>

This message simply means that the command entered is not part of the command set for the external exerciser.

When the user enters a command that is recognized by the external exerciser, that command will then be processed according to the corresponding command description given in one of the following sections of this document. If an error is encountered as a result of issuing a SCSI command to the device, the hardware status that is returned by the device will be displayed to the user. The status display will consist of some device identification information followed by several categorized error messages. The categories are reject errors, fault errors, access errors, and information errors. Reject errors indicate illegal interaction with the device, such as an opcode error. These errors result when commands are sent to the device, but are not recognized by it. Fault errors indicate hardware failures. Access errors indicate media absence, formatting problems, or operator intervention. Information errors indicate potential problems or performance irregularities in the device.

FOR HP INTERNAL USE ONLY

General Diagnostic Commands

This section discusses those commands that are considered to be general commands for this diagnostic. The commands are considered general because they are not specific to the autochanger or to the MO Drive/Controller. Because this diagnostic may have up to three devices to support, one autochanger and two MO drives, DASSDIAG has provided a way to direct commands to specific devices. Keep in mind that DASSDIAG may have obtained access to all three devices concurrently, but only one device may be the target of a specific command.

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ACCESS

This command will allow the user to select which of the possible three devices the following commands will be directed to.

INPUT FORMAT:

DASSDIAG> access pdev n.n.n

{If the user types the access command with a pdev, s/he will have access to the device at that pdev. Otherwise DASSDIAG will display the list of available devices and their pdev, (physical device path).}

OUTPUT FORMAT:

```
      DEVICE  PDEV
=====
1. AUTOCHANGER - n.n.n
2. MO DRIVE 1 - n.n.n
3. MO DRIVE 2 - n.n.n
```

{At this point a new prompt is displayed and the user must select the }
{number next to the device he/she wishes to access.}

ENTER DEVICE SELECTION> 1

{In this example the Autochanger has been selected for access. All commands entered to the exerciser will now be directed to the autochanger at the pdev indicated. }

FOR HP INTERNAL USE ONLY

ACTIVE

This command will allow the user to determine which of the possible three devices is active and ready to accept commands.

INPUT FORMAT:

DASSDIAG> active

OUTPUT FORMAT:

```
      DEVICE PDEV
=====
1. AUTOCHANGER - n.n.n ***
2. MO DRIVE 1  - n.n.n
3. MO DRIVE 2  - n.n.n
```

{The three asterisks next to device 1, the autochanger, indicates}
{that it is the active device.}

FOR HP INTERNAL USE ONLY

TREE

This command will allow the user to invoke one of the trouble trees sections previously described. The trouble tree associated with the currently active (selected) device will be run on that device.

INPUT FORMAT:

```
DASSDIAG> tree
```

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Autochanger Commands

The following commands all target autochanger functions.

FOR HP INTERNAL USE ONLY

EXCHANGE MEDIUM

This non-destructive/non-exclusive command is used to exchange the medium at the source element address with the medium at the destination element address.

INPUT FORMAT:

```
DASSDIAG>exchange <source address><destination 1><destination 2>
```

{Where source and destination1 destination2 address correspond to a }
{number indicating the address of an element in the autochanger.}

FOR HP INTERNAL USE ONLY

INITIALIZE ELEMENT STATUS

This non-destructive/non-exclusive command will check all elements for medium and other status relevant to that element. The information is retained and can be accessed by the `read element status` command.

INPUT FORMAT:

```
DASSDIAG> initialize element status
```

FOR HP INTERNAL USE ONLY

INQUIRE

This non-destructive/non-exclusive command is used to request information describing the type of device and Vital Product Data from the library.

INPUT FORMAT:

DASSDIAG> inquire

OUTPUT FORMAT:

```
Device Type -----> Medium Changer
Vendor ID   -----> xxxxxxxxxxxx
Product ID  -----> xxxxxxxxxxxx
Revision Level -----> nn.nn
```

FOR HP INTERNAL USE ONLY

LOG SENSE

This non-destructive/non-exclusive command provides a means to retrieve statistical information maintained by the library about the autochanger.

INPUT FORMAT:

DASSDIAG> log [<log name>]

{If the "log" command is entered with a log name, DASSDIAG displays }
{information particular to that log. If the "log" command is entered}
{without a log name the following menu is displayed.}

OUTPUT FORMAT:

Available Logs:

=====

- | | | |
|---------------------|-----------------------|---------------------|
| 1. Error Log | 4. Drive Log | 7. Run Time Log |
| 2. Move Success Log | 5. Version & Revision | 8. Retry Log |
| 3. Recovery Log | 6. Odometer Log | 9. Move history Log |

ENTER LOG SELECTION> 6

{In this example the odometer log is selected. DASSDIAG will next }
{display information contained in the odometer log.}

ODOMETER LOG

Move Odometer	- nnnn
Flip Odometer	- nnnn
Translate Odometer	- nnnn
Mailslot Rotate Odometer	- nnnn
Power-on Hours	- nnnn

FOR HP INTERNAL USE ONLY

MODE SENSE

This non-destructive/non-exclusive command is used to acquire geometric parameter information about the autochanger. With this command, the user may obtain information pertaining to the element address assignment.

INPUT FORMAT:

DASSDIAG> sense

OUTPUT FORMAT:

ELEMENT ADDRESS ASSIGNMENTS:

First medium transport element address: nnnn (total elements nn)
First storage element address: nnnn (total elements nn)
First import/export element address: nnnn (total elements nn)
First data transfer element address: nnnn (total elements nn)

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MOVE MEDIUM

This non-destructive/exclusive command is used to move media between autochanger elements.

INPUT FORMAT:

DASSDIAG> move <source address> <destination address>[invert]

{Where source and destination address correspond to a number indicating}
{the address of an element in the autochanger.}

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POSITION TO ELEMENT

This non-destructive/exclusive command is used to position the medium transport element in front of the destination element address.

INPUT FORMAT:

DASSDIAG> position <destination address> [invert]

{Destination address is the address of the autochanger element}
{that the transport element is to be positioned in front of.}
{The user may optionally specify that the transport element be}
{inverted before positioning in front of the destination element.}

FOR HP INTERNAL USE ONLY

PREVENT/ALLOW MEDIUM REMOVAL

This non-destructive/exclusive command provides a means of preventing, or allowing, the manual insertion or removal of medium into/from the autochanger I/O element.

INPUT FORMAT:

DASSDIAG> prevent

{or}

DASSDIAG> allow

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READ ELEMENT STATUS

This non-destructive/non-exclusive command provides a means of determining the exact status of the various elements (storage slots, I/O station, MO drives, and transport element) within the autochanger.

INPUT FORMAT:

```
DASSDIAG> read <Element type> <element address> <num of elements>
{FULL}
```

```
{If the user types this command with the corresponding element type,}
{DASSDIAG will display the information pertaining to that element }
{type. Valid element types are :
```

1. all
2. transport
3. storage
4. I/O
5. data



```
{The element address is the starting address of the element that }
{information is desired for. Num of elements is the number of elements}
{that is to be reported starting from the starting address.}
```

OUTPUT FORMAT:

```
{If storage element was selected starting at address 11 for a number}
{of one the output would look like the following:}
```

```
ELEMENT STATUS REPORT           (1 elements reporting)
```

```
Status of storage element at addr 11: currently empty
```

```
{If there had been exceptions, meaning problems, additional information}
{about the problem would be displayed.}
To display only the elements containing media, include the FULL parameter
in the command line.
```

FOR HP INTERNAL USE ONLY

RECEIVE DIAGNOSTIC RESULTS

This non-destructive/exclusive command is used to get the results of the test performed as a result of the `send diagnostic` command.

INPUT FORMAT:

`DASSDIAG> receive results`

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RELEASE

This non-destructive/exclusive command performs the opposite function of the **reserve** command.

INPUT FORMAT:

DASSDIAG> release [<third party id>][<reservation id>]

FOR HP INTERNAL USE ONLY

REQUEST SENSE

This non-destructive/non-exclusive command is used to determine specific error conditions, when the autochanger fails to successfully execute a command.

INPUT FORMAT:

```
DASSDIAG> request sense
```

{At this point DASSDIAG will display messages indicating the particular cause of failure of the last failed command.}

FOR HP INTERNAL USE ONLY

RESERVE

This non-destructive/exclusive command is used to reserve the autochanger elements for use by a single initiator. If and when the autochanger is connected to multiple initiators, the third party id may be used to reserve an element for another SCSI device.

INPUT FORMAT:

DASSDIAG> reserve [<third party id>][<reservation id>]

{Where third party id is the SCSI device who the reservation is being made for. The reservation id is a value used to identify each element reserved by this call.}

OUTPUT FORMAT:

ENTER RESERVATION ID> 41

ENTER ELEMENT ADDRESS> 10

{Element 10 is now reserved with reservation id 41.}

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REZERO UNIT

This non-destructive/exclusive command sets the autochanger to a specific predefined state, after recalibrating the mechanical system.

INPUT FORMAT:

```
DASSDIAG> rezero
```

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SEND DIAGNOSTIC

This destructive/exclusive command causes the autochanger to perform certain predefined diagnostic test/exercise routines. The request sense and the receive diagnostic results commands can be used to get the results of a test.

INPUT FORMAT:

DASSDIAG> senddiag [<test number> <loop count> [<parms>]]

{The user may enter the senddiag command with the optional test number and loop count and the optional parameter depending on what the test number is. If the user enters only the the senddiag command, he/she will then be prompted for the test number, loop count and parameters.}

OUTPUT FORMAT:

{If only the senddiag command was entered.}



Available predefined diagnostics/exerciser routines:

- | | | |
|----------------------------|----------------------------|-------------------------|
| 1. power on test | 2. wellness test | 3. controller test |
| 5. init mechanism | 10. init element status | 11. mechanism exercise |
| 12. vertical move test | 13. translate test | 14. flip test |
| 15. storage slot test | 16. drive I/O test | 17. mailslot I/O test |
| 18. speed factor utility | 19. zero maximum force log | 20. set full speed |
| 21. set half speed | 22. set quarter speed | 23. park picker |
| 24. fill picker | 25. empty picker | 26. zero runtime log |
| 27. set retries | 28. set default retries | 30. microprocessor test |
| 31. rom checksum test | 32. ram checksum test | 33. non dest. ram test |
| 34. SCSI cntlr. chip test | 35. peripheral chip test | 36. motor cntlr. chip |
| 37. drive connect test | 38. control panels lights | 40. power supp. test |
| 42. vertical sensor test | 43. mailslot sensor test | 50. find home sequence |
| 51. calibrate vert. system | | |

ENTER TEST NUMBER> 18

ENTER LOOP COUNT (1/10/100/1000) [1]> 1

{If parameters are required. DASSDIAG will prompt the user for the correct parameters. In this example test 18 has been selected. Test 18 is the Set Speed Factor exercise that requires one parameter, the 1/parameter number that determines how fast the system moves the mechanics.}

ENTER PARAMETER 1 > 3

{This tells the autochanger to set the speed to 1/3 of full speed. Remember the results of the test can be obtained using the Request Sense

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and the Receive Diagnostic Results commands.}

FOR HP INTERNAL USE ONLY

TEST UNIT READY

This non-destructive/non-exclusive command is used to determine the "ready" state of the autochanger. If the autochanger is in a "ready" state when it receives this command, DASSDIAG will indicate that the unit is ready.

INPUT FORMAT:

DASSDIAG> test unit

OUTPUT FORMAT:

Unit Ready

or

Unit Not Ready

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Optical Drive Controller Commands

The following commands are used to test the functionality of the optical drive.

FOR HP INTERNAL USE ONLY

ERASE

This destructive/non-exclusive command executes an erase operation from the specified logical block address for the number of blocks specified.

INPUT FORMAT:

```
DASSDIAG> erase [<block address> <# of blocks>]
```

{Where block address is the starting block from which the erase operation is to be performed. The # of blocks parameter indicates how many contiguous blocks are to be erased from the block address.

If the user did not

enter any of these parameters from the command line s/he will be prompted for them}

OUTPUT FORMAT:

```
ENTER BLOCK ADDRESS> nnnn
```

```
ENTER NUMBER OF BLOCKS> nn
```

FOR HP INTERNAL USE ONLY

FORMAT UNIT

This destructive/exclusive command initializes the medium.

INPUT FORMAT:

```
DASSDIAG> format [[no] certify] [[no] erase]
              [{retain | replace [{physical | block}]}
              | append {physical | block} ]]
```

{If a defect list is requested, the user will be prompted as follows: }

OUTPUT FORMAT:

```
ENTER TRACK ADDRESS OF TRACK/SECTOR TO BE SPARED [CR ONLY TO END]>
or
ENTER LOGICAL BLOCK ADDRESS TO BE SPARED [CR ONLY TO END]>
```

{The default format command will erase and re-certify the entire M0 disk. There is no user supplied defect list; a defect list is constructed during the re-certification process.}

FOR HP INTERNAL USE ONLY

INQUIRE

This non-destructive/non-exclusive command requests information describing the controller and the drive.

INPUT FORMAT:

DASSDIAG> inquire

OUTPUT FORMAT:

Peripheral Device Type --- Direct Access Device
Vendor Identification --- HP
Product Identification --- S6300.650A
Revision Level --- n.nn

FOR HP INTERNAL USE ONLY

MODE SELECT (Currently Not Implemented)

This command sets the medium, drive unit, or controller unit parameters.

FOR HP INTERNAL USE ONLY

MODE SENSE

This non-destructive/non-exclusive command reads parameter information pertaining to the controller, medium, and drive unit.

INPUT FORMAT:

DASSDIAG> sense [{all | error | connect | format}]

FOR HP INTERNAL USE ONLY

PREVENT/ALLOW MEDIUM REMOVAL

This non-destructive/non-exclusive command provides a means of preventing or allowing the removal of media in the drive unit.

INPUT FORMAT:

DASSDIAG> prevent

{or}

DASSDIAG> allow

FOR HP INTERNAL USE ONLY

READ

This non-destructive/non-exclusive command reads 1 data block starting from the specified logical block address.

INPUT FORMAT:

```
DASSDIAG> read [logical address>]
```

FOR HP INTERNAL USE ONLY

READ BUFFER

This non-destructive/non-exclusive command reads data from the data buffer of the MO Controller. Normally, this command is used in conjunction with the write buffer command to test the data buffer memory of the MO Controller, as well as SCSI bus integrity.

INPUT FORMAT:

```
DASSDIAG> read buffer [<buffer offset> [<length>]]
```

{If the user does not enter a buffer offset, or the buffer offset is zero, the read will commence from address zero of the MO controller's data buffer, otherwise reading of the data buffer will start from the offset indicated in the buffer offset parameter.}

FOR HP INTERNAL USE ONLY

READ CAPACITY

This non-destructive/non-exclusive command reads the capacity of the medium. This command returns the last logical block address and its length.

INPUT FORMAT:

```
DASSDIAG> read capacity
```

OUTPUT FORMAT:

```
Highest valid disk address is logical block nnnnnn  
Logical block length for this disk is nnnn
```

FOR HP INTERNAL USE ONLY

READ DEFECT DATA

This non-destructive/non-exclusive command will read the medium defect information.

INPUT FORMAT:

```
DASSDIAG> defects [{primary | growing | all}]
```

{At this point the defect list is displayed to the user.}

FOR HP INTERNAL USE ONLY

READ LONG

This non-destructive/non-exclusive command reads data from the specified logical block address with ECC data. It may be used to read and inspect data which has been somehow corrupted (bad ECC).

INPUT FORMAT:

DASSDIAG> read long <logical block address>

FOR HP INTERNAL USE ONLY

REASSIGN BLOCKS

This destructive/exclusive command reassigns defective sectors to the nearest side band. This command is only valid for a medium that has been formatted in format mode 2 or 3.

INPUT FORMAT:

DASSDIAG> reassign

{At this point the user will be prompted for the logical block address that are to be spared.}

OUTPUT FORMAT:

ENTER LOGICAL BLOCK ADDRESS THAT IS TO BE SPARED> nnnnn

{The user will receive this prompt until s/he indicates terminate by hitting <CR> without entering any data.}

FOR HP INTERNAL USE ONLY

RECEIVE DIAGNOSTIC RESULTS

This non-destructive/exclusive command is used to get the results of the test performed as a consequence of the `send diagnostic` command. If no error resulted from the previous `send diagnostic` command, nothing is displayed.

INPUT FORMAT:

DASSDIAG> receive results

OUTPUT FORMAT:

```
Diagnostic Results:
=====
Error Code -- nn
Test Failed -- nnn
FRU 1      -- {Fru most likely at fault}
FRU 2      -- {Second fru most likely at fault}
FRU 3      -- {Third fru most likely at fault}
```

FOR HP INTERNAL USE ONLY

RELEASE

This non-destructive/exclusive command performs the opposite function of the **reserve** command. It releases a specified drive unit from the reserved state.

INPUT FORMAT:

DASSDIAG> release [<third party id>][<reservation id>]

FOR HP INTERNAL USE ONLY

REQUEST SENSE

This non-destructive/non-exclusive command is used to determine specific error conditions, when the MO controller fails to successfully execute a command.

INPUT FORMAT:

DASSDIAG> request sense

{At this point DASSDIAG will display messages indicating the particular cause of failure of the last failed command.}

FOR HP INTERNAL USE ONLY

RESERVE

This non-destructive/exclusive command is used to reserve the drive unit for use by a single initiator. If and when the unit is connected to multiple initiators, the third party id option may be used to reserve a SCSI device other than the initiator.

INPUT FORMAT:

```
DASSDIAG> reserve [<third party id>][<reservation id>]
```

{Where third party id is the SCSI device who the reservation is being made for. The reservation id is a value used to identify each element reserved by this call.}

FOR HP INTERNAL USE ONLY

REZERO UNIT

This non-destructive/non-exclusive command sets the autochanger to a specific predefined state, after recalibrating the mechanical system. It also moves the optical head to physical track 0.

INPUT FORMAT:

```
DASSDIAG> rezero
```

FOR HP INTERNAL USE ONLY

SEEK

This non-destructive/non-exclusive command moves the optical head to the physical track where the specified logical block exists.

INPUT FORMAT:

```
DASSDIAG> seek [<logical block address>]
```

{If the user does not specify what logical block address to use in the command line, DASSDIAG will prompt the user for it. }

FOR HP INTERNAL USE ONLY

SEND DIAGNOSTIC

This non-destructive/non-exclusive command causes the MO controller to perform diagnostic tests on itself, on the attached drive unit, or on both itself and the drive unit. The **receive diagnostic results** commands should be used to get the results of a test, except when the controller is directed to execute the default selftest.

INPUT FORMAT:

DASSDIAG> senddiag [selftest] [loop <cnt>]

{The user may enter the senddiag command with the optional selftest parm.
If the selftest parm is entered the device will perform its default selftest.
If the user does not enter the selftest parm s/he will be prompted as follows:}

OUTPUT FORMAT:

Test types:	0 (controller)	1 (drive)	2 (functional)	3 (access)
	=====	=====	=====	=====
Tests:	0 ROM Test	0 Stop Spindle	0 Stop Spindle	0 SFP Read
	1 RAM Test	1 DCN Test	1 Start Spindle	1 Manu. WR/RD
	2 HIC Chip Test	2 ACN Chip Test	2 Sel. ROM mode	
	3 BMM Chip Test	3 BCN Chip Test	3 Sel. MO mode	
	4 DIC Chip Test		4 High Order Seek	
	5 ECP Chip Test		5 Seek Test	
	6 Buffer Mem.		6 Magnet Erase Mode	
			7 Magnet Write Mode	

ENTER TEST TYPE> 0

{In this example the Controller Self Diagnostics is selected, therefore the following prompt is displayed.}

ENTER TEST NUMBER (CR when done)> 0

{In this example the Rom Test is selected. The prompt will be re-issued. Additional tests may be selected; when done enter CR only.}

FOR HP INTERNAL USE ONLY

START/STOP UNIT

This non-destructive/exclusive command may be used to start or stop medium rotation , and/or eject the medium from the drive unit.

INPUT FORMAT:

```
DASSDIAG> start
```

```
{ or }
```

```
DASSDIAG> stop [eject]
```

{If the stop command is entered with the eject parameter, the drive will spind down and eject the medium. If the eject parameter is not entered the drive will only spend down the medium.}

FOR HP INTERNAL USE ONLY

TEST UNIT READY

This non-destructive/non-exclusive command is used to determine the "ready" state of the autochanger. If the autochanger is in a "ready" state when it receives this command, DASSDIAG will indicate that the unit is ready.

INPUT FORMAT:

```
DASSDIAG> test unit
```

OUTPUT FORMAT:

```
Unit Ready
```

```
{ or }
```

```
Unit Not Ready
```

FOR HP INTERNAL USE ONLY

VERIFY

This non-destructive/non-exclusive command causes the verification of the written data by checking the error correction code. This command, when given a logical block address, will begin verification of data at that logical block address, through the number of logical blocks specified by the # of blocks parameter.

INPUT FORMAT:

DASSDIAG> verify [<logical block address> <# of blocks>]

{If this command is entered without any parameters the user will be prompted for the parameters.}

OUTPUT FORMAT:

ENTER LOGICAL BLOCK ADDRESS> 20

ENTER NUMBER OF BLOCKS> 4

FOR HP INTERNAL USE ONLY

WRITE

This destructive/non-exclusive command writes data to the specified logical block address. Optionally, the data may be verified by reading ECC information, after the write has been completed.

INPUT FORMAT:

```
DASSDIAG> write <logical address> [<pattern no>]
                               [[no] erase] [verify]
```

{If the user selects the erase option with the write command the device will perform an erase before the write operation. If the user does not select the erase option along with this command, s/he must issue an ERASE command to the destination area before using the write command. The default is to erase before writing.}

OUTPUT FORMAT:

```
PATTERNS AVAILABLE:
=====
```

- 0. All zeros
- 1. All ones
- 2. Walking zeros
- 3. Walking ones
- 4. User supplied

```
ENTER PATTERN SELECTION> 4
```

{If a user supplied pattern was selected, the following prompt will appear:}

```
Enter number or ASCII quoted string to be used as a pattern
(the number is taken as a 64-bit pattern, e.g., $0123456789ABCDEF)
PATTERN>"DRM was here  "
```

{In the example, the string "DRM was here " would be used as a repeating pattern for one entire block.}

FOR HP INTERNAL USE ONLY

WRITE BUFFER

This destructive/exclusive command writes data to the data buffer of the MO Controller. Normally, this command is used in conjunction with the read buffer command to test the data buffer memory of the MO Controller and the SCSI bus integrity.

INPUT FORMAT:

```
DASSDIAG> write buffer  
                [<buffer offset> [<pattern numbers> [<length>]]]
```

{If the user does not enter a buffer offset, or the buffer offset is zero, the write will commence from address zero of the MO controller's data buffer, otherwise writing of the data buffer will start from the offset indicated in the buffer offset parameter. Pattern numbers are the same as in the write block command.}

{ *** Note 65536 bytes is the largest number of transfer bytes allowed}

FOR HP INTERNAL USE ONLY

Error and Warning Messages

The following is a list of some of the most significant error and warning messages which are generated and displayed by DASSDIAG.

111	*** DASS DIAGNOSTIC ABNORMAL TERMINATION (DASSERR 111)
112	*** DIAGNOSTIC INTERNAL ERR, COULD NOT INIT DIAG ENVIRONMENT (DASSERR 112)
113	*** DIAGNOSTIC INTERNAL ERR, COULD NOT ALLOCATE MEMORY BUFF (DASSERR 113)
114	*** AN UNEXPECTED ERROR OCCURRED IN THE DASS DAR (DASSERR 114)
115	*** DIAGNOSTIC INTERNAL FAULT, UNEXPECTED ERR FROM SYSTEM SERVICE (DASSERR 115)
116	*** DIAGNOSTIC INTERNAL ERR, COULD NOT OUTPUT MESSAGE (DASSERR 116)
117	*** DIAGNOSTIC INTERNAL ERR, COULD NOT READ BUFFER (DASSERR 117)
118	*** DIAGNOSTIC INTERNAL ERR, COULD NOT READ CATALOG FILE (DASSERR 118)
119	*** DIAGNOSTIC INTERNAL ERR, COULD NOT RELINQUISH ACCESS TO PDEV (DASSERR 119)
120	*** DIAGNOSTIC INTERNAL ERR, UNABLE TO OBTAIN ACCESS TO DEV (DASSERR 120)
121	*** THE MAXIMUM NUMBER OF ERRORS HAS BEEN EXCEEDED (DASSERR 121)
122	*** UNRECOGNIZED COMMAND -- TYPE "HELP" FOR A LIST OF VALID COMMANDS (DASSERR 122)

FOR HP INTERNAL USE ONLY

123 *** A NUMERICAL INPUT WAS EXPECTED BUT NOT RECEIVED (DASSERR 123)

124 Status returned by Sherlock: !

125 *** DIAGNOSTIC INTERNAL ERR, COULD NOT WRITE TO BUFFER (DASSERR 125)

126 *** DIAGNOSTIC INTERNAL ERR, IO_PATH_TEST (DASSERR 126)

127 *** WARNING -- THE I/O PATH TO THE DISK MAY NOT BE FUNCTIONING
 PROPERLY (DASSERR 127)

128 *** FAILED ATTEMPTING TO INITIATE DRIVE POWER ON SELFTST
 (DASSERR 128)

129 *** FAILED ATTEMPTING TO IDENTIFY DEVICE (DASSERR 129)

130 *** FAILED ATTEMPTING TO READ DIAGNOSTIC SELFTST RESULTS
 (DASSERR 130)

131 *** ERROR LOG MAY BE CORRUPTED, VALUE IN NO. OF ENTRIES FIELD
 EXCEEDS EXPECTED MAXIMUM (DASSWARN 131)

132 *** FAILED ATTEMPTING TO ERASE BLOCK PRIOR TO WRITE (DASSERR 132)

133 *** FAILED ATTEMPTING TO WRITE PATTERN TO MEDIA (DASSERR 133)

134 *** FAILED ATTEMPTING TO READ DATA BLOCK FROM MEDIA (DASSERR 134)

135 *** FAILED ATTEMPTING WRITE BUFFER REQUEST DURING LOOPBACK
 (DASSERR 135)

136 *** FAILED ATTEMPTING READ BUFFER REQUEST DURING LOOPBACK
 (DASSERR 136)

137 *** COMMAND NOT VALID FOR AUTOCHANGER --
 USE THE ACCESS COMMAND TO SELECT AN HD DRIVE AS THE ACTIVE DEVICE

FOR HP INTERNAL USE ONLY

138	*** COMMAND NOT VALID FOR NO DRIVE -- USE THE ACCESS COMMAND TO SELECT AUTOCHANGER AS THE ACTIVE DEVICE
139	*** COMMAND ONLY VALID IF INITIAL DEVICE WAS AN AUTOCHANGER (DASSERR 139)
140	*** REQUESTED FUNCTION IS NOT IMPLEMENTED FOR DEVICE (DASSERR 140)
141	*** INVALID OPTION WAS SPECIFIED FOR REQUESTED FUNCTION (DASSERR 141)
142	*** AN UNKNOWN (ILLEGAL) FUNCTION WAS REQUESTED (DASSERR 142)
143	*** NO DEVICE IS CURRENTLY SELECTED (DASSERR 143)
144	*** A BUFFER USED BY THE DEVICE ACCESS ROUTINE IS CORRUPT (DASSERR 144) (software detected an invalid buffer ID)
145	*** DIAGNOSTIC'S BUFFER IS TOO SHORT TO HANDLE DATA TRANSFER (DASSERR 145)
146	*** INTERNAL ERROR IN DEVICE ACCESS ROUTINE (DASSERR 146)
147	*** DEVICE ACCESS ROUTINE RETURNED AN UNKNOWN ERROR CODE (DASSERR 147) Error status: ! (!H)
148	*** TEST TYPE, AND AT LEAST ONE TEST NUMBER ARE REQUIRED (DASSERR 148)
150	*** INVALID DEVICE SPECIFIED BY USER (DASSERR 150)
151	*** EXCLUSIVE MODE REQUIRED TO EXECUTE THIS COMMAND (DASSWARN 151)
152	*** DESTRUCTIVE MODE REQUIRED TO EXECUTE THIS COMMAND (DASSWARN 152)
153	*** I/O TIMED OUT. I/O WAS ABORTED (DASSERR 153)

FOR HP INTERNAL USE ONLY

154 *** THE I/O REQUEST FAILED (DASSERR 154)

155 *** I/O ABORTED DUE TO PREVIOUS I/O ERROR (DASSERR 155)

156 *** A POWER FAILURE WAS DETECTED. ALL I/O's ABORTED (DASSERR 156)

250 *** NO ADDITIONAL ERR INFO AVAILABLE
(from sense data param blk) (DASSWARN 201)

6773 *** PRIOR TESTING COMPLETED SUCCESSFULLY, ADDITIONAL NO DRIVE TESTS
 REQUIRE EXCLUSIVE/DESTRUCTIVE ACCESS PERMISSION. THESE TESTS CAN
 NOT BE ATTEMPTED WITH YOUR CURRENT TEST MODE AND ACCESS LEVEL
 (DASSWARN 6773)

6774 *** USER CANCELED DESTRUCTIVE TESTS FOR DISK DRIVE/MEDIA
(DASSWARN 6774)

6800 *** NO AVAILABLE STORAGE SLOTS; NO DRIVES MUST BE EMPTIED FOR
 ADDITIONAL TESTING (DASSERR 6800)

6801 *** PRIOR TESTING COMPLETED SUCCESSFULLY, ADDITIONAL AUTOCHANGER
 TESTS REQUIRE EITHER 1) ALL NO DRIVES ARE EMPTY (NO MEDIA LOADED),
 OR 2) EXCLUSIVE ACCESS PERMISSION TO NO DRIVES SO THAT DASSDIAG
 MAY UNLOAD DRIVES PROGRAMMATICALLY (DASSWARN 6801)



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HP 7974A/7978A/B Magtape Drive Diagnostic

Introduction

The HP 7974A/7978A/B Magtape Drive Diagnostic will test an HP 7974A or HP 7978A/B Magtape Drive. The diagnostic will run on any HP Precision Architecture RISC computer system which supports the Online Diagnostic subsystem connected to an HP 7974A or HP 7978A/B tape drive to identify and isolate defective Field Replaceable Units (FRUs). The diagnostic is structured so that online tests may be run before tests which require the device to be offline. The user can specify which sections and steps are to be run.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10003.

Minimum Configuration

The hardware required to run the diagnostic consists of an HP Precision Architecture RISC computer system with a supported (see above) Magtape Drive connected to it. The drive under test must contain internal selftests that are capable of detecting failed Field Replaceable Units (FRU's) in the drive.

Auto-Diagnostics

DIAG7478 can be invoked by the I/O system for auto-diagnostic purposes when a nonrecoverable error has been detected. In auto-diagnostic mode, this diagnostic program will execute the sections and steps listed in the "Default Tests" section of this chapter.

Operating Instructions

Before attempting to run the diagnostics, ensure that the tape drive to be tested is powered on. If the sections which test tape movement and write/read operations are to be run, ensure that a scratch tape is mounted and that the tape drive is placed online.

Default Tests

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

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 6	Hardware Status
Step 65	Display Hardware Status with Text
Section 40	Firmware Utilities
Step 132	Display Firmware Header
Step 133	Display Gains
Step 134	Display Electronic Set-up Values
Section 50	Image Utilities
Step 141	Display Header
Step 142	Display HP-IB Address
Step 143	Display Amount of Tape Across Head
Step 144	Display Master Controller Firmware Revision
Step 145	Eprom Check
Section 55	Display Logs
Step 151	Display Internal Drive Error Log
Step 152	Display Internal Drive Tape Log

For the HP 7974A only:

Section 34	HP 7974A Selftests
Step 118	Power-On Selftest
Step 119	Master Controller Tests
Step 120	Loop Write/Read Test

For the HP7978A/B only:

Section 38	HP7978A/B Selftests
Step 123	Power-on Selftest
Step 124	Master Controller Tests
Step 125	Servo Controller Tests
Step 126	HP-IB Internal Loopback Tests
Step 127	Internal Digital Loopback Tests
Step 128	Write Clock Test

FOR HP INTERNAL USE ONLY

RUN Command

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

sysdiag

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

In MPE XL the default magtape LDEV parameter is 7. In HP-UX no default magtape device parameter exists. For example, to run the diagnostic in an MPE XL environment, you might enter:

```
DUI >RUN DIAG7478 pdev=4.2.0 <RUN Command Options>
```

```
      |                               |  
      |       none required for     |  
      |       default test suite    |  
      |                               |
```

*insert physical location of
device to be tested here;
alternatively, for MPE XL,
type the ldev number;
or for HP-UX, type the devfile name*

FOR HP INTERNAL USE ONLY

Test Execution

The diagnostic displays the following header and welcome message:

```
*****
****
****          7974A/7978 TAPE DIAGNOSTIC          ***
****
****          (C) Copyright Hewlett Packard Co. 1987      ***
****                All Rights Reserved.                ***
****                Version A.00.00                      ***
****
*****
Welcome, Today is MON, MAY 22, 1987, 9:00AM
```

The diagnostic will then execute all the selected sections and steps. Following the header, DIAG7478 will attempt to access the magnetic tape drive that was specified in the RUN command. If the status returned is "fail", the following error message will be output:

```
*** DIAGNOSTIC COULD NOT OBTAIN ACCESS TO DEVICE (MTDERR 6062)
7974A/7978A/B MAG TAPE DIAGNOSTIC ABORTING
```

Otherwise, the diagnostic will issue an identify command to the specified device to determine whether it is an HP 7974A or 7978A/B magnetic tape drive. If the device does not respond to the identify command, the following error message will be output:

```
*** DEVICE FAILED TO RESPOND TO IDENTIFY (MTDERR 5034)
NO IDENTIFY CODE WAS RETURNED TO IDENTIFY REQUEST
HP7974A/7978 TAPE DIAGNOSTIC TERMINATING ABNORMALLY
```

Next, DIAG7478 will examine the identity code to determine if the device is an HP 7974A or HP 7978A/B. If the identity is not recognized by DIAG7478, it is assumed to be an HP 7974A and the following is output:

```
*** IDENTIFY FAILED (MTDERR 5033)
ILLEGAL IDENTIFY CODE OF N HEXADECIMAL RETURNED
ASSUMING THE DEVICE IS AN HP 7974A MAG TAPE DRIVE
```

The diagnostic will ask whether or not the user wishes to continue the diagnostic assuming that the device to be tested is an HP 7974A:

```
Continue?  enter "Yes" to resume, or "No" to abort
```

If "Yes" then the diagnostic will continue, assuming that the tape drive is an HP 7974A. If "No" or if the diagnostic is in auto-diagnostic mode then the diagnostic will terminate, and the following message will be output:

```
HP 7974A/7978A/B Magnetic Tape Diagnostic Terminating
```

If the tape drive identify succeeds, the sections and the steps specified by the user will be executed in numerical order. If the user did not specify sections and steps or if the diagnostic is being run in auto-diagnostic mode, then the default sections and steps will be executed.

Test Section Descriptions

There are eighteen diagnostic program sections which are available for user selection. The user may also select individual steps to be run for sections 6, 10, 15, 16, 20, 23, 25, 34, 38, 40, 45, 50, and 55.

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 6	Hardware Status
Step 65	Interpret Hardware Status
Step 66	Display Hardware Status in Binary
Section 10	Set Tape Density commands
Step 70	Set Density to 800 or 6250 CPI
Step 71	Set Density to 1600 CPI
Section 15	Write/Read Comparison Check (NRZI or GCR)
Step 74	256 1-Byte/Record File
Step 75	Maximum Buffer File
Step 76	Stream Test
Step 77	Worst Case Low Frequency File
Step 78	Worst Case High Frequency File
Step 79	Worst Case Tripole File
Section 16	Write/Read Comparison Check (PE)
Step 80	256 1-Byte Record File
Step 81	Maximum Buffer File
Step 82	Stream Test
Step 83	Worst Case Low Frequency File
Step 84	Worst Case High Frequency File
Step 85	Worst Case Tripole File
Section 20	Selectable Tape Movement Commands
Step 91	Forward Space One File (to end of next EOF mark)
Step 92	Back Space One File (to start of previous EOF)
Step 93	Back Space One Record (to end of next record gap)
Step 94	Forward Space One Record (to start of previous record gap)
Step 95	Write Record Gap
Step 96	Write File Mark
Step 97	Rewind Online
Step 98	Rewind Offline



FOR HP INTERNAL USE ONLY

Section 23	Selectable Tape Read Data Commands
Step 100	Read one file (NRZI or GCR)
Step 101	Read one file (PE)
Section 25	Paces
Step 105	Write Files until EOT (NRZI for 7974A/GCR for 7978A/B)
Step 106	Read Files until EOT (NRZI for 7974A/GCR for 7978A/B)
Step 107	Write Files (PE) until EOT
Step 108	Read Files (PE) until EOT
Step 109	Tape Movements:
	1. Back Space 2 Records
	2. Forward Space 1 Records
	3. Back Space 2 Files
	4. Forward Space 1 File
	5. Rewind Online
	6. Forward Space by record through all records on tape
	7. Back Space by record through all records on tape
	8. Forward Space by file through all files on tape
	9. Back Space by file through all files on tape
Section 34	HP 7974A Selftests
Step 110	Transport Test (online)
Step 111	Transport Servo/Capstan (online)
Step 112	Error Detection Circuitry (online)
Step 113	Write/Backspace/Read test (online)
Step 114	NRZI (800 CPI) Stop/Start Write Tests (online)
Step 115	NRZI (800 CPI) Streaming Write Tests (online)
Step 116	PE (1600 CPI) Stop/Start Write Tests (online)
Step 117	PE (1600 CPI) Streaming Write Tests (online)
Step 118	Power-on Selftest (on/offline)
Step 119	Master Controller Tests (on/offline)
Step 220	Loop Write/Read Test (on/offline)
Section 38	7978A/B Selftests
Step 121	Write/Read PE Data Block Test (online)
Step 122	Write/Read GCR Data Block Test (online)
Step 123	Power-on Selftest (offline)
Step 124	Master Controller Tests (on/offline)
Step 125	Servo Controller Tests (on/offline)
Step 126	HP-IB Internal Loopback Tests (on/offline)
Step 127	Internal Digital Loopback Tests (on/offline)
Step 128	Write Clock Test (on/offline)

FOR HP INTERNAL USE ONLY

Section 40	Firmware Update Utilities
Step 131	Write Firmware Update
Step 132	Display Firmware Header
Step 133	Display Gain Values
Step 134	Display Electronic Set-up Values
Step 135	Firmware Update Dump
Step 136	Firmware Update Reset
Section 45	Download Diagnostics
Step 138	Download Diagnostics
Step 139	Display Downloaded Diagnostics
Section 50	Image Dump Utilities
Step 141	Display Header
Step 142	Read HP-1B Address
Step 143	Read Amount of Tape Across Head
Step 144	Read Master Controller Firmware ID
Step 145	Check EEPROM Test Cells
Step 146	Dump Image
Section 55	Internal Device Logs
Step 151	Display Internal Drive Error Log
Step 152	Display Internal Drive Tape Log
Step 153	Clear Internal Error Logs
Section 60	Interactive Section
Section 62	Do All Tests

FOR HP INTERNAL USE ONLY

Section 2—CLEAR

This section of the diagnostic places the selected device into the following known state:

- Tape drive protocol will be restarted
- Data buffers will be cleared
- Current tape position is retained
- Tape status will be retained
- On/Offline status will remain as is

The device response to this section is not tested. In order to do so, other sections such as Identify, Loopback, and Hardware Status must be executed. If no errors are generated, the diagnostic will output the following message:

```
Section 2 - Clear  
End Section 2
```

Error Output Example:

```
Failed Tape Clear Command
```

See error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 3—IDENTIFY

This section issues an identify command to the selected tape drive. The device should return a 2-byte identity code. The following ID code and the device mnemonic for the HP 7974A or HP 7978A/B will be output:

ID Codes

HP 7974A = 174 hexadecimal
HP 7978A/B= 178 hexadecimal

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

```
Section 3 - Identify
  ID code of nnn hexadecimal returned
  Hardware Status bit id for xxxxxx is on
  Device is a xxxxxx
End Section 3
```

Error Output Example:

Failed Tape Identify Command

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 4—LOOPBACK

This section tests the HP-IB Communication Link between the host and HP 7974A/7978A/B by testing the following items: HP-IB (ABI) chip, HP-IB bus transceivers data buffer, handshake logic and buffer memory. This operation involves writing a loopback of 256 bytes of data on the HP-IB channel to the magnetic tape controller. If errors exist the first ten errors will be printed in the following format:

Section 4 -Loopback
End Section 4

Error Output Example:

*** WRITE AND READ DATA LOOPBACK FAILED (MTDERR 5045)

Byte #	Hex Value Transmitted	Hex Value Received	Bit Positions In Error 01234567
nnn	\$nn	\$nn	nnnnnnnn
.	.	.	.
nnn	\$nn	\$nn	nnnnnnnn

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 6—HARDWARE STATUS

This section interprets a 6-byte hardware status message obtained from either a selected HP 7974A/7978A/B or from a calling program if in_decode_stat is set.

Step 65 Interpret Hardware Status

This step decodes the 6 hardware status bytes into text output. Each bit corresponds to the DIO line with the same number. A subset of the messages printed below will be interpreted based on the following specifications:

Status Byte	Description
Bytes 1-3	contain the error and status information returned from the DIO lines. Each bit corresponds directly to its DIO line. If a DIO line is on, then the information will be displayed. If the line is off, then no error or status state exists and nothing will be printed for that bit.
Byte 4	contains 2 fields - the retry count for the last read or write operation and the error detail if a command reject error occurred (status byte 2, DIO line 4). If no valid information is contained in byte 4, it should be set to a value of 0.
Bits 0-4	indicate the number of retries performed by the device. If these bits have a value of 00000 then the operation succeeded on the first try. If these bits have a value of 00001 then a correctable error was detected on the first try. If the bits have a greater value than 00001, then the value initiates the number of tries performed to complete that operation.
Bits 5-7	contain the reason for a command reject error. The meanings are as follows:

Decimal	Message
0	Null Code (0)
1	No further detail (1)
2	Device Reject-See byte 5.
3	Protocol Reject-See byte 5.
4	No further detail (4)
5	No further detail (5)
6	No further detail (6)
7	Self-Test Failure

FOR HP INTERNAL USE ONLY

- Byte 5** is dependent on the errors reported in previous status information. If the information in previous bytes conflicts with the information in status byte 5, the information from status byte 5 is most likely correct.
- Byte 6** is used only for reporting the transparent status of hard or soft errors while in immediate report mode. This byte indicates which command had the error. It contains the number of commands sent and reported since the command in question was issued. For nontransparent status, this byte will always be zero.

FOR HP INTERNAL USE ONLY

Step 66 Display Hardware Status in Binary

This step decodes the 6 hardware status bytes into binary, and displays them. If no errors are generated, the diagnostic will output the following message:

Section 6 - Hardware Status

Table 30-1. Status Byte 1

Bit	Value	Description
0	----	End of file (tape mark)
1	----	BOT (load point)
2	----	EOT (end of tape)
3	----	Recovered error check (see retry count)
4	----	Command rejected (see reject codes A1/BE)
5	----	File write protected (no write ring)
6	----	Unrecovered data/format error (see reject codes 29/49)
7	----	Unit on-line

Table 30-2. Status Byte 2

Bit	Value	Description
0	----	GCR format (6250 BPI) (7978B)
1	----	Unknown tape format/density
2	----	Data parity error (transport electronics)
3	----	Data timing error (shouldn't happen on 7974A/7978B)
4	----	Tape runaway
5	----	Door open
6	----	Long records supported (7978B)
7	----	Immediate response mode enabled

Table 30-3. Status Byte 3

Bit	Value	Description
0	----	PE format (1600 BPI)
1	----	NRZI format (800 BPI) (7974A)
2	----	Power restored or device cleared
3	----	HP-IB command parity error
4	----	Tape position lost/loss of tension (see reject codes 51/5E)
5	----	Formatter error (see reject codes 65/6E)
6	----	Servo error (see reject codes 51/5E)
7	----	Controller error (see reject codes 79/8C)

FOR HP INTERNAL USE ONLY

Table 30-4. Status Byte 4

Bit	Value	Description
0	----	Command error code
1	----	Command error code
2	----	Command error code
3	----	Retry count
4	----	Retry count
5	----	Retry count
6	----	Retry count
7	----	Retry count

Note The following may appear only if a command reject has occurred (byte 1, bit 5) and a device reject is indicated (byte 4, value 2).



Table 30-5. Status Byte 5

Bit	Value	Description
-	5	Device is write protected but a write type command was initiated.
-	6	Tape not loaded when command received.
-	7	Write density command given but requested density not available.
-	9	The tape to be read had unidentifiable format. Density read may not be available, or the tape may have an unreadable density ID, or may be blank.
-	10	The tape to be written had unidentifiable format; a write record, write file mark, or write gap command was received but cannot be processed without a Write Format command if tape was unidentified at load point.
-	11	Drive is not online.
-	16	A write format command was issued but tape not positioned at Beginning of Tape.
-	19	Backward type command (except Rewind) was initiated with the tape already at BOT.
-	23	Protocol was not synched.
-	24	Unknown tape command.
-	31	Length of write record requested exceeded maximum record size supported by drive.
-	33	Self-test failure. Drive will not accept tape commands.
-	37	Tape positioning failure while removing readheads.
-	40	Door open reject: door was opened during a long gap while the tape was beyond the end of tape market. This condition is not repeatable; unspooling of the tape may result.



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Note The following may appear if and only if an unrecovered data format error (byte 1, bit 7) has occurred.

Table 30-6. Status Byte 5 (continued)

Bit	Value	Description
-	41	Tape velocity was out of specification.
-	45	Multiple tracks were in error. Two or more tracks were in error for a Read or Write of PE or NRZI density, or two or more tracks were in error.
-	47	Failure to verify a tape mark or density ID just written.
-	48	Noise on detect. Indistinguishable flux transitions were detected while attempting to detect a recorded block.
-	49	Data format error. Flux transitions were found or were missing in the tracks for block detect.
-	50	Failure to identify tape following a rewind command.
-	51	Gap detected before end of data. The read formatter detected a full tape width drop-out within the data portion of a data block.
-	52	Data block drop-out. A full tape width drop-out was detected within the preamble or postamble of a data block.
-	53	Redundancy check error. The read formatter detected either a CRC, ACRC LRC, or residual error while reading or verifying a data block.
-	54	HP 7978 Read parity error. The read formatter detected an unrecovered parity error within a data block. For PE this error could include a
-	55	HP 7974A abnormal command abort, door opened.
-	57	HP 7974A maximum skew exceeded.
-	58	HP 7974A false preamble or postamble detected.
-	59	HP 7974A corrected data error on write.
-	60	Buffer overrun. Record size exceeded the maximum record size supported on a read.
-	61	Data block timeout. Could not detect the gap following a data block. Could be caused by a record length longer than the drive supports.
-	62	Tape mark drop-out. A full tape width drop-out was detected within a tape mark.
-	63	Tape mark unverified. Detected a tape mark which does not meet ANSI specifications in terms of flux transitions and erasure in the appropriate tracks.
-	64	Tape mark timeout. Could not detect the gap following a detected tape mark.

FOR HP INTERNAL USE ONLY

Note



The following may appear only if the position is unrecovered (byte 3, bit 5) or a servo error (byte 3, bit 7) has occurred.

Table 30-7. Status Byte 5 (continued)

Bit	Value	Description
-	41	Tape velocity was out of specification.
-	81	Servo controller unresponsive. The servo will not take data from the master controller.
-	82	Servo failed to reach the desired state requested by the master controller.
-	83	Servo shutdown. The servo system lost tape tension unexpectedly.
-	84	Servo controller hard failure. The servo controller has detected a hard failure within itself.
-	85	Servo protocol error. An invalid byte was received by servo from master controller.
-	86	A run time error was detected by servo.
-	87	In position interrupt not received. Master controller did not get the in position interrupt it expected.
-	88	No gap detected by the servo after reading or writing data block or tape mark.
-	89	Safety shutdown of motor driver.
-	90	No BOT detected on load or rewind.
-	91	Speed out of Specifications.
-	92	The desired state requested by the master controller was invalid for the current context.
-	94	Tape positioning failure.

FOR HP INTERNAL USE ONLY

Note The following may appear only if a formatter error (byte 3, bit 6) has occurred.

Table 30-8. Status Byte 5 (continued)

Bit	Value	Description
-	101	HP 7978 read formatter unresponsive. The read formatter did not respond with end of record status after a data block was detected.
-	102	HP 7978 Read Formatter hardware error.
-	103	Bad block type detected on write operation.
-	104	Erase failure. Flex transitions were detected in a portion of tape currently being erased.
-	105	No data detected after write.
-	106	Tracks out of sync on write verify.
-	107	HP 7974A formatter hardware error.
-	108	HP 7974A formatter unresponsive.
-	109	No gap timeout. The gap timer did not count down, or was never started.
-	110	Formatter byte count mismatch with data buffer.

Note The following will appear only if a controller error (byte 3, bit 8) occurs.

Table 30-9. Status Byte 5 (continued)

Bit	Value	Description
-	121	Transaction ID mismatch between command sent to device program and the returned report.
-	122	No pending command found for report received from device program.
-	123	Invalid report message received from device program.
-	124	Report queue overflow.
-	125	Unknown command received by device program.
-	126	Command queue overflow.
-	128	Missing End of Record flag in data buffer.
-	129	Data buffer parity error.
-	131	Byte count mismatch between putting a record into the data buffer and removing it.
-	133	Processor handshake abort between HP-IB interface board and channel program.
-	134	Unknown HP-IB interface exception detected.
-	137	Illegal access to the servo controller registers detected.
-	138	Device program firmware error.
-	139	Hardware utilities firmware error.
-	140	Channel program firmware error.

FOR HP INTERNAL USE ONLY

Note The following will appear only if a command reject (byte 1, bit 5) and a protocol error (byte 4, value 3) have occurred.



Table 30-10. Status Byte 5 (continued)

Bit	Value	Description
-	161	Command queue not empty; cannot accept self-test, loopback, or diagnostic commands while tape commands are queued.
-	162	Request DSJ expected.
-	163	Request status expected.
-	165	Unknown unit select.
-	166	Tape command secondary expected.
-	167	Tape command data byte expected.
-	168	Missing EOI on tape command data byte, self-test number, or end command data byte.
-	170	Command phase protocol error for write record.
-	173	Report phase protocol error.
-	174	Cold load sequence protocol error.
-	176	End "complete" expected.
-	178	End "data" expected.
-	180	Unknown interface secondary command.
-	181	Misplaced data byte.
-	184	Interface loopback protocol error.
-	185	Run self-test protocol error.
-	188	HP-IB command parity error.
-	189	Reset by operator during a protocol sequence.
-	190	Device clear received.
-	nnn	Non-transparent status.
-	nnn	The number of commands sent since soft error were nnn.
-	nnn	The number of commands which failed since write failure were nnn.

End Step 65 - Display Hardware Status With Text

Status Byte Number: Contents (Base 2):

- 1: nnnnnnnn (1st Status Byte)
- 2: nnnnnnnn (2nd Status Byte)
- 3: nnnnnnnn (3rd Status Byte)
- 4: nnnnnnnn (4th Status Byte)
- 5: nnnnnnnn (5th Status Byte)
- 6: nnnnnnnn (6th Status Byte)

End Step 66 - Display Hardware Status in Binary

End Section 6

FOR HP INTERNAL USE ONLY

Error Output Example:

Failed hardware status command

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 10—SET TAPE DENSITY COMMANDS

This section allows the user to set the tape density to 800, 1600, or 6250 CPI, if the capabilities of the drive permit it. The tape drive must be online to perform this function. Step 70 will set the density to 800 CPI if the tape drive is an HP 7974A or to 6250 CPI if the tape drive is an HP 7978A/B.

Step 70 Set Density 800 CPI (HP 7978A only)
 Set Density 6250 CPI (HP 7978A/B only)

Step 71 Set Density 1600 CPI

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

For the HP 7974A only:

```
Section 10 - Set Tape Density
      End Step 70 - Set Density 800 CPI
      End Step 71 - Set Density 1600 CPI
End Section 10
```

For the HP 7978A/B only:

```
Section 10 - Set Tape Density
      End Step 70 - Set Density (GCR)
      End Step 71 - Set Density (PE)
End Section 10
```

Error Output Example:

```
Failed set density command
```

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 15—WRITE/READ COMPARISON CHECK (NRZI & GCR)

This section outputs a series of files filled with worst-case data at 800 CPI if the device is an HP 7974A; or at 6250 CPI if the device is an HP 7978A/B. The data will be read back and compared against what was written. If discrepancies exist, then the number of bits written, read, in error, and the distance in feet from BOT will be output through the first ten errors. After requested files are processed, the tape will be rewound and left online. If the HP 7974A does not have the 800 CPI option, the diagnostic will continue but will skip all steps which require 800 CPI.

- Step 74 **256 1-Byte/Record File:** This step will write a file of one-byte records, spanning the 256 byte character set.
- Step 75 **Maximum Buffer File:** This step will write a file the full size of
- Step 76 **Streaming Test:** This step will write five files of 16K bytes each to tape in streaming mode, read them back, and check the data read against what was written.
- Step 77 **Worst Case Low Frequency Level**
- Step 78 **Worst Case High Frequency Level**
- Step 79 **Worst Case Tripole File**

Note The files created by steps 77 - 79 will contain records of 128, 256, and 512 bytes.



If no errors are generated, the diagnostic may output one or more of the following messages:
For the HP 7974A only:

Section 15 - Write/Read Comparison Checks (NRZI)

End Step 74 - 256 1-Byte/Record File (NRZI)

End Step 75 - Maximum Buffer File (NRZI)

End Step 76 - Stream Test (NRZI)

End Step 77 - Worst Case Low Frequency File (NRZI)

End Step 78 - Worst Case High Frequency File (NRZI)

End Step 79 - Worst Case Tripole File (NRZI)

End Section 15

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For the HP 7978A/B only:

- Section 15 - WRITE/READ COMPARISON CHECKS (GCR)
 - End Step 74 - 256 1-BYTE/RECORD FILE (GCR)
 - End Step 75 - MAXIMUM BUFFER FILE (GCR)
 - End Step 76 - STREAM TEST (GCR)
 - End Step 77 - WORST CASE LOW FREQUENCY FILE (GCR)
 - End Step 78 - WORST CASE HIGH FREQUENCY FILE (GCR)
 - End Step 79 - WORST CASE TRIPOLE FILE (GCR)
- End Section 15

Error Output Example:

Failed Tape Set Density Command
Failed Tape Write Command
Failed Tape Write End of File Command
Failed Tape Read Command

Byte #	Hex Value Transmitted	Hex Value Received	Bit Positions In Error	Ft of Tape Over Head
nnnn	\$nn	\$nn	nnnnnnnn	nnnnn.nnn
.
nnnn	\$nn	\$nn	nnnnnnnn	nnnnn.nnn

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 16—WRITE/READ COMPARISON CHECK PHASE ENCODED (PE)

This section writes out a series of files filled with worst-case data for the 1600 CPI density. The data will be read back and compared against what was written. If discrepancies exist then the number written, the number read, the bits in error, and the feet from BOT will be output through the first ten errors. After requested files are processed, the tape will be rewound and left online. The following steps are available:

- Step 80 **256 1-Byte Record File (PE):** This step will write a file of 256 one-byte records, spanning the 256-byte character set.
- Step 81 **Maximum Buffer File (PE):** This step will write a file of the full size of the buffer (16K bytes, and write data to check the tracks).
- Step 82 **Streaming Test (PE):** This step writes five files of 16K bytes each to tape in stream mode, reads them back, and checks the data against what was written.
- Step 83 **Worst Case Low Frequency File (PE):**
- Step 84 **Worst Case High Frequency File (PE):**
- Step 85 **Worst Case Tripole File (PE):**

Note The files created by steps 82 - 85 will contain records of 128, 256, and 512 bytes.



If no errors are generated, the diagnostic may output one or more of the following messages:

```
Section 16 - WRITE/READ COMPARISON CHECKS (PE)

      End Step 80 - 256 1-BYTE RECORD FILE (PE)

      End Step 81 - MAXIMUM BUFFER FILE (PE)

      End Step 82 - STREAMING TEST (PE)

      End Step 83 - WORST CASE LOW FREQUENCY FILE (PE)

      End Step 84 - WORST CASE HIGH FREQUENCY FILE (PE)

      End Step 85 - WORST CASE TRIPOLE FILE (PE)

End Section 16
```

FOR HP INTERNAL USE ONLY

Error Output Example:

Failed Tape Set Density Command
Failed Tape Write Command
Failed Tape Write End of File Command
Failed Tape Read Command

Byte #	Hex Value Transmitted	Hex Value Received	Bit Positions In Error 01234567	Ft of Tape Over Head
nnnn	\$nn	\$nn	nnnnnnnn	nnnn
.
nnnn	\$nn	\$nn	nnnnnnnn	nnnn

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 20—SELECTABLE TAPE MOVEMENT COMMANDS

This section allows the user to forward and backspace records and files, test the drive's ability to write a record gap or a file mark, and rewind the tape drive leaving the drive online or offline. The following steps are available:

Step 90	Forward Space One File
Step 92	Back Space One File
Step 93	Back Space One Record
Step 94	Forward Space One Record
Step 95	Write Record Gap
Step 96	Write File Mark
Step 97	Rewind Online
Step 98	Rewind Offline

If no errors are generated, the diagnostic may output one or more of the following messages:

Section 20 - SELECTABLE TAPE COMMAND

End Step 91 - FORWARD SPACE ONE FILE

End Step 92 - BACK SPACE ONE FILE

End Step 93 - BACK SPACE ONE RECORD

End Step 94 - FORWARD SPACE ONE RECORD

End Step 95 - WRITE RECORD GAP

End Step 96 - WRITE FILE MARK

End Step 97 - REWIND TAPE ON-LINE

End Step 98 - REWIND TAPE OFF-LINE

End Section 20

FOR HP INTERNAL USE ONLY

Section 23—SELECTABLE TAPE READ DATA COMMANDS

This section allows data to be read from a pre-written tape. The user can create the data for the pre-written tape on the same HP 7974A/7978A/B by using Sections 15-16, or could simply use data on a customer's previously written tape file. If the file exceeds 16K characters, then after every 16K of data has been processed, the diagnostic will ask the user whether or not to continue reading records and to display records:

Read More Records in File ?
Continue ? Enter 'YES' to resume, 'NO' to abort>

Display More Records in File ?
Continue ? Enter 'YES' to resume, 'NO' to abort>

Records will be read and displayed until either the user enters NO to the continuation question or the end of file is reached. Once the user indicates that no further records should be displayed, the second question will not be displayed again.

Step 100 Read one file (NRZI for 7974A/GCR for 7978A/B)
Step 101 Read one file (PE)

If no errors are generated, the diagnostic may output one or more of the following messages:

For the HP 7974A only:

Section 23 - SELECTABLE TAPE READ DATA

```
Record n Read Dump (in Hexadecimal) :  
      1  2  3  4  5  6  7  8  9 10  
=====
```

```
nnnn : $nn $nn $nn $nn $nn $nn $nn $nn $nn $nn  
..  
nnnn : $nn $nn $nn $nn $nn $nn $nn $nn $nn $nn  
.  
Record n Read Dump (in Hexadecimal) :  
      1  2  3  4  5  6  7  8  9 10  
=====
```

Read n Records

End Step 100 - READ ONE FILE (NRZI)

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```
Record n Read Dump (in Hexadecimal) :  
      1  2  3  4  5  6  7  8  9 10  
=====
```

nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn
..	:
nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn

```
Record n Read Dump (in Hexadecimal) :  
      1  2  3  4  5  6  7  8  9 10  
=====
```

nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn
..	:
nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn

Read n Records
End Step 101 - READ ONE FILE (PE)

End Section 23

For the HP 7978A/B only:

```
Record n Read Dump (in Hexadecimal) :  
      1  2  3  4  5  6  7  8  9 10  
=====
```

nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn
..	:
nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn

```
Record n Read Dump (in Hexadecimal) :  
      1  2  3  4  5  6  7  8  9 10  
=====
```

nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn
..	:
nnnn	:	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn	\$nn

Read n Records
End Step 100 - READ ONE FILE (GCR)

```
Read n bytes from tape  
Read n bytes from tape  
.  
.  
.  
Read n bytes from tape
```

End Step 101 - READ ONE FILE (PE)

End Section 23

Error Output Example:

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 25—PACES

This section implements paces by writing files of pseudo-random worst-case ASCII and binary, reading the files, and performing tape movements on the files. Previous sections and steps which wrote and read files and performed tape movements are designed to do a quick test of the function. This section is designed to push the drive to its limits by forcing it to handle large amounts of random data and random size at maximum speed. The EOT sensor and its associated circuitry must be functioning properly for this test to complete.

Note It is strongly recommended that a small tape be mounted for this section: execution time is heavily dependent on tape length and system load.

The following steps are available:

- Step 105 Write Files (NRZI for 7974A/GCR for 7978A/B) until EOT
- Step 106 Read Files (NRZI for 7974A/GCR for 7978A/B) until EOT
- Step 107 Write Files (PE) until EOT
- Step 108 Read Files (PE) until EOT
- Step 109 Tape Movements:
 1. Back Space 2 Records
 2. Forward Space 1 Record
 3. Back Space 2 Files
 4. Forward Space 1 File
 5. Rewind
 6. Forward Space the number of records on tape
 7. Back Space the number of records on tape
 8. Forward Space the number of files on tape
 9. Back Space the number of files on tape

If no errors are generated, the diagnostic may output one or more of the following messages for the HP 7974A only:

Section 25 - Paces

Wrote NNN Files
End Step 105 - Write Files (NRZI) to EOT

Read NNN Files
End Step 106 - Read Files (NRZI of random size to EOT

Wrote NNN Files
End Step 107 - Write Files (PE) to EOT

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Read NNN Files

End Step 108 - Read Files (PE) of random size to EOT

Forward Spaced NNN records over NNN files

Back Spaced NNN records over NNN files

Forward Spaced NNN files

Back Spaced NNN files

End Step 109 - Tape Movements

End Section 25

FOR HP INTERNAL USE ONLY

If no errors are generated, the diagnostic may output one or more of the following messages for the HP 7978A/B only:

Section 25 - EDT PACES

Wrote NNN Files
End Step 105 - WRITE FILES (GCR) to EOT

Read NNN Files
End Step 106 - READ FILES (GCR) TO EOT

Wrote NNN Files
End Step 107 - WRITE FILES (PE) TO EOT

Read NNN Files
End Step 108 - READ FILES (PE) TO EOT

Forward Spaced NNN records over NNN files
Back Spaced NNN records over NNN files
Forward Spaced NNN files
Back Spaced NNN files
End Step 109 - TAPE MOVEMENTS

End Section 25

Error Output Example:

Failed to write :

File Number	Record Number	Bytes In Record	Feet Over Tape Head
nnn	nn	nnnn	nnnnn.nnn
.	.	.	.
.	.	.	.
nnn	nn	nnnn	nnnnn.nnn

Failed to read :

File Number	Record Number	Bytes In Record	Feet Over Tape Head
nnn	nn	nnnn	nnnnn.nnn
.	.	.	.
.	.	.	.
nnn	nn	nnnn	nnnnn.nnn

See the error message section for more detailed information.

FOR HP INTERNAL USE ONLY

Section 34—HP 7974A SELFTESTS

This section tests only the HP 7974A by running the built in selftests. This section is not applicable for the HP 7978A/B. If this section is requested for an HP 7978A/B drive, then the following message will be printed and the applicable selftests will be run:

***** ILLEGAL SECTION FOR REQUESTED DEVICE (MTDERR 7774)
REQUESTED SECTION 34 (STEPS 111-120 APPLIES ONLY TO HP 7974**

All selftests may be run when the HP 7974A is online; selftests 118-119 may be run on or offline. Selftests which do not require a tape can be run when HP 7974A is offline. When a tape is needed to run a selftest, an operator must be present to mount the tape. A scratch tape should be used on all selftests requiring a tape (i.e., online), even if the selftest does not write or read the tape. The following steps are available:

- Step 110 **Transport Test** (online)
Selftest 101 will be run.
- Step 111 **Transport Servo/Capstan** (online)
Selftests 110, 104, 105, 106, 123, 130, 109, will be run.
- Step 112 **Error Detection Circuitry** (online)
Selftests 107, 110, 124, 130 will be run.
- Step 113 **Write /Backspace /Read Test** (online)
Selftests 109, 117, 110, 130 will be run.
- Step 114 **NRZI (800 CPI) Stop/Start Write Tests** (online)
Selftests 127, 110, 114, 118, 119, 130 will be run.
- Step 115 **NRZI (800 CPI) Streaming Write Tests** (online)
Selftests 127, 110, 114, 120, 11, 109, 114, 120, 121, 130 will be run.
- Step 116 **PE (1600 CPI) Start/Start Write Tests** (online)
Selftests 128, 110, 114, 120, 11, 109, 114, 120, 121, 130 will be run.
- Step 117 **PE (1600 CPI)**
Selftests 128, 110, 114, 120, 11, 109, 121, 130 will be run.
- Step 118 **Power-On Self-Test**(on/offline)
Selftest 5 will be run.
- Step 119 **Master Controller Tests** (on/offline)
Selftest 6, 8, 9, 10, 11, 19 will be run.
- Step 120 **Loop Write/Read Test** (on/offline)
Selftest 108 will be run.

FOR HP INTERNAL USE ONLY

If no errors are generated, the diagnostic may output one or more of the following messages for the HP 7974A only:

Section 34 - HP 7974A Self-Tests

Completed n test(s) successfully of 1 test(s) requested
End Step 110 - Transport Test

Completed n test(s) successfully of 7 test(s) requested
End Step 111 - Transport Servo/Capstan Tests

Completed n test(s) successfully of 5 test(s) requested
End Step 112 - Error detection Circuitry Tests

Completed n test(s) successfully of 5 test(s) requested
End Step 113 - Write/Backspace/Read Test

Completed n test(s) successfully of 9 test(s) requested
End Step 114 - 800 CPI Stop/Start Write Tests

Completed n test(s) successfully of 10 test(s) requested
End Step 115 - 800 CPI Streaming Tests

Completed n test(s) successfully of 9 test(s) requested
End Step 116 - 1600 CPI Stop/Start Write Tests

Completed n test(s) successfully of 10 test(s) requested
End Step 117 - 1600 CPI Streaming Tests

Completed n test(s) successfully of 1 test(s) requested
End Step 118 - Power-On Self-Test

Completed n test(s) successfully of 6 test(s) requested
End Step 119 - Master Controller Tests

Completed n test(s) successfully of 1 test(s) requested
End Step 120 - Loop Write/Read Test

End Section 34

FOR HP INTERNAL USE ONLY

Section 38—HP 7978A/B SELF-TESTS

This section will test only the HP 7978A/B by running the built-in selftests. This section is not applicable for the HP 7974A. If this section is requested for an HP 7974A drive, then the following message will be printed and the applicable selftests will be run:

***** ILLEGAL SECTION FOR REQUESTED DEVICE (MTDERR 7978)
REQUESTED SECTION 38 (STEPS 121-128) APPLIES ONLY TO HP 7978A**

All selftests may be run when HP 7978A/B is online; however, some tests (Power-on Selftest) will set the tape drive offline. Selftests which do not require a tape can be run when HP 7978A/B is offline. When a tape is needed to run a selftest, an operator must be present to mount the tape. A scratch tape should be used on all selftests requiring a tape (i.e., online), even if the selftest does not write or read the tape. The following steps are available:

- Step 121 **Write/Read PE Data Block Test** (online)
Selftests 32, 21, 33, 31 will be run.
- Step 122 **Write/Read GCR Data Block Test** (online)
Selftests 32, 22, 34, 31 will be run.
- Step 123 **Power-On Self-Test** (offline)
Selftest 4 will be run.
- Step 124 **Master Controller Tests** (on/offline)
Selftests 5, 6, 8, 9, 10, 11, 19 will be run.
- Step 125 **Servo Controller Tests** (on/offline)
Selftests 42, 41, 43, 44, 50, 51, 52, 53, 54 will be run.
- Step 126 **HP-IB Internal Loopback Tests** (on/offline)
Selftests 13, 14 will be run.
- Step 127 **Internal Digital Loopback Tests** (on/offline)
Selftests 15, 16 will be run.
- Step 128 **Write-Clock Test** (on/offline)
Selftests 12, 49 will be run.

FOR HP INTERNAL USE ONLY

If no errors are generated, the diagnostic may output one or more of the following messages:

Section 38 - HP 7978A/B SELF-TESTS

Completed n tests successfully of 2 tests requested
End Step 121 --WRITE/READ PE DATA BLOCK TEST

Completed n tests successfully of 2 tests requested
End Step 122 --WRITE/READ GCR DATA BLOCK TEST

Completed n tests successfully of 1 tests requested
End Step 123 --POWER-ON SELF-TEST

Completed n tests successfully of 7 tests requested
End Step 124 --MASTER CONTROLLER TESTS

Completed n tests successfully of 10 tests requested
End Step 125 --SERVO CONTROLLER TESTS

Completed n tests successfully of 2 tests requested
End Step 126 --HPIB INTERNAL LOOPBACK TESTS

Completed n tests successfully of 2 tests requested
End Step 127 --INTERNAL DIGITAL LOOPBACK TEST

Completed n tests successfully of 2 tests requested
End Step 128 --WRITE-CLOCK TEST



FOR HP INTERNAL USE ONLY

Section 40—FIRMWARE UPDATE UTILITIES

This section will allow the user to write and/or read the firmware update on the device. If the user chooses to write, then the diagnostic will seek and open a file in the diagnostic system location named FIRMWARE. It will attempt to read this file. The file must be binary, contain only one record, and the first word must contain the length of the data to be downloaded followed by the data to be used as an update. If the length of the file is within the acceptable range, then the file's checksum will be analyzed for accuracy. If the checksum passes, then the file will be passed using update protocol to the device. The device will prompt the user for the update password. If the password is incorrect, then the update will return an incorrect password status and will not execute. For further aid, contact CE Assist at the National Response Center. The following steps are available:

- Step 131 Write Firmware Update
- Step 132 Display Firmware Header
- Step 133 Display Gain Values
- Step 134 Display Read/Write Values
- Step 135 Firmware Update Dump
- Step 136 Firmware Update Reset

If no errors are generated, the diagnostic may output one or more of the following messages:

Section 40 - Firmware Updates

Wrote Firmware Successfully

Firmware Update Dump (in Hex) :

	1	2	3	4	5	6	7	8	9	10
1:	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn
.
203:	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn

End Step 131 - Write Firmware Update

Header : \$66nn
Rom ID : \$nn
Checksum: \$nnnn

End Step 132 - Display Firmware Header

PE Read Electronic Gain Values

1: \$nnnn 2: \$nnnn 3: \$nnnn 4: \$nnnn
5: \$nnnn 6: \$nnnn 7: \$nnnn 8: \$nnnn
9: \$nnnn

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PE autogain read electronic set-up value : \$nnnn
PE minimum autogain value : \$nnnn
PE maximum autogain value : \$nnnn

GCR Read Electronic Gain Values
1: \$nnnn 2: \$nnnn 3: \$nnnn 4: \$nnnn
5: \$nnnn 6: \$nnnn 7: \$nnnn 8: \$nnnn
9: \$nnnn

GCR autogain read electronic set-up value : \$nnnn
GCR minimum autogain value : \$nnnn
GCR maximum autogain value : \$nnnn

End Step 133 - Display Gain Values

PE read electronic setup value : \$nnnn
PE write electronic setup value : \$nnnn
PE write clock setup value : \$nnnn
PE density ID write clock setup : \$nnnn

GCR read electronic setup value : \$nnnn
GCR write electronic setup value : \$nnnn
GCR write clock setup value : \$nnnn
GCR density ID write clock setup : \$nnnn

Density ID read electronic setup : \$nnnn
Density phase locked loop setup : \$nnnn

Read retry : \$nnnn
Read gain boost : \$nnnn

Write holdoff (clock counts) : \$nnnn
Extended gap length : \$nnnn

End Step 134 - Display Read/Write Values

Firmware Update Dump (in Hex) :
1 2 3 4 5 6 7 8 9 10

1: \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn
.
203: \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn \$nnnn

End Step 135 - Firmware Update Dump

End Step 136 - Firmware Update Reset

FOR HP INTERNAL USE ONLY

Section 45—DOWNLOAD DIAGNOSTICS

This section permits the selection of diagnostics which are to be downloaded into the device and executed locally. Following the diagnostic execution, results will be available to the host-based diagnostic. All files to be used must reside in the diagnostic system location. No password is required for downloaded diagnostics.

If the user chooses to do a download diagnostic, then the diagnostic program will search for a file named DOWNLOAD. If the file exists, then the diagnostic will attempt to read it. The file must be binary, contain only one record, and the first word must contain the length of the data to be downloaded, followed by the data to be downloaded. If the length of the data to be downloaded is acceptable, then a checksum analysis will be performed. If the checksum is correct, then the diagnostic will be downloaded. Since a downloaded diagnostic is performed only once and the download area will eventually be overwritten by the tape drive, no clear or reset on the downloaded diagnostic is necessary or possible. The following steps are available:

- Step 138 Download Diagnostic
- Step 139 Display Downloaded Diagnostic

If no errors are generated, the diagnostic may output one or more of the following messages:

Section 45 - DOWNLOADING SELF-TESTS

```
Diagnostic results (in Hex) :
  1   2   3   4   5   6   7   8   9  10
=====
1: $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn
.   .   .   .   .   .   .   .   .   .
800: $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn
```

End Step 138 - DOWNLOAD DIAGNOSTIC

```
Diagnostic results (in Hex) :
  1   2   3   4   5   6   7   8   9  10
=====
1: $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn
.   .   .   .   .   .   .   .   .   .
51: $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn $nnnn
```

End Step 139 - DISPLAY DOWNLOADED DIAGNOSTIC
End Section 45

FOR HP INTERNAL USE ONLY

Section 50—IMAGE DUMP UTILITIES

This section displays additional information on the HP 7974A/7978A/B internal status retrieved from an Image Dump request: image header, RAM and EPROM checksums, HP-IB address, amount of tape across the head, master controller firmware revision, check EPROM test cells, dump RAM.

This section is also useful for monitoring service contracts based on duty cycle (head wear via amount of tape across the head). The following steps are available:

- Step 141 Display Header
- Step 142 Display HP-IB address
- Step 143 Display number of feet of tape which have passed across head
- Step 144 Display Master Controller Firmware ID
- Step 145 Check EPROM Test Cells
- Step 146 Dump RAM

If no errors are generated, the diagnostic may output one or more of the following messages:

Section 50 - IMAGE UTILITIES

```
Ram Header Value: $nnnn
Ram Checksum : $nnnn
Eeprom CheckSum : $nnnn
End Step 141 --IMAGE HEADER
```

```
HPIB address is n
End Step 142 --READ HPIB ADDRESS
```

```
Amount of Tape Across Head is nnnnnn feet
End Step 143 --READ AMOUNT OF TAPE ACROSS HEAD
```

```
Master Controller/Firmware Update is Revision n
End Step 144 --READ MASTER CONTROLLER FIRMWARE ID
```

Eeprom Test Cells:

Actual Value	Correct Value
\$9999	\$9999
\$9999	\$9999
\$0000	\$0000
\$FFFF	\$FFFF
\$AAAA	\$AAAA
\$5555	\$5555
\$6666	\$6666
\$9999	\$9999

```
End Step 145 - CHECK EEPROM TEST CELLS
```

FOR HP INTERNAL USE ONLY

Image Dump (in Hex) :

	1	2	3	4	5	6	7	8	9	10
	=====									
1:	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn
.
206:	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn	\$nnnn

End Step 146 - Image Dump

End Section 50

FOR HP INTERNAL USE ONLY

Section 55—INTERNAL DEVICE LOGS

This section requests an image dump of the tape drive's RAM, thus gaining access to the two internal logs (error and tape) from a selected HP 7974A/7978A/B. Steps 151 and 152 may then be used to decode each log. The following steps are available:

Step 151 Display Internal Drive Error Log: The HP 7974A/7978A/B keeps an internal log from 0 - 10 of the most recently encountered errors. The error log contains:

4 bytes TIME from Power-on that this tape was loaded.

2 bytes ERROR CODE encountered in hexadecimal.

The diagnostic will decode the error code and print all information about that error. For a list of error messages, refer to the back of this section.

Step 152 Display Internal Drive Tape Log: The HP 7974A/7978A/B keeps an internal log containing a history for each of the last 20 tapes loaded on the HP 7974A/7978A/B. The tape log occupies words 302 through 421. It is a twenty entry circular log which contains:

4 bytes TIME from Power-on that this tape was loaded.

2 bytes HARD-ERROR Number of data blocks that the drive was unable to read or write.

2 bytes SOFT-ERROR Number of data blocks that were successfully retrieved. If the number of attempts exceeds the number of allowable retries, then a hard error results instead.

4 bytes CMD-COUNT number of commands processed since the tape was loaded.

Section 55 may display one of the following two messages:

Section 55 --INTERNAL DEVICE LOGS

NOTE: PRINTING THIS LOG WILL CAUSE PROTOCOL ERRORS
\$EOBF (Internal reset) AND EOBE (Device clear received)
TO BE PLACED INTO IT

Internal Error Log is empty; no data will be displayed

End Step 151 --DISPLAY ERRORLOG

FOR HP INTERNAL USE ONLY

NOTE: PRINTING THIS LOG WILL CAUSE PROTOCOL ERRORS
\$EOBF (Internal reset) AND EOBE (Device clear received)
TO BE PLACED INTO IT

		Time				Hard	Soft	Number
		From				Error	Error	Commands
		Power-on				Count	Count	Processed
=====								
Tape	n	days	hours	min	sec	n	n	nnn
Tape	n	days	hours	min	sec	n	n	nnn
Tape	n	days	hours	min	sec	n	n	nnn

Error Output Example:

Failed Tape Read Log Command

FOR HP INTERNAL USE ONLY

Section 60—INTERACTIVE

This section allows the user to enter commands to be executed, in the order desired, with any number of repetitions. To obtain a list of commands, type **HELP** in response to the **MTD7478>** prompt. Note that the command numbers correspond to the diagnostic section and step numbers. To repeat the last command, type **REDO** in response to the **MTD7478>** prompt.

Specifying a section number will cause all default steps in that section to execute in their normal order. The commands are:

Sections:

2	Clear
3	Identify
4	Loopback
6	Hardware Status
10	Set Density
15	Write/Read Comparison Check (NRZI or GCR)
16	Write/Read Comparison Check (PE)
20	Selectable Tape Movement Commands
25	Paces
34	HP 7974A Selftests
38	HP 7978A/B Selftests
40	Firmware Updates
45	Download Diagnostics
50	Image Dump Utilities
55	Internal Device Logs
62	Do All Tests

Steps:

65	Interpret Hardware Status with Text
66	Display Hardware Status in Binary
70	Set Density 800 CPI or 6250 CPI
71	Set Density 1600
74	256 1-Byte/Record File (NRZI) or (GCR)
75	Maximum Buffer File (NRZI) or (GCR)
76	Stream Tests (NRZI) or (GCR)
77	Worst Case Low Frequency File (NRZI) or (GCR)
78	Worst Case High Frequency File (NRZI) or (GCR)
79	Worst Case Tripole File (NRZI) or (GCR)
80	256 1-Byte/Record File (PE)

FOR HP INTERNAL USE ONLY

- 81 Maximum Buffer File (PE)
- 82 Stream Tests (PE)
- 83 Worst Case Low Frequency File (PE)
- 84 Worst Case High Frequency File (PE)
- 85 Worst Case Tripole File (PE)
- 91 Forward Space One File (to end of next EOF mark)
- 92 Back Space One File (to beginning of previous EOF)
- 93 Back Space One Record (to start of previous record gap)
- 94 Forward Space One Record (to end of next record gap)
- 95 Write Record Gap
- 96 Write File Mark
- 97 Rewind online
- 98 Rewind offline
- 100 Read one file (NRZI) or (GCR)
- 101 Read one file (PE)
- 105 Write Files (NRZI) or (GCR) of random size until EOT
- 106 Read Files (NRZI) or (GCR) of random size until EOT
- 107 Write Files (PE) of random size until EOT
- 108 Read Files (PE) of random size until EOT
- 109 Tape Movements:
 - 1. Back Space 2 Records
 - 2. Forward Space 1 Record
 - 3. Back Space 2 Files
 - 4. Forward Space 1 File
 - 5. Rewind
 - 6. Forward Space the number of records on tape
 - 7. Back Space the number of records on tape
 - 8. Forward Space the number of files on tape
 - 9. Back Space the number of files on tape

For HP 7974A Only:

- 110 Transport Test (online)
- 111 Transport Servo/Capstan (online)
- 112 Error Detection Circuitry (online)
- 113 Write/Backspace/Read test (online)
- 114 NRZI (800 CPI) Stop/Start Write Tests (online)
- 115 NRZI (800 CPI) Streaming Write Tests (online)
- 116 PE (1600 CPI) Stop/Start Write Tests (online)
- 117 PE (1600 CPI) Streaming Write Tests (online)
- 118 Power-On Self-Test (on/offline)
- 119 Master Controller Tests (on/offline)
- 120 Loop Write/Read Test (on/offline)

FOR HP INTERNAL USE ONLY

For HP 7978 A/B Only:

121	Write/Read PE Data Block Test (online)
122	Write/Read GCR Data Block Test (online)
123	Power-On Self-Test (offline)
124	Master Controller Tests (on/offline)
125	Servo Controller Tests (offline)
126	HP-IB Internal Loopback Tests (on/offline)
127	Internal Digital Loopback Tests (on/offline)
128	Write-Clock Test (on/offline)
131	Write Firmware Update
132	Display Firmware Header
133	Display Gain Values
134	Display Electronic Set-up Values
135	Firmware Update Dump
136	Firmware Update Reset
138	Download Diagnostics
139	Display Downloaded Diagnostics
141	Display Image Header
142	Read HP-IB address
143	Read Amount of Tape Across Head
144	Read Master Controller Firmware ID
145	Check EEPROM Test Cell
146	Dump Image
151	Display Internal Drive Error Log
152	Display Internal Drive Tape Log
153	Perform Selftest

FOR HP INTERNAL USE ONLY

For example, if the user requested command number 38, followed by command number 2, then the diagnostic would execute the default steps (123-128) and a clear device (2) in that order.

The diagnostic will display the following prompt: **MTD7478>**. At the prompt, the user may enter any sequence of command numbers, thus setting the order of execution. If the user enters a command which requires a previous command, then the sequence will not execute; the following error message will be printed:

***** ERROR. COMMAND N MUST BE PRECEDED BY COMMAND M (MTDERR 6800)**

Command numbers must be separated by commas. The user may also specify the number of times each command should be repeated by following the command number with a colon and then number of repetitions; the default is one repetition per command. For example, if the user wants to execute commands 4, 25, and 20 in that order, repeating command 4 twice and Section 25, Steps 107 and 108 three times, enter the following:

MTD7478>4:2,(107,108):3,20

The user may enter as many commands as desired. One layer of parentheses is also allowed to permit cluster repetitions. For example, a user who wants to run steps 107 and 108 in that order 3 times straight can enter:

MTD7478> (107,108):3

To end the interactive section, the user types **EXIT**.

Example:

Section 60 - Interactive

MTD7478>4:2,(107,108):2,20

**Section 4 - LOOPBACK
End Section 4**

**Section 4 - LOOPBACK
End Section 4**

**Section 25 - PACES
Wrote N Files
End Step 107 - WRITE FILES (PE) TO EOT
End Section 25
Section 25 - PACES
Read N Files
End Step 108 - READ FILES (PE) TO EOT
End Section 25**

**Section 25 - PACES
Wrote n Files
End Step 107 - WRITE FILES (PE) TO EOT
End Section 25**

**Section 25 - PACES
Read N Files
End Step 108 - READ FILES (PE) TO EOT**

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End Section 25

Section 20 - SELECTABLE TAPE MOVEMENT

End Step 91 - FORWARD SPACE ONE FILE

End Step 92 - BACK SPACE ONE FILE

End Step 93 - BACK SPACE ONE RECORD

End Step 94 - FORWARD SPACE ONE RECORD

End Step 97 - REWIND ON-LINE

End Section 20

MTD7478>Exit

End Section 60

FOR HP INTERNAL USE ONLY

Section 62—DO ALL TESTS

This section will require the tape drive to be put online initially, and will then run through all tests in the diagnostic, except the write firmware update and the download diagnostic steps.

Caution



The user should note that this step will run all tests including those requiring the device to be online and those tests which will overwrite any tape currently mounted. Therefore, it is important that a scratch tape only be mounted on the drive if this step is to be run.

The output will correspond to the normal output if the user had entered the **RUN DIAG7478** command requesting all sections or steps except write firmware update and download diagnostic.

FOR HP INTERNAL USE ONLY

Error Messages

The following is a list of error messages which may appear when using DIAG7478. Other diagnostic error messages may appear at any time. Error messages without the (MTDERR #) 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.

5000 FAILED TO FIND THE FILE PATH (MTDERR 5000)
CAUSE
ACTION

5001 FAILED FILE READ (MTDERR 5001)
CAUSE
ACTION

5002 FAILED FILE OPEN (MTDERR 5002)
CAUSE
ACTION

5003 FAILED FILE WRITE (MTDERR 5003)
CAUSE
ACTION

5004 FAILED TO READ FULL FILE (MTDERR 5004) READ ##### BYTES OUT OF ##### BYTES.
CAUSE
ACTION

5005 FAILED TO WRITE FULL FILE (MTDERR 5005) WROTE ##### BYTES OUT OF ##### BYTES.
CAUSE
ACTION

5011 FAILED TO GET BUFFER SPACE FOR DIAGNOSTIC USE (MTDERR 5011)
CAUSE
ACTION

5016 ATTEMPT TO DO MAKE STRING FAILED (MTDERR 5016)
CAUSE
ACTION

FOR HP INTERNAL USE ONLY

5017 ATTEMPT TO DO MAKE NUMBER FAILED (MTDERR 5017)
CAUSE
ACTION:

5018 OUTPUT DATA FAILED (MTDERR 5018)
CAUSE
ACTION

5033 IDENTIFY FAILED: (MTDERR 5033)
 ILLEGAL IDENTIFY CODE ON ### HEXADECIMAL RETURNED
 ASSUMING THE DEVICE IS AN HP7974A MAGNETIC TAPE DRIVE.
CAUSE
ACTION

5034 DEVICE FAILED TO RESPOND TO IDENTIFY (MTDERR 5034)
 NO IDENTIFY CODE WAS RETURNED TO IDENTIFY REQUEST.
 7974/7978 TAPE DIAGNOSTIC TERMINATING ABNORMALLY.
CAUSE
ACTION

5043 WRITE DATA LOOPBACK FAILED (MTDERR 5043)
 TIMEOUT AFTER ### SECONDS.
CAUSE
ACTION

5044 WRITE DATA LOOPBACK FAILED (MTDERR 5044)
CAUSE
ACTION

5045 WRITE AND READ DATA LOOPBACK FAILED (MTDERR 5045)

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

CAUSE
ACTION

FOR HP INTERNAL USE ONLY

5061 FAILED TO READ RAM (MTDERR 5061)
CAUSE
ACTION

5063 TIMEOUT AFTER ### SECONDS DURING STATUS (MTDERR 5063)
CAUSE
ACTION

5100 FILE LOADED DOES NOT MATCH EXPECTED FORMAT (MTDERR 5100)
CAUSE
ACTION

5200 FORWARD SPACED ### FILES TO BOT BUT (MTDERR 5200)
HARDWARE DOES NOT INDICATE END OF TAPE STATUS
CAUSE
ACTION

5500 UNKNOWN STATUS RETURNED FROM DEVICE (MTDERR 5500)
CAUSE
ACTION

5600 STATUS CONFLICT (MTDERR 5600)
STATUS REGISTER 5 INDICATES COMMAND REJECT BUT NO COMMAND REJECT IS
RECORDED.
CAUSE
ACTION

5601 STATUS CONFLICT (MTDERR 5601)
STATUS REGISTER 5 INDICATES UNRECOVERED DATA/FORMAT ERROR BUT NONE IS
RECORDED.
CAUSE
ACTION

5602 STATUS CONFLICT (MTDERR 5602)
STATUS REGISTER 5 INDICATES POSITION UNRECOVERED OR SERVO ERROR BUT
NEITHER IS RECORDED.
CAUSE
ACTION

FOR HP INTERNAL USE ONLY

5603 STATUS CONFLICT (MTDERR 5603)
STATUS REGISTER 5 INDICATES FORMATTER ERROR BUT NONE IS RECORDED.
CAUSE
ACTION

5604 STATUS CONFLICT (MTDERR 5604)
STATUS REGISTER 5 INDICATES CONTROLLER ERROR BUT NONE IS RECORDED.
CAUSE
ACTION

5605 STATUS CONFLICT (MTDERR 5605) STATUS REGISTER 5 INDICATES COMMAND REJECT
AND PROTOCOL ERROR, BUT NONE IS RECORDED.
CAUSE
ACTION

5700 READ FROM TAPE FAILED (MTDERR 5700)
CAUSE
ACTION

5720 ERROR OCCURRED IN SCANNER EDIT ROUTINE (MTDERR 5720)
CAUSE
ACTION

5722 NOTHING TO REDO (MTDERR 5722)
CAUSE
ACTION

5724 WRITE RECORD GAP FAILED (MTDERR 5724)
CAUSE
ACTION

5804 FAILED TO OBTAIN DEVICE STATUS (MTDERR 5804)
NO STATUS TO INTERPRET.
CAUSE
ACTION

FOR HP INTERNAL USE ONLY

5900 BAD CHECKSUM (MTDERR 5900)
 CKSUM READS : #####
 CHECKSUM SHOULD BE : #####
 FILE WILL NOT BE TRANSFERRED TO DEVICE.
CAUSE
ACTION

6000 THE MAXIMUM NUMBER OF ERRORS SPECIFIED HAVE BEEN GENERATED; 7974/78 TAPE
 DIAGNOSTIC WILL TERMINATE. (MTDERR 6000)
CAUSE
ACTION

6008 RECORD ### DID NOT COMPARE ON RE-READ (MTDERR 6008)
CAUSE
ACTION

6009 TAPE DENSITY DOES NOT MATCH (MTDERR 6009) DENSITY REQUESTED: ### CPI.
 DENSITY ACTUAL: ### CPI.
CAUSE
ACTION

6010 HARDWARE STATUS INDICATES DEVICE DENSITY UNKNOWN
 (MTDERR 6010)
CAUSE
ACTION

6011 HPIB ADDRESS IS ###. SHOULD BE BETWEEN 0 AND 7
 (MTDERR 6011)
CAUSE
ACTION

6066 7974/7978 ENCOUNTERED INTERNAL ERROR. ABNORMAL
 TERMINATION. (MTDERR 6066)
CAUSE
ACTION

6067 TAPE DRIVE INTERNAL TEST ### FAILED (MTDERR 6067)
CAUSE
ACTION

FOR HP INTERNAL USE ONLY

6068 COULD NOT START INTERNAL SELF-TEST ### (MTDERR 6068)
CAUSE
ACTION

6070 BAD FILE FORMAT, DOWNLOAD NOT PERFORMED (MTDERR 6070)
CAUSE
ACTION

6074 STREAMING FAILED TO COMPLETE FLUSHING REMAINING IO's. (MTDERR 6074)
CAUSE
ACTION

6722 FAILED TO INITIALIZE STEPS AND OBTAIN DEVICE (MTDERR 6722)
CAUSE
ACTION

7000 FAILED TO WRITE ONE BYTE RECORD NUMBER ###. (MTDERR 7000)
 FAILED TO WRITE CHARACTER ### TO TAPE.
CAUSE
ACTION

7002 ILLEGAL CHARACTER IN COMMAND STRING (MTDERR 7002)
CAUSE
ACTION

7005 UNKNOWN COMMAND REQUESTED IN COMMAND STRING (MTDERR 7005)
CAUSE
ACTION

7010 ILLEGAL SYNTAX IN COMMAND STRING (MTDERR 7010)
CAUSE
ACTION

7015 FAILED TO RESET SCANNER (MTDERR 7015)
CAUSE
ACTION

FOR HP INTERNAL USE ONLY

7020	FAILED TO EXTRACT BITS (MTDERR 7020)
CAUSE	
ACTION	
<hr/>	
7070	INFORMATION TRANSFER TO BUFFER FAILED (MTDERR 7070)
CAUSE	
ACTION	
<hr/>	
7075	INFORMATION RECEIPT FROM BUFFER FAILED (MTDERR 7075)
CAUSE	
ACTION	
<hr/>	
7080	FAILED TO OBTAIN MESSAGE FROM THE CATALOG (MTDERR 7080)
CAUSE	
ACTION	
<hr/>	
7632	ERROR IN RAM HEADER (MTDERR 7632) RAM HEADER READS ###. RAM HEADER SHOULD BE \$0407
CAUSE	
ACTION	
<hr/>	
7633	### ## -- INCORRECT EEPROM TEST CELL VALUE (MTDERR 7633)
CAUSE	
ACTION	
<hr/>	
7774	ILLEGAL SECTION FOR SELECTED DEVICE (MTDERR 7774) REQUESTED SECTION 34 (STEPS 111-120) APPLIES ONLY TO HP7074. SECTION 38 (STEPS 121-129) RUNS HP7978 SELF-TESTS. DIAGNOSTIC WILL RUN HP7978 DEFAULT SELF-TESTS STEPS.
CAUSE	
ACTION	
<hr/>	
7778	ILLEGAL SECTION FOR SELECTED DEVICE (MTDERR 7778) REQUESTED SECTION 38 (STEPS 121-129) APPLIES ONLY TO HP7978. SECTION 34 (STEPS 111-120) RUNS HP7974 SELF-TESTS. DIAGNOSTIC WILL RUN HP7974 DEFAULT STEPS.
CAUSE	
ACTION	
<hr/>	

Selftest Error Messages

This section provides a list of error messages which may be returned following the use of one or more selftests for either the HP 7974A or HP 7978A/B magtape drives. The user can refer to either the HP 7974A or the HP 7978A/B selftest error code section depending upon whether the selftests were issued from Section 34 or 38. Once a four digit status code has been displayed, it may be interpreted to show which FRU failed, the subassembly in error, and information on the probable cause or action. The selftest error code sections follow these error messages.

	ERROR IN SECTION 34 OR 38.
CAUSE	A selftest step in either Section 34 or 38 has failed.
ACTION	Examine the next message to determine which step of the selftest has failed.
	ERROR IN STEP N.
CAUSE	The group of internal selftests corresponding to Step N above has encountered at least one error.
ACTION	Carefully examine the following selftest status messages for a selftest status code or further information.
	FAILED TAPE SELFTEST COMMAND.
CAUSE	A selftest command issued by at least one part of Section 34 or 38 has not completed as specified.
ACTION	Determine which selftest has failed and interpret the corresponding error code as specified for either the HP 7974A or HP 7978A/B Tape Drive.
6067	TAPE DRIVE INTERNAL TEST N FAILED. (MTDERR 6067)
CAUSE	Selftest number N has failed.
ACTION	When the selftest status code is displayed, record it and refer to the appropriate selftest code group (HP 7974A or HP 7978A/B) for interpretation.
	SELFTEST STATUS EQUALS \$NNNN.
CAUSE	The selftest which failed has returned status NNNN which may be interpreted to determine the bad FRU.
ACTION	If the selftest error message originated from Section 34, then refer to the HP 7974A selftest error code section of this manual for interpretation. If the selftest error message originated from Section 38, then refer to the HP 7978A/B selftest error code section of this manual for interpretation.
6068	COULD NOT START INTERNAL SELFTEST. (MTDERR 6068)
CAUSE	One or more conditions necessary for selftest initiation has not been met.
ACTION	Examine any other error messages immediately proceeding or following this one for evidence of either a data transaction error or a fault with the tape drive power or cable connections.

Selftest Error Codes for the HP 7974A Tape Drive

The error codes were developed to help trained service personnel identify major component failures, isolate the subassemblies which may be responsible for these failures, and to troubleshoot "mysterious" conditions. Referring to the table below, you can see that the codes are split into four major parts: the FRU in error, the suspected FRU subassembly, the action which caused the failure and the multi-test code. In most cases, these errors indicate a need for adjustment or repair which cannot be performed by the customer.

The Selftest error codes are made up of the four (4) digits in the FRU and CODE sequence. Therefore, to determine the meaning of the code in the example below, you would look up 8702 to find the interpretation.

Table 30-11.

FRU in error.	Subassembly within FRU in error.	The action which caused the failure.	The multi-test code.
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Table 30-12. Graphic illustration of the 7974A Diagnostic Error Messages.

DISPLAY	MEANING
F00	Failed Test 00
FRU	Field Replaceable Unit (FRU) code is next
0087	8: FRU which failed 7: Subassembly in FRU which failed
CODE	Cause of failure next
0002	0: Action during test which caused failure 2: Other FRUs or subassemblies that should be tested (Multi-test code)

FOR HP INTERNAL USE ONLY

1NNN Servo and Tape Motion Assembly FRU

11NN Capstan motor and tachometer subassembly

- 111x The low speed ramps were too long.
- 112x The low speed ramps were too short.
- 113x The high speed ramps were too long.
- 114x The high speed ramps were too short.

12NN Tape Motion Mechanical Assembly FRU

- 121x Low speed servo failure.
- 122x High speed servo failure.



x: multi-test codes

- 0 Does not apply.
- 1 speed adjustment, capstan assembly, power supply overload, mechanical guides and rollers.
- 2 mechanical rollers/guides/arms, capstan assembly, Control Board servo circuits, power supply overload, speed adjustments.

2NNN NRZI Board FRU

- 21yx NRZI parity circuitry failed.
- 22yx NRZI LRC circuitry failed.
- 23yx NRZI CRC circuitry failed.
- 24yx Not Used.
- 25yx No head current detected.
- 26yx Identify status circuitry failed.
- 27yx EOF detection circuitry failed.
- 28yx Block valid signal timed out in test.
- 29yx Block valid signal too long.
- 21yx Failure during selftest.

y: Actions that detected the failure.

- 0 Does not apply.
- 1 Fixed data pattern.
- 2 Random data pattern.
- 3 Occurred during a write test only.
- 4 Occurred during a read test only.
- 5 No board installed or connected disconnected.

FOR HP INTERNAL USE ONLY

x: multi-test codes

- 0 Does not apply
- 1 NRZI board
- 2 NRZI board, head connectors, head
- 3 NRZI board, tape, head
- 4 Connector missing, board missing, or power failure.

40NN Master Controller Assembly FRU

41NO CPU error on Master Controller assembly.

- 4110 CPU data register malfunction. The data value written was not the value read while verifying.
- 4120 CPU address register malfunction. Written data not data read back. Value read while verifying.
- 4130 CPU condition code malfunction.
- 4140 A CPU register had its data fade after a two second wait.
- 4160 CPU addressing malfunction.

42NO Master Controller RAM failure.

- 4210 RAM failure found during march test.
- 4220 RAM failure found during the selective one walking bit test.
- 4230 RAM failure found during the selective zero walking bit test.

43NO Master Controller Data Buffer subassembly failure.

- 4300 Data buffer subassembly is unresponsive.
- 4310 Data Buffer RAM failure in marching RAM test.
- 4320 Data Buffer register failure in walking '1' bit test.
- 4330 Data Buffer register failure in walking '0' bit test.
- 4340 Data Buffer length counter/USM function failure.
- 4350 Data Buffer usage counter/USM function failure.
- 4360 Data Buffer parity/USM function failure.
- 4370 Data transferred not the data received.
- 4380 Transferred data missing EOR.
- 4390 Data Buffer has incorrect pre-fetch data.

FOR HP INTERNAL USE ONLY

44N0 Master Controller timer chip subassembly failure.

- 4410 Timer interrupt status error.
- 4420 Timer interrupt status could not be cleared.
- 4430 Timer 1 didn't count down to zero.
- 4440 Timer 1 or timer 2 is substantially faster than the other timer.
- 4450 Timer 1 or timer 2 is substantially slower than the other timer.
- 4460 Timer 1 or timer 3 is substantially faster than the other timer.
- 4470 Timer 1 or timer 3 is substantially slower than the other timer.

45N0 Master Controller EEPROM chip subassembly failure.

- 4510 The read/write ready status was not present.
- 4520 The computed EEPROM check sum was not the same as the stored check sum.
- 4530 An EEPROM read value was incorrectly read.
- 4540 A write value into the EEPROM did not verify after write.
- 4550 The computed EEPROM check sum did not verify after being written.
- 4560 EEPROM is write enabled and should not be.
- 4570 EEPROM is not write enabled and should be.

4600 ROM Checksum error

5N00 Data Formatter Board FRU

- 51yx Preamble circuit failure.
- 52yx Postamble circuit failure.
- 53yx MTE circuit failure.
- 54yx Skew circuit failure.
- 55yx Vertical parity error circuit failure.
- 56yx Corrected error circuit failure.
- 57yx Data error.
- 5802 No head current detected.
- 5803 No block signal detected.
- 5Fyx No data formatter board detected.

y: Actions that detected the failure.

- 0 Does not apply
- 1 Fixed data pattern.
- 2 Random data pattern.
- 3 Occurred during a write test only.
- 4 Occurred during a read test only.
- 5 No board installed or connector disconnected test.

FOR HP INTERNAL USE ONLY

x: multi-test codes

- 0 Does not apply
- 1 Data formatter board, Digital read logic board.
- 2 Data formatter board, Heads.
- 3 Digital read logic, Data formatter, tape, head.
- 4 Connectors loose, Boards missing, Power supply problems.

6NNO HP Interface Bus (HP-IB) Assembly FRU

61NO HP-IB failure.

- 6100 The HP-IB is unresponsive.
- 6110 The inbound FIFO was not empty after an attempt to clear.
- 6120 The internal HP-IB loopback has failed.
- 6130 The "end" bit in the interface is not functional.

62NO HP-IB/Master Controller interface failure.

- 6210 The data transferred was not received.
- 6220 The data transferred was missing an EOI.

7NNN Drive Interface Board FRU

- 710x Data transfer module assembly.
- 711x Error found in testing Interface reset circuit.
- 712x Error detected in write interface initialization.
- 713x Error detected in read interface initialization.
- 714x Error detected in sense byte interface initialization.
- 715x Door opened during test.
- 716x Sense byte transfer test failed.
- 717x Sense byte value not returned correctly.
- 720x Front panel module assembly.
- 721x Virtual display test failed.
- 722x Virtual bottom test failed.
- 730x Command status module assembly.
- 731x Failure occurred in sending diagnostic command to transport.
- 732x Sense byte handshake test failure.

FOR HP INTERNAL USE ONLY

x: multi-test codes

- 1 Cables, Drive Interconnect, Control/Motherboard
- 2 Cables, Drive Interconnect
- 3 Cable, Drive Interconnect, or Control/Motherboard
- 4 Not Used
- 5 Cables, Drive Interconnect, Data Formatter, Control/Motherboard.
- 6 Drive Interconnect or Control/Motherboard

8NNM Digital Read Electronics Board FRU

- 81yx Corrected error circuit failure.
- 82yx False postamble detection circuit failure.
- 83yx Multiple track error circuit failure.
- 84yx Vertical parity error circuit failure.
- 86yx No identification status during an identify.
- 87yx No EOF status detected while trying to write a file mark.
- 88yx Block valid signal timed out during test.
- 89yx Block valid signal lasted longer than expected.
- 8A00 Error encountered during selftest.
- 8Byx No ID mark detected in write from BOT.
- 8Cyx Gap found in ID.
- 8F00 The hardware is not present or responsive.

y: Actions that detected the failure.

- 0 Does not apply
- 1 Fixed data pattern.
- 2 Random data pattern.
- 3 Occurred during a write test only.
- 4 Occurred during a read test only.
- 5 No board installed or connector disconnected test.

x: multi-test codes

- 0 Does not apply
- 1 Digital read logic board, Data formatter board, Tape, Heads.
- 2 Digital read logic board, Data formatter board, Heads, Tape.

FOR HP INTERNAL USE ONLY

9NNN Head/Tape Interface Assembly FRU

91yx False Preamble detected.
92yx False postamble detected.
93yx Multiple tracks in error were detected.
94yx Skew error was detected.
95yx Vertical parity error was detected.
96yx Corrected error was detected (STE).
97yx Data error detected in read test.

y: Actions that detected the failure.

0 Does not apply.
1 Fixed data pattern.
2 Random data pattern.
3 Occurred during a write test only.
4 Occurred during a read test only.
5 No board installed or connector disconnected test.

x: Multi-test codes

0 Multi-test code does not apply.
1 Tape, Heads, Read logic board, Data formatter board.

ANNN Drive Control/Motherboard FRU

A10x Servo Forward speed slow or reverse speed fast.
A11x Servo Forward speed fast or reverse speed slow.
A12x Servo High speed ramp too short or low speed ramp too long.
A13x Servo High speed ramp too long or low speed ramp too short.
A14x Repositions close to limit. Check speed adjustment.
A15x Repositions beyond limit. Check speed adjustment.
A20x The RAM circuits failed RAM tests.
A30x The molex connectors are loose.
A40x The power supply (not 5V) is failing test.
A50x The ROMs are failing checksum test.
A60x Data Formatter, NRZI, or Read Logic Board not present.
A71x Drive failed to enter NRZI density.
A72x Drive failed to enter PE density.

FOR HP INTERNAL USE ONLY

x: multi-test codes

0 Does not apply.

1 speed adjustment, Control Board circuits, capstan assembly,
power supply overload, mechanical arms, and guide assemblies.

BNNN Unexpected Exceptions

The MC68000 Microprocessor is capable of responding to a number of unexpected conditions which rarely occur in the HP 7974A. If one of these errors is detected, a hardware or firmware error is indicated. The drive will respond by shutting itself down and displaying the error code.

B100 Address error.
B200 Illegal instruction.
B300 Divide by zero.
B400 Register bounds violation.
B500 Overflow.
B600 Privilege violation.
B700 Trace exception.
B800 Emulation of future instruction.
B900 Spurious interrupt.
BA00 Unimplemented interrupt.
BB00 Unassigned vector.

DNNN Runtime-Detected errors

FOR HP INTERNAL USE ONLY

Runtime errors prevent the execution or completion of a diagnostic program. Errors D310, D330, D370, and D380 can be corrected by the operator and are the most commonly displayed sequences. Codes D340 and D350 apply to the firmware update procedure that is used by HP service personnel. The remaining D-codes indicate that the drive requires servicing. All runtime errors are logged in the error log. If fatal error occurs, test 1 (Error log) and test 5 (Power on selftest) should be run for more detail.

D000 Operating System detected failure.
D100 Channel Program detected failure.
D177 Transaction ID mismatch.
D17A Missing PDN command.
D17B Report Queue error.
D17C Report Queue full.
D17D Unknown command to device program.
D17E Full command Queue.
D183 Data buffer byte count mismatch.
D184 Bad message type.
D185 Processor handshake abort.
D186 Interface exception.
D187 Outbound data freeze.
D188 Inbound FIFO error.
D189 EEPROM update failure.
D18A Device firmware error D18B. Hardware utility firmware error.
D18C Channel case error.
D200 Device Program detected failure.
D201 Data busy remained asserted when it should have disabled.
D203 A polling loop terminated early.
D204 Unexpected status returned from the transport.
D205 Device write protected or failure to go online.
D206 Formatter busy did not assert upon receipt of a command.
D207 The HP interface board did not initialize correctly.
D208 The rewind command handshake failed.
D209 Load point was not detected when expected.
D20A Transport failed to be put in the intended density.
D20B Formatter busy remained asserted when it should have disabled.
D20C Transport encountered an unrecognized command.
D20D A reposition took longer than expected. Speed adjustment required.
D20E Erase current not detected in head.
D20F A command was rejected by the transport.
D210 The sense bytes were lost when a sense byte read was attempted.
D211 Power was lost partially or totally during the last operation.
D212 The door was open during a command.
D213 The transport failed to complete a command.
D214 Formatter busy was asserted too long during a sense byte read.

FOR HP INTERNAL USE ONLY

D215 Position was lost during retries.
D216 Online failure.
D22D Multiple track error.
D22F Gap in ID.
D231 ID found in read.
D233 Gap in block found.
D237 Door open error.
D239 Skew error.
D23A False preamble/postamble.
D23B Corrected write error.
D253 Servo shutdown error.
D268 Erase failure.
D269 No read after write detected.
D26B Hardware failure.
D26C Timeout error.
D277 Transaction ID mismatch.
D27A Missing PDN command.
D27B Report Queue error.
D27C Report Queue full.
D27D Unknown command to device program.
D27E Full command Queue.
D280 Missing EOR in data buffer.
D283 False EOR in data buffer.
D284 Bad message type.
D285 Processor handshake abort.
D286 Interface exception.
D287 Outbound data freeze.
D288 Inbound FIFO error.
D289 EEPROM update failure.
D28A Device firmware error.
D28B Hardware utility firmware error.
D28C Channel case error.
D300 Diagnostic Program detected failure.
D310 No tape was loaded when a read or write diagnostic test was selected.
D320 Wrong density.
D330 No write ring was installed when a write test selected.
D340 A tape-related error has occurred during a local firmware update.
D350 A valid firmware update record was not found on the loaded tape.
D360 The EEPROM READY signal did not come true during a Tape Usage Odometer update.
D370 Door opened while running test.
D380 BOT/EOT was detected abnormally during a diagnostic operation.
D3F0 An unknown failure code was received from the transport.
D3F1 The user pressed the enter button during a test.
D3FF The selftest was terminated early.

FOR HP INTERNAL USE ONLY

Host Protocol Errors

EOA1 Command Queue not empty.
EOA2 Request DSJ expected.
EOA3 Request status expected.
EOA7 Data byte expected.
EOA8 Missing EOI on data byte.
EOAA Command phase protocol error.
EOAC Read protocol error.
EOAD Report phrase protocol error.
EOAE Cold load protocol error.
EOB0 End complete expected.
EOB2 End data expected.
EOB4 Improper secondary.
EOB8 Loopback protocol error.
EOB9 Selftest protocol error.
EOBC Command parity error.
EOBD Reset by operator.
EOBE Device clear.

Bus Error Exceptions

A Bus Error will occur whenever the Master Controller accesses subsystems which do not respond within an allowable amount of time. Since the error can occur during a CPU instruction, the drive is shut down immediately to prevent the Master Controller from executing unpredictably. These Bus Error codes usually indicate a failure of the HPIB, Master Controller, or Drive Interconnect.

4300 The Master Controller Data Buffer subassembly is unresponsive.
6100 The HP-IB is unresponsive.
DTAK Microprocessor did not receive a DTAK.

Selftest Error Codes for the HP 7978A/B Tape Drive

The error codes were developed to help trained service personnel identify major component failures, isolate the subassemblies which may be responsible for these failures, and to troubleshoot "mysterious" conditions. Referring to the table below, you can see that the codes are split into four major parts: the FRU in error, the suspected FRU subassembly, the action which caused the failure and the multi-test code. In most cases, these errors indicate a need for adjustment or repair which cannot be performed by the customer.

The Selftest error codes are made up of the four (4) digits in the FRU and CODE sequence. These error codes are presented as 2 digit most and least significant bytes respectively when they appear on the front panel of an HP 7978A/B Magnetic Tape Drive. Therefore, to determine the meaning of the code in the example below, you would look up 8702 to find the interpretation.

Table 30-13.

FRU in error.	Subassembly within FRU in error.	The action which caused the failure.	The multi-test code.
---------------	----------------------------------	--------------------------------------	----------------------

Table 30-14. Graphic Illustration of the 7978A Diagnostic Error Messages.

DISPLAY	MEANING:
F00	Failed Test 00
FRU	Field Replaceable Unit (FRU) code is next
0087	8: FRU which failed 7: Subassembly in FRU which failed
CODE	Cause of failure next
0002	0: Action during test which caused failure 2: Other FRUs or subassemblies that should be tested (Multi-test code)

FOR HP INTERNAL USE ONLY

1NNO Servo Controller Assembly FRU

10NN A general problem was found with the Servo Controller.

1001 The Servo Controller was unable to perform a soft shutdown during an Unload operation.

1010 The Servo Controller experienced an unexpected loss of tape tension or a safety shutdown has occurred. If a safety shutdown has occurred, please close the door.

1021 The Servo Controller detected that connector J25 is disconnected.

1022 The Servo Controller detected that connector J26 is disconnected.

1023 The Servo Controller detected that connector J27 is disconnected.

1024 The Servo Controller detected a failure on the Buffer Arm assembly.

1025 The Servo Controller was unable to open its relay.

1026 The Servo Controller was unable to close its relay.

1027 The Servo Controller detected a failure in its external counter.

1028 The Servo Controller detected a direction bit failure.

1029 The Servo Controller detected a failure in its internal counter.

102A The Servo Controller detected a failure in its Quadrature circuitry.

102B The Servo Controller detected MOT1_FAIL_NEG.

102C The Servo Controller detected MOT1_FAIL_POS.

102D The Servo Controller detected a sensor test failure.

102F The Servo Controller DAC failed under 0 volts.

1030 The Servo Controller DAC failed over 0 volts.

1031 The Servo Controller DAC failed under -6 volts.

1032 The Servo Controller DAC failed over -6 volts.

1033 An over tension shutdown has occurred during the motor drive diagnostic test.

104N Invalid two-port RAM value.

105N Invalid diagnostic parameter.

1060 The Servo Controller detected an in-position echo failure.

1061 The Servo Controller detected a gap echo failure.

1070 Requested moving fast while not moving at -75 ips.

1080 Reposition overflow.

1081 Not in moving state when an in-position interrupt occurred.

1082 In-position interrupt sign error.

10DN Servo firmware error.

10EN Servo table lookup error.

10FO This FRU is unresponsive or missing.

FOR HP INTERNAL USE ONLY

12N0 A Servo Controller related error has been detected by the Master Controller.

1210 The Servo Controller found an error in its kernel test.
1220 The Servo Controller failed the interface test with the Master Controller.

1230 The Servo Controller failed the gap interrupt test.
1240 An in-position interrupt was not received.
1250 A gap interrupt was not received.
1260 The write enable signal was not high in the sensor test.
1270 The write enable signal was not low in the sensor test.
12F0 The Servo Controller was not present or responsive.

2NNN Motor Drive Assembly

3NNO Front Panel Assembly FRU

30F0 This FRU is unresponsive or missing.

4NNO Master Controller Assembly FRU

41N0 CPU error on Master Controller assembly.

4110 CPU data register malfunction. The data value written was not the value read while verifying.
4120 CPU address register malfunction. The data value written was not the value read while verifying.
4130 CPU condition code malfunction.
4140 A CPU register had its data fade after a two second wait.
4160 CPU addressing malfunction.

42N0 Master Controller RAM failure.

4220 RAM failure found during the selective one walking bit test.
4230 RAM failure found during the selective zero walking bit test.

43N0 Master Controller Data Buffer subassembly failure.

4310 Data Buffer RAM failure in marching RAM test.
4320 Data Buffer register failure in walking '1' bit test.
4330 Data Buffer register failure in walking '0' bit test.
4340 Data Buffer length counter/USM function failure.
4350 Data Buffer usage counter/USM function failure.
4360 Data Buffer parity/USM function failure.
4370 The data transferred was not received. Possible HPIB problem.
4380 The data transferred is missing an EOR. Possible HPIB problem.
4390 The Data Buffer Pop Prefetch status was incorrect during the Data Buffer test.

FOR HP INTERNAL USE ONLY

44N0 Master Controller timer chip subassembly failure.

4410 Timer interrupt status error.
4420 Timer interrupt status could not be cleared.
4430 Timer 1 didn't count down to zero.
4440 Timer 1 or timer 2 is substantially faster than the other timer.
4450 Timer 1 or timer 2 is substantially slower than the other timer.
4460 Timer 1 or timer 3 is substantially faster than the other timer.
4470 Timer 1 or timer 3 is substantially slower than the other timer.
45N0 Master Controller EEPROM chip subassembly failure.

4510 The read/write ready status was not present.
4520 The computed EEPROM checksum was not the same as the stored checksum.
4530 An EEPROM read value was incorrectly read.
4540 A write value into the EEPROM did not verify after write.
4550 The computed EEPROM checksum did not verify after being written.
4560 The EEPROM is write enabled when it should be disabled.
4570 The EEPROM is not write enabled when it should be enabled.

NNNN Master Controller timer chip has failed.
NNNN Master Controller EEPROM failure during a firmware update.
NNNN Master Controller ROM checksum failure.

5Nyz Formatter Assembly FRU.

y denotes an event.

y=1 Write ID	y=2 Write Data
y=3 Verify Data	y=4 Write a Tape Mark
y=5 Force 1 track in error	y=6 Force 2 tracks in error
y=7 Force unrecoverable data	y=8 Force a Parity error
y=9 Force data overruns	y=A Force a data underruns

z denotes a multi-test code.

51yz Write Formatter failure.
5NNN Hardware status at time of error detection.

52yz Data Detect and Deskew failure.
5NNN Hardware status at time of error detection.

FOR HP INTERNAL USE ONLY

53yz Read Formatter failure.
5NWN Hardware status at time of error detection.

5NWN Hardware status at time of error detection.
Bits 1-0 Write Formatter status.
Bits 7-0 Data Detect and Deskew status.
Bit 11 Parity or bad data in buffer status.
Bits 10-0 Read Formatter status bits 14-4.

6NNO HP Interface Bus (HPIB) Assembly FRU.

61NO HPIB failure.

6110 The inbound FIFO was not empty after an attempt to clear.
6120 The internal HPIB loopback has failed.
6130 The 'end' bit in the interface is not functional.

62NO HPIB Master Controller interface failure.

6210 The data transferred was not received. Possible Data Buffer problem.
6220 The data transferred was missing an EOI. Possible Data Buffer problem.

7NNO Write Electronics Assembly FRU.

71NO Write Clock failure.

7110 The GCR Density frequency is not working.
7120 The GCR Data frequency is not working.
7130 The PE Density frequency is not working.
7140 The PE Data frequency is not working.

8NNO Read Electronics Board FRU.

8abc Auto-gain error code. Parameter 0 indicates which tracks are bad by putting a '1' in the track fields. Parameter 1 indicates low or high amplitude by putting a '0' or '1' in the indicated tracks for low or high, respectively. Note: The high order bit is 15, while the low order bit is 0.

a Bit 11 contains the parameter. Bits 10-9 contain the density. (PE=2,GCR=3) Bit 8 contains track 9 data.
b Bits 7-4 contain tracks 8-5.
c Bits 3-0 contain tracks 4-1.

FOR HP INTERNAL USE ONLY

9NNO Phase Locked Loop (Clock Recovery) Assembly FRU.

y denotes an event.

y=1 Write ID	y=2 Write Data
y=3 Verify Data	y=4 Write a Tape Mark
y=5 Force 1 track in error	y=6 Force 2 tracks in error
y=7 Force unrecoverable data	y=8 Force a Parity error
y=9 Force data overruns	y=A Force data underruns

z denotes a multi-test code.

91yz An error was detected while accessing the Write Formatter.

92yz An error was detected while accessing the Data Detect and Deskew.

93yz An error was detected while accessing the Read Formatter.

AONN AOF0 Read/Write Head is not plugged in or unresponsive.

BN Unexpected exceptions. (Front Panel reportable only.)

B1 Address error exception.
B2 Illegal instruction exception.
B3 Divide by zero exception.
B4 Register bounds violation exception.
B5 Overflow exception.
B6 Privilege violation exception.
B7 Trace exception.
B8 Emulation of future instruction exception.
B9 Spurious interrupt exception.
BA Unimplemented interrupt exception.
BB Unassigned vector exception.

Bus Error Exceptions. (Front Panel reportable only.)

43 The Master Controller Data Buffer subassembly is unresponsive.

51 Write Formatter is unresponsive.

52 Data Detect and Deskew is unresponsive.

53 Read Formatter is unresponsive.

61 The HPIB is unresponsive.

C1 Bus error exception from an unknown source has occurred.

FOR HP INTERNAL USE ONLY

Halted state error codes. (Front Panel reportable only.)

41 MC68000 CPU error.
42 Master Controller RAM failure.
44 Master Controller timer chip failure.
45 The EEPROM failed during a firmware update.
46 Master Controller ROM failure.
D4 Power cycle the tape drive. Firmware update is complete.

DNNN Runtime-Detected errors.

DONN Operating System detected failure.
D1NN Channel Program detected failure.

D179 Transaction ID mismatch.
D17A Missing pending command.
D17B Report Queue error.
D17C Report Queue full.
D17D Unknown command to device program.
D17E Full command Queue.
D17F Unknown non-Host command.
D183 Data buffer-byte count mismatch. (Test MC)
D184 Bad message type.
D185 Process handshake abort. (Test HPIB)
D186 Interface exception. (Test HPIB)
D187 Outbound data freeze. (Test HPIB)
D188 Inbound interface FIFO error. (Test HPIB)
D189 EEPROM update failure. (Test MC)
D18C Channel Program case error.
D1FF Device Program is unresponsive to the Channel Program.

D2NN Device Program detected failure.

D201 A timeout on a Device Program report occurred.
D202 The maximum number of retries have occurred during a tape diagnostic.
D203 A soft error has occurred during a tape diagnostic.
D204 Tape runaway.
D205 The tape is write protected.
D209 The read record/move command returned an unidentifiable tape.
D20A The write gap/tape mark record command returned an unidentifiable tape.
D210 The tape is not at load point.
D213 Backward move command while tape is at load point.
D225 Tape positioning failure. (Test SC)

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D226 System Reset.
D227 Readahead Reject.
D228 The door was open, so reject the command.
D229 Velocity is out of specification. (Test SC)
D22D Multiple tracks were in error. (Test F)
D22F Tape mark or ID was not verified. (Test F)
D230 Gap noise was detected. (Test F)
D231 Data format error. (Test F)
D232 Not identifiable on load or rewind commands. (Test F)
D233 Gap before end of data. (Test F)
D234 Data block dropout. (Test F)
D235 Redundancy error. (Test F)
D236 Read parity errors. (Test F)
D23C Data Buffer overrun. (Test MC)
D23D Data block timeout. (Test F)
D23E Tape mark dropout. (Test F)
D23F Tape mark unverified. (Test F)
D240 Tape mark timeout. (Test F)
D251 Servo Controller is unresponsive. (Test SC)
D252 Servo Controller command not complete.
D253 The Servo Controller shutdown. (Test SC)
D254 Servo Controller hardware failure. (Test SC)
D255 Servo Controller protocol error. (Test SC)
D256 Servo Controller runtime error. (Test SC)
D257 No in-position interrupt. (Test SC)
D258 No gap position interrupt. (Test SC)
D259 Safety shutdown. (Test MDRIVE)
D25A No BUT marker.
D25B Speed out of specification. (Test SC)
D25C Desired state is invalid.
D25E Tape position failure. (Test SC)
D265 Read Formatter unresponsive. (Test F)
D266 Read Formatter hardware error. (Test F)
D267 Bad detect on write. (Test F)
D268 Bad erase. (Test WE)
D269 No detect on write. (Test F, WE)
D26A Track out of synchronization. (Test F)
D26E Formatter byte count mismatch. (Test F)
D27C Report Queue overflow.
D27D Unknown command.
D280 No end of record on a write record. (Test F, MC)
D283 Data Buffer byte count mismatch. (Test MC)
D28A Device Program case error.
D28B Device Program hardware utility case error.

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D3N0 Diagnostic Program detected failure.

D310 A tape was not loaded when a read or write data block test was called, or the tape was not positioned at BOT.

D320 A tape with the wrong density ID was loaded for a read data block test.

D330 No write ring was installed on the tape loaded for a write data block test

D340 A tape-related error was occurred during a local firmware update.

D345 EEPROM failure was detected during firmware update.

D350 A valid firmware update record was not found on the loaded tape.

D360 The EEPROM READY signal did not come true during a Tape Usage Odometer update.

D364 Download is too large.

D366 Invalid download ID.

D367 Incorrect Download checksum.

D368 The firmware update will not fit into EEPROM. Aborted.

D369 Invalid ID for a firmware update.

D36A Invalid version number for the firmware update. (Not found.)

D36B Bad firmware update checksum.

D36C Insufficient data for the firmware update.

D36D Odd number of bytes for a firmware update.

D36E The requested version number is incorrect for your installed ROM (PROM). No update was performed.

D36F Firmware update has been aborted.

D370 The door was open while attempting to run a servo controller test which requires the door to be closed.

D380 Servo handshake/hardware failure during tests 35 - 40.

D390 A tape is mounted on the drive during motor drive tests.

D400 Power cycle the tape drive. Firmware update has successfully completed.

E>NNN Protocol errors.

E079 Command Queue not empty.

E0A2 Request DSJ expected.

E0A3 Request status expected.

E0A5 Unknown unit select.

E0A6 Listen 1 expected.

E0A7 Data byte expected.

E0A8 Missing EOI on data byte.

E0AA Command phase protocol error.

E0AC Read record report phase protocol error.

E0AD Report phase protocol error.

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EOAE Cold load protocol error.
EOBO End "complete" or "Complete - idle" expected.
EOB2 End "Data" expected.
EOB4 Improper secondary.
EOB5 Misplaced data byte.
EOB8 Interface loopback protocol error.
EOB9 Selftest protocol error.
EOBD Reset by the operator.
EOBE Device clear received.

FNNN Remote status.

FCFC Only local access to diagnostic allowed.
FDFD Incorrect Online/Offline mode for a diagnostic.
FEFE Non-existent diagnostic.
FFFF Diagnostic passed.

Front Panel errors and warnings.

A1 Resetting the Device Program.
A2 Drive is active and is offline.
A3 Dirty tape path warning.
F0 Selftest failure.
F1 The tape is not tensioned.
F2 BOT marker is not present.
F3 Hardware failure.
F4 Firmware error.
F5 Host protocol error.

Multi-Test Codes

The multi-test code within the LSB of the diagnostic error message is used to supply additional information about what may really have failed. An FRU and subsystem FRU will be contained in the MSB of the diagnostic error message, but may reflect a symptom rather than error isolation. The multi-test code is used to provide subsequent FRUs which may have caused the failure. The FRUs are listed below from most likely to fail to least likely to fail.

NNN1	Digital Loopback w/PLL Test -- PE	PLL, F, MC, WE.
NNN2	Digital Loopback w/PLL Test -- GCR	F, MC, WE.
NNN3	Digital Loopback w/o PLL Test -- PE	F, MC, WE.
NNN4	Digital Loopback w/o PLL Test -- GCR	F, MC, WE.



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Reel Tape Diagnostic

Introduction

The reel tape diagnostic (REELDIAG) tests the HP7979A, HP7980A, and/or HP7980XC tape drives which are connected to any HP Precision Architecture RISC computer system which supports the Online Diagnostic Subsystem. REELDIAG is capable of detecting failures of one or more Field Replaceable Units (FRUs). REELDIAG will:

- Set the selected tape drive to a known condition
- Identify the drive as one of the above listed types (and subtype, if necessary)
- Test the HPIB Communication Link between the host and the device
- Request the device to run certain internal selftests
- Obtain and decode hardware status and selftest results
- Obtain and decode device internal logs

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10007.

Minimum Configuration

The hardware required to run the diagnostic consists of an HP Precision Architecture RISC computer system with minimum memory, an HPIB interface, a channel adapter and a supported (see above) Magtape Drive connected to it. The drive under test must contain internal selftests that are capable of detecting failed Field Replaceable Units (FRUs) in the drive.

Auto-Diagnostics

The magnetic reel tape diagnostic program can be invoked by the I/O system for auto-diagnostic purposes when an unrecoverable drive error has been detected. In auto-diagnostics mode, this diagnostic program will execute the following sections and steps:

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 10	I/O path trouble tree
Section 11	Drive electronics trouble tree

Operating Instructions

Before attempting to run the diagnostics, ensure that the tape drive to be tested is powered on. If the sections which test tape movement and write/read operations are to be run, ensure that a scratch tape is loaded.

Default Tests

If the user doesn't specify sections and steps to be run, the following default sections and steps will be executed. The default tests do not care whether the drive is on-line or off-line and they will not read from or write to any loaded tape.

Section 10	Non-destructive I/O path trouble tree
Section 11	Drive electronics trouble tree

RUN Command

To start the Online Diagnostics, enter the following command at the system prompt:

sysdiag


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

DUI >

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

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The program will allow the user to select which testing functions are to be executed, but the default set can also be invoked by not making any section or step specification. In addition, only certain sections/steps will be performed when called as an auto-diagnostic. For security reasons, no auto-diagnostic section will cause any tape reads or writes.

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 REELDIAG pdev=4.2.2 <RUN Command Options>
      |
      |   none required for
      |   default test suite
      |
      |
      |   insert physical location of
      |   device to be tested here;
      |   alternatively, for MPE XL,
      |   type the ldev number;
      |   for HP-UX, type the devfile name
```

Various error options are used by the RUN command. A detailed description can be obtained by referring to the DUI chapter of this manual. Enter the desired RUN options.

Test Execution

When REELDIAG is executed, the following welcome message will be displayed:

```
*****
*****          MAGNETIC REEL TAPE DIAGNOSTIC          *****
*****
*****   (C) Copyright Hewlett Packard Co. 1987   *****
*****           All Rights Reserved.           *****
*****           Version A.00.00                 *****
*****
*****
```

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

Upon completion of all sections and steps selected by the user or upon a fatal error condition, REELDIAG will exit and control will be returned to the Diagnostic User Interface (DUI).

REELDIAG EXITING ...

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Unless the program is being called simply to decode status, the diagnostic will first request access to the device from the diagnostic subsystem. If access to the drive is not obtained, error messages from the subsystem as well as this diagnostic will appear and the program will terminate.

If access to the device was obtained, the diagnostic will automatically invoke a diagnostic subsystem routine to test the I/O path to the tape drive. This is necessary since REELDIAG has no knowledge of intermediate hardware connecting the host to the drive. If the status returned from this routine is not "successful", a warning message will be displayed but the diagnostic will continue.

If the I/O path tests out okay, the diagnostic will automatically ask the device to identify itself. If the device fails to respond to the request, the program will terminate. If an unexpected identification code is received, an appropriate warning message will be displayed but the execution will continue so as to allow development devices to be diagnosed. In this case if the program is in autodiagnosics mode, an HP7980 will be assumed, otherwise, the user will be prompted for one of the known, valid identification codes to use to diagnose the device:

```
***WARNING: Device is not diagnosed by this program.  
           HPIB code returned = nnnn.
```

{or}

```
***WARNING: Device is not recognized as a reel tape drive.  
           HPIB code returned = nnnn.
```

```
Which of the following devices emulates the selected device?
```

```
HP7979A  
HP7980A  
HP7980XC
```

```
[<cr> = none/exit program]
```

```
Your selection >
```

If the device correctly identifies itself, the sections and steps specified by the user in the DUI RUN command will be executed. If the user did not specify sections and steps to be run, the default sections and steps will be executed.

If during the execution of any program section or step the diagnostic request fails, the appropriate error at the end of this chapter will be displayed.

Test Section Description

The following sections and steps are applicable for execution in this diagnostic program:

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 5	Selftest
Section 6	Display device status
Section 7	Display Log information
Section 10	Non-destructive trouble tree
Section 11	Drive electronics trouble tree
Section 12	R/W function trouble tree
Section 13	Media trouble tree
Section 50	Interactive external exerciser

Variable output in the output examples is represented by one of the following codes (note the italics font):

<i>n</i>	Refers to a decimal digit (a 4-digit number would be represented as <i>nnnn</i>).
<i>c</i>	Refers to an ASCII character.
<i>h</i>	Refers to a hexadecimal digit (0-F).
<i>o</i>	Refers to an octal digit (0-8).
<i>b</i>	Refers to a binary digit (0-1).
<i>text</i>	Is a description of what will appear at that spot.

In addition, an exclamation point (!) in error messages and warnings is normally a symbol representing the point at which certain context sensitive words, phrases, or numbers will be inserted.

Many sections provide generic information displays which cover both the older and newer tape drives. In cases where particular information is not available from the machine, the phrase "NA" (Not Applicable) will be displayed in its place. Similarly, the value of certain states and counters in some drives must be initialized, and until they are, contain all Fs (hex), indicating their unset state. This value will be displayed as "nv" (no value) by REELDIAG. Neither of these are to be considered error conditions, unless other values are definitely expected.

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Section 2—CLEAR

This section will place the selected device into a known state:

- Tape drive protocol will be restarted
- Data buffers will be cleared
- Current tape position will be retained
- Current tape status will be retained
- Current On/Off-Line status will be retained

The appropriate commands to selectively clear the device are sent. However, the device response to these commands is not tested. To test the response, use other sections such as Identify, Loopback and Device Status.

Section 2 -- CLEAR

End of Section 2 -- CLEAR

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Section 3—IDENTIFY

This section requests the specified tape drive to identify itself in order to determine whether it is responding. If not, an error message will be displayed and the program aborted. Otherwise, the user will be informed of the device identity. The ID code, the device mnemonic HPnnnA, and the current firmware revision number will be displayed.

If the code does not match one of the devices which the program recognizes, a warning will be issued and the user prompted for one of the known, valid identification codes to use to diagnose the device. If none is supplied, the program will terminate. Otherwise, the execution will continue on the selected provisional basis.

Section 3 -- IDENTIFY

===== DEVICE IDENTIFICATION =====

HPIB code = *hhhh* - Device is recognized as a
reel tape drive.

Product = HPnnnnc

Available

densities:

density (e.g. 1600 PE)

density (e.g. 1600 PE)

: :

: :

RAM :nnn KBytes

Firmware :

processor name nn.nn.nn

processor name nn.nn.nn

: :

: :

End of Section 3 -- IDENTIFY

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Section 4—LOOPBACK

This section will test the HPIB Communication Link between the host and selected tape drive.

Section 4 -- LOOPBACK
Tape Drive data channel checks out OK.
End of Section 4 -- LOOPBACK

{or}

Section 4 -- LOOPBACK

The following transmission errors were detected during the loopback test:

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
12	56	54	0000010
33	7F	3D	0100010
.	.	.	.
.	.	.	.
.	.	.	.

End of Section 4 -- LOOPBACK

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Section 5—SELFTTEST

This section will attempt to isolate and identify a problem by requesting the device to run one or more of its own built-in selftests.

Error class is a general classification of the type of error according to one of the following:

- Runtime error
- Protocol error
- Diagnostic error
- Multi-processor error
- Read/write hardware status
- Read electronics status

Runtime and protocol errors will not normally detect faulty FRUs, whereas multi-processor errors test the communication between processors and may list more than one FRU if the problem cannot be isolated exactly. In that case, FRUs will be listed in order of probability of failure.

If the unit being tested is not capable of doing a particular selected step, the following message will be displayed and execution will continue with the next selected step.

***WARNING - The device selected was not designed to perform this step.
(REELWARN nnnnn)

Tape drive diagnostics are ordered hierarchically, such that some tests call many others. This implies that when a failure is detected, the remaining tests in the checkout may not be run. Secondary and tertiary problems might not be detected until the first problem is fixed, since reporting the first problem cancels the remaining tests. The details of each step within this section follows:

Step 20 **Complete electronics checkout:** This step will request a set of selftests which cause the device to check itself out as thoroughly as possible without requiring any interaction with a mounted tape and without intentionally causing RAM data destruction.

The following selftests will be run:

- HP7979A - Test Sequence #0
- HP7980A - Test Sequence #0
- HP7980XC - Test Sequence #0

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Section 5 -- SELFTEST

No faulty Field Replaceable Units (FRUs) were detected
by device diagnostic #*nnn*.

{or}

Device diagnostic #*nnn* detected the following failure:

Error Class - *error group according to device ERS*
[Detection - (*nnn*) while name of detecting action]
[- (*nnn*) name of detecting proc. Processor/Program]
[- (*nnn*) name of detecting test Test]
Explanation - (*hhh*) error explanation as listed in device ERS
Faulty FRUs - (*nn*) FRU name as listed in device ERS
[- (*nn*) FRU name as listed in device ERS]

{or}

Device diagnostic #*nnn* was unable to either run to completion
and/or isolate an FRU. Error returned:

Error Class - *error group according to device ERS*
Explanation - (*hhh*) error explanation as listed in device ERS

End Step *nn* - {step name}

End of Section 5 -- SELFTEST

Note



This is a generalized example and except for the section header/trailer will
be repeated for each step selected for execution. Selftest numbers will be
displayed in decimal; error and FRU numbers in hexadecimal.

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Section 6—DISPLAY DEVICE STATUS

This section will obtain, decode, and display 6 bytes of hardware status from the tape drive. The format of this status is fixed by HP-IB specifications, not the device itself, so that status will be consistent across devices, even though device specific statuses may be returned.

This section will cause the display of both the raw, uninterpreted values of each status register as well as several messages which will reflect, in words, the status of the drive. Registers 1-3 contain 1 bit status flags. Those flags which simply indicate status and not necessarily an error condition will generate a message regardless of their value. Error condition flags will cause message display only when set to true and their messages will be preceded by an asterisk(*). The wording of the messages will conform closely to those which appear in the HP7974/78/79/80 HPIB Interface Specifications.

Finally, the status will be checked for combinations of flag and error number settings which should not occur. An appropriate warning will be issued for each implausible combination.

The phrase "UNRECOGNIZED" will be applied to all items which have a value which is not known (i.e., invalid) to REELDIAG. These values are unexpected and will normally refer to a problem in the device itself or a change in the format of the hardware status.

Section 6 -- DISPLAY DEVICE STATUS

=====

DEVICE STATUS

=====

RAW FORM:

Register	Hex Value	DIO Map	Decimal Value(s)
#1	hh	87654321	bbbbbbb
#2	hh	bbbbbbb	
#3	hh	bbbbbbb	
#4	hh		nn, nn
#5	hh		nnn
#6	hh		nnn

INTERPRETED DRIVE STATUS:

Tape drive is [ON-line, OFF-line]
Immediate Response Mode is [ENABLED, DISABLED]
*Device has been CLEARED/POWERED-ON since last command
*Drive door is OPEN

INTERPRETED TAPE STATUS:

Tape is Write [ENABLED, PROTECTED]
Tape density is [800cpi, 1600cpi, 6250cpi,
UNKNOWN/INVALID, UNRECOGNIZED]
Tape position is [BOT, EOF, EOT, KNOWN, LOST, UNKNOWN/INVALID]
*Tape RUNAWAY condition detected
*Data TIMING error detected

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INTERPRETED I/O STATUS:

Last command was [REJECTED, ACCEPTED, ACCEPTED but FAILED]

- Last command was retried *nnn* times

*Reject Class: [DEVICE reject, PROTOCOL reject,
SELFTTEST failure, #*n*]

*Error location : [CONTROLLER, SERVO, FORMATTER, UNRECOGNIZED]

*Error #*hhh* - error explanation

*HPIB Command Parity Error detected

*Unrecovered Data PARITY error detected

*Unrecovered Data/Format Error (MTE)

*RECOVERED error detected (STE)

***WARNING: The above status contains the following inconsistencies:

(one or more of the following as appropriate:)

- Conflicting tape density indicators
- Conflicting tape position indicators

- Conflicting error location indicators
- Conflicting retry count and/or error recovery flags
- Conflicting command status, reject reason, and/or error explanation

- A problem was indicated, but no explanation was provided in Register 5

- Register 5 implies a(n) [DEVICE reject,
FORMATTER,
CONTROLLER,
SERVO/tape position,
PROTOCOL reject,
unrecovered data/format]
error but this is not fully indicated.

End of Section 6 -- DISPLAY DEVICE STATUS



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Section 7—DISPLAY DEVICE LOG

This section will obtain, decode, and display pertinent information from the logs maintained by the tape drive itself. The information will be broken into logical groupings which are activated by separate steps. Also available is a step which displays the log dump in uninterpreted form.

Device memory organization is product dependent, but will be translated to fit the common display interface specified below. Display items which do not apply to a particular device will display the value "NA" for "not applicable". If an entire step does not apply to the selected device, a special message indicating so will be displayed and the remainder of the display ignored. The phrase "UNRECOGNIZED" will be applied to all items which have a value which is not known to REELDIAG. These values are unexpected and will normally refer to a problem in the device itself. Other details of memory organization can be found in the diagnostic ERS for each tape drive product.

Step 60 Maintenance info: This step will display the contents of normal operation counters and other information not contained in the error logs. This will include tape odometer, RAM odometer, current clock setting, number of power cycles, battery date, and version numbers. The string "NA" will be displayed for any information item which, by design, is not available from a particular device.

Step 61 Configuration: This step will indicate how the device is currently configured; i.e. selected gap size, write retrycount, whether or not archival rewind is enabled, etc. The string "NA" will be displayed for any information item which, by design, is not available from a particular device. If the value of a particular configuration item has not been set (value = FF), the string "nv" will be displayed.

A warning will be issued for any configuration item which contains a value outside the documented range for that value for the selected device. A number will be supplied in the message which refers to the corresponding configuration value as documented in the ERS for the device. Also, in this case, coded values will be displayed as "UNRECOGNIZED" or "***"; whereas uncoded numeric values will be displayed despite the apparent error.

Step 62 Fault log: Each error recorded in the device's hard error log will be displayed in succession. Information from other drives will be adjusted to fit this format to provide a uniform interface. The interpreted displays will include error class/subclass, error explanation text, the name of the offending FRU, and lapsed time since last error.

Error class is a general classification of the type of error according to one of the following:

- Runtime error
- Protocol error
- Diagnostic error
- Multi-processor error
- Read/write hardware status
- Read electronics status

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Different types of log entries will often require different interpretations and/or different display formats. Runtime and protocol errors will not normally detect faulty FRUs, whereas multi-processor errors test the communication between processors and may list more than one FRU since the problem cannot be isolated exactly. In that case, FRUs will be listed in order of probability of failure (if known). Read/write hardware status and read electronics status are reserved for later planned incorporation of 7974 and 7978 devices.

The items delimited with square brackets ([]) in the output below are displayed only if there is a pertinent value to be shown.

The actual number of entries which will be displayed will vary according to the number actually logged and the device itself. The maximum number of entries which should be displayed is as follows:

HP7974 - 10 entries
HP7978 - 10 entries
HP7979 - 30 entries
HP7980 - 30 entries

- Step 63 **Error rates:** In addition to the error log, which records serious, usually fatal errors, the error rate log keeps track of the number of errors from which the device was able to recover on its own. Each loading of a tape generates a new entry. These entries will be shown in an interpreted format by the program.

The display will consist of 3 major sections. The first lists cumulative error rates for the device; the second lists error rates for the current loaded tape (if any); and the third displays the contents of the rest of the log (error rates for previous tapes).

The actual number of entries which will be displayed will vary according to the number actually logged and the device itself. The maximum number of entries which should be displayed is as follows:

HP7979 - 20 entries
HP7980 - 20 entries

- Step 64 **Device Controller Statistics:** Finally, there are a number of useful information items found in the device controller log. These are the drive repositioning statistics (info item #20 on newer drives), tape auto load statistics (auto load drives only - info item #21) and gap gains.

- Step 69 **Raw Dump:** This section will display the entire memory dump as a table of paired hex values. No attempt will be made to group the characters according to the logical units from the drive's point of view (the other steps effectively do most of that). Rather, the display is to be entirely device independent except for the number of bytes returned by the device, as follows:

HP7979 - 1509 bytes (variable)
HP7980 - 1509 bytes (variable)

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Section 7 -- DISPLAY DEVICE LOGS

MAINTENANCE INFO

Clock : nnnn:nn:nn
Tape odometer : nnnnnnnnnnnnn.n feet
RAM odometer : nnnnnnnnnn
Power cycles : nnnnn
Battery date : nn
Versions:
processor nn.nn.nn
:
:
:

End Step 60 - Maintenance Info

POWER-ON CONFIGURATION VALUES

FRONT PANEL

Allow FP configuration change	ENABLED/DISABLED
Front panel media removal	ENABLED/DISABLED
Prompt for archival rewind	ENABLED/DISABLED
Prompt for data compression	ENABLED/DISABLED
Operator selection timeout	ENABLED/nn
Front panel language	ENGLISH/GERMAN/FRENCH/SPANISH
Activity indicator symbol	"-"/"--"/"*
Gauge usage	"BOT EOT"/ "Data in buffer"/ "Queued commands/reports....."

GENERAL CONTROL

Allow FP configuration change	ENABLED/DISABLED
Allow host configuration change	ENABLED/DISABLED
Default write density	NONE/800/1600/6250/COMPRESSED
FP density control lock	ENABLED/DISABLED [HOST override]
Auto online	ENABLED/DISABLED
Archival rewind	ENABLED/DISABLED [OVERRIDE prompt]
Stop on failure	ENABLED/DISABLED
Report Recovered Errors	ENABLED/DISABLED

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WRITE

Immediate response mode	ENABLED/DISABLED
Tape mark count to terminate immediate response mode	DISABLED/ <i>nn</i>
Retry count	<i>nn</i>
Gap size	
800cpi (NRZI)	MIN = <i>n.nn</i> MAX = <i>n.nn</i>
1600cpi (PE)	MIN = <i>n.nn</i> MAX = <i>n.nn</i>
6250cpi (GCR)	MIN = <i>n.nn</i> MAX = <i>n.nn</i>
EOT stop	ENABLED/DISABLED
Holdoff timeout	<i>nn</i>
Startup point (8ths of memory)	<i>n</i>

DATA COMPRESSION

Default	COMPRESSED/UNCOMPRESSED [OVERRIDE prompt]
Front panel request	COMPRESSED/UNCOMPRESSED
Host request	COMPRESSED/UNCOMPRESSED
Host override of front panel	ENABLED/DISABLED
Resulting request	COMPRESSED/UNCOMPRESSED
Expansion protection	ENABLED/DISABLED
Max record size	<i>nnn</i> Kbytes
Max record tape marks	<i>nnn</i>
Max record bytes	<i>nnnn</i> Kbytes
Max access tape marks	<i>nn</i>
Max access bytes	<i>nnnn</i> Kbytes
Record optimization threshold	<i>nn:l</i>
DC optimization threshold	<i>nn:l</i>
DC optimization sample period	<i>n</i> Bytes

READ

Readahead mode	ENABLED/DISABLED
Tape mark count to terminate readahead mode	DISABLED/ <i>nn</i>
Retry count	<i>nn</i>
Trailing buffer	<i>n</i> records (<i>nn</i> Kbytes)
Startup point (8ths of memory)	<i>n</i>

INTERFACE

Unload after rewind offline	ENABLED/DISABLED
Device emulation	HP7974/HP7978/HP7979/HP7980

End Step 61 - Power-on Configuration Values

FOR HP INTERNAL USE ONLY

=====

ERROR LOG

=====

----- 01 -----

Error Class - error group according to device ERS
[Detection - (nnn) while name of detecting action]
[- (nnn) name of detecting test]
[- (nnn) by name of detecting processor/program]
[Explanation - (hhh) error explanation as listed in device ERS]
[Faulty FRUs - (nn) FRU name as listed in device ERS]
[- (nn) FRU name as listed in device ERS]
Cumltv Time - nnnnn.n:n:n
Lapsed Time - nnnnn.n:n:n
(or) Clock reset since last error
NOTE: Error occurred during power-on selftest.

----- 02 -----

:
:

----- nn -----

End Step 62 - Fault Log

FOR HP INTERNAL USE ONLY

CUMULATIVE SOFT ERROR RATES

800cpi (NRZI)	READ	WRITE	TOTAL
Density	nnnnncpi (ccc)	nnnnncpi (ccc)	
Hard Errors	nnn	nnn	nnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	
	{and/or}		

1600cpi (PE)	READ	WRITE	TOTAL
Density	nnnnncpi (ccc)	nnnnncpi (ccc)	
Hard Errors	nnn	nnn	nnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	
	{and/or}		

6250cpi (GCR)	READ	WRITE	TOTAL
Density	nnnnncpi (ccc)	nnnnncpi (ccc)	
Hard Errors	nnn	nnn	nnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

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=====

CURRENT TAPE ERROR RATE

=====

nnncpi (ccc)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

=====

ERROR RATE LOG

=====

----- 01 -----

nnncpi (ccc)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

Load Time - nnnnn:nn:nn

----- 02 -----

:

:

----- nn -----

End Step 63 - Error Rates

FOR HP INTERNAL USE ONLY

=====

DRIVE CONTROLLER STATISTICS

=====

Drive Repositioning:

Forward reposition error - mean *nn* mils
Forward reposition error - variance *nn* mils squared

Reverse reposition error - mean *nn* mils
Reverse reposition error - variance *nn* mils squared

Tape Auto Load:

Loads attempted *nnnnn*
Successful loads *nnn%*
Successful loads requiring retries *nnn%*

Gap Gains:

	800 (NRZI)	1600 (PE)	6250 (GCR)
Track 1	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
2	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
3	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
4	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
5	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
6	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
7	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
8	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
9	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>
Average	<i>hhhh</i>	<i>hhhh</i>	<i>hhhh</i>

End Step 64 - Drive Controller Statistics

FOR HP INTERNAL USE ONLY

RAW DUMP

WORDS	0	1	2	3	4	5	6	7	8	9
0	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh
10	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh
20	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh	hhhh
:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:

End Step 69 - Raw Dump
End of Section 7 -- DISPLAY DEVICE LOGS

FOR HP INTERNAL USE ONLY

Section 10—I/O PATH TROUBLE TREE

This section will check out the device as thoroughly as possible without requiring exclusive level access to the device. The trouble tree will determine whether the device is up and responding, and whether the HP-IB channel appears to be free of problems.

This section is nondestructive since the tests will not clear data buffers or otherwise reset the device.

Note This trouble tree is NOT destructive, nor does it require on-site manual assistance.

The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed, until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

The output listed below for this section refers to, and is representative of anticipated conditions, but may not be fully inclusive of all possible situations.

OUTPUT

Section 10 -- IO PATH TROUBLE TREE

{Scenario 1:}

TIME-OUT : Device identification

SUSPECT: (in descending order of probability)

1. Device powerfail
2. Device not at specified address
3. HP-IB cable/cable connections
4. HP-IB interface
5. HP-IB adapter
6. Bad channel

{Scenario 2a:}

REJECTED: Device identification

SUSPECT: (in descending order of probability)

1. HP-IB interface
2. HP-IB adapter
3. Bad channel

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{Scenario 2b:}

FAILED : Device identification
HPIB code = hhhh - WARNING: Device is not recognized
as a reel tape drive.

SUSPECT: (in descending order of probability)
1. HPIB interface
2. HPIB adapter
3. Bad channel

{Scenario 3:}

PASSED : Device identification
REJECTED : HPIB Loopback test

SUSPECT: (in descending order of probability)
1. HPIB cable
2. HPIB interface
3. HPIB adapter
4. Channel adapter

{Scenario 4:}

PASSED : Device identification
FAILED : HPIB Loopback test

SUSPECT: (in descending order of probability)
1. HPIB cable
2. HPIB interface
3. Data buffer
4. HPIB adapter
5. Channel adapter

{Scenario 5:}

PASSED : Device identification
PASSED : HPIB Loopback test

NO PROBLEMS DETECTED.
Suggestions for further action:

1. Run electronics checkout trouble tree.

End of Section 10 -- IO PATH TROUBLE TREE

Section 11—DRIVE ELECTRONICS TROUBLE TREE

This section will check out the device as thoroughly as possible without on-site assistance (tape handling), and without taking excessively long to complete. The trouble tree will determine whether the device is up and responding, whether the HP-IB channel appears to be free of problems, and whether the basic data processing hardware of the device reports that it is functioning correctly.

This section is destructive, since the tests may clear data buffers and otherwise reset the device or even declare it unuseable by processes other than diagnostics. The tree is not designed to read to or write from tape.

Note This trouble tree is DESTRUCTIVE and does NOT require on-site manual assistance.

The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed, until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

OUTPUT

Section 11 -- DRIVE ELECTRONICS TROUBLE TREE

{Scenario 1:}

TIME-OUT: Device identification

SUSPECT: (in descending order of probability)

1. Device powerfail
2. Device not at specified address
3. HP-IB cable/cable connection
4. HP-IB interface
5. HP-IB adapter
6. Bad channel

{Scenario 2a:}

REJECTED : Device identification

SUSPECT: (in descending order of probability)

1. HP-IB interface
2. HP-IB adapter
3. Bad channel

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{Scenario 2b:}

PASSED : Device identification
HPIB code = hhhh - WARNING: Device is not recognized
as a reel tape drive.

SUSPECT: (in descending order of probability)
1. HPIB interface
2. HPIB adapter
3. Bad channel

{Scenario 3:}

PASSED : Device identification
REJECTED : HPIB Loopback test

SUSPECT: (in descending order of probability)
1. HPIB cable
2. HPIB interface
3. HPIB adapter
4. Channel adapter

{Scenario 4:}

PASSED : Device identification
FAILED : HPIB Loopback test

SUSPECT: (in descending order of probability)
1. HPIB cable
2. HPIB interface
3. Data buffer
4. HPIB adapter
5. Channel adapter

{Scenario 5:}

PASSED : Device identification
PASSED : HPIB Loopback test
REJECTED : Power-on selftest sequence

SUSPECT: (in descending order of probability)
1. Drive controller

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{Scenario 6:}

PASSED : Device identification
PASSED : HPIB Loopback test
FAILED : Power-on selftest sequence

SUSPECT: (in descending order of probability)
1. FRU - name of suspected failing component/FRU
1. FRU - name of suspected failing component/FRU

{Scenario 7:}

PASSED : Device identification
PASSED : HPIB Loopback test
FAILED : Power-on selftest sequence

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Read logs; use exerciser to run specific tests for log problems.
2. RUN R/W trouble tree

End of Section 11 -- DRIVE ELECTRONICS TROUBLE TREE

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Section 12—R/W FUNCTION TROUBLE TREE

This tree is intended to diagnose major tape transport and read/write problems in a short period of time. Normally, the electronics trouble tree (section 11) should have been already run with a "pass" status. Any failures will be isolated as far as possible without an undue expenditure of time. If an intermittent and/or media problem is suspected after running this tree, the media check trouble tree, which can take a substantial amount of time to complete, may be run.

Since this tree may cause data to be written to or read from tape, REELDIAG will prompt the user for confirmation before reading or writing tape, if a tape is found already loaded, prior to the first r/w operation.

Note This trouble tree is DESTRUCTIVE, and it requires on-site MANUAL ASSISTANCE.



The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed, until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

OUTPUT

Section 12 -- R/W FUNCTION TROUBLE TREE

{Scenario 1:}

REJECTED : Power-on selftest sequence

SUSPECT: (in descending order of probability)

1. Data path
2. Drive controller

Suggestions for further action:

1. Run electronics trouble tree

{Scenario 2:}

FAILED : Power-on selftest sequence

SUSPECT: (in descending order of probability)

1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU

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{Scenario 3:}

PASSED : Power-on selftest sequence
FAILED : Servo test

SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - *name of suspected failing component/FRU*
2. FRU - *name of suspected failing component/FRU*
{or otherwise}
1. Drive controller
2. Encoder/capstan
3. Motor
4. Power supply

{Scenario 4:}

PASSED : Power-on selftest sequence
PASSED : Servo test
FAILED : Data buffer test

SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - *name of suspected failing component/FRU*
2. FRU - *name of suspected failing component/FRU*
{or otherwise}
1. Data Buffer

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{Scenario 5:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
FAILED : R/W formatter test



SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU
{or otherwise}
1. R/W FRU
2. Formatter

{Scenario 6:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
PASSED : R/W formatter test
FAILED : Actual R/W test - general
FAILED : Actual R/W test - detailed

SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU
{or otherwise}
1. Heads/head connectors
2. R/W board

Suggestions for further action:

1. Clean heads and run this trouble tree again

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{Scenario 7:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
PASSED : R/W formatter test
FAILED : Actual R/W test - general
PASSED : Actual R/W test - detailed

SUSPECT: (in descending order of probability)

{if FRUs given}

1. FRU - *name of suspected failing component/FRU*
2. FRU - *name of suspected failing component/FRU*

{or otherwise}

1. Media
2. Heads

Suggestions for further action:

1. Run media trouble tree
2. Clean heads and run this trouble tree again

{Scenario 8:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
PASSED : R/W formatter test
PASSED : Actual R/W test - general
PASSED : Actual R/W test - detailed

NO PROBLEMS DETECTED

Suggestions for further action:

1. Run media trouble tree

End of Section 12 -- R/W FUNCTION TROUBLE TREE

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Section 13—MEDIA TROUBLE TREE

This trouble tree will attempt to distinguish defective media from drive read/write hardware problems. It may also serve to identify and isolate intermittent hardware problems.

Large amounts of data must be written, read, and verified, making execution time only a minor constraining factor. It is expected that the electronics and read/write hardware trouble trees will have already passed before running this section.

If a branch in the tree is reached which requires an extensive period of time to complete (e.g., verifying the medium, erasing the tape, etc.), the user will be informed of how to break and abort that process.

Since this tree may cause data to be written to or read from tape, REELDIAG will prompt the user for confirmation before reading or writing tape, if a tape is found already loaded, prior to the first R/W operation.

Note This trouble tree is DESTRUCTIVE and requires on-site MANUAL ASSISTANCE.



The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed, until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

The output listed below for this section refers to, and is representative of, anticipated conditions, but may not be fully inclusive of all possible situations.

OUTPUT

Section 13 -- MEDIA TROUBLE TREE

{Scenario 1:}

FAILED : Tape load

SUSPECT: (in descending order of probability)

1. Human error
2. Servo
3. BOT sensor
4. Medium
5. Drive controller
6. Door sensor

Suggestions for further action:

1. Manually correct tape load
2. Run manual selftests 84-87, 90-93
3. Run manual selftest 94
4. Run manual selftest 88

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{Scenario 2:}

PASSED : Tape load
FAILED : Write test

SUSPECT: (in descending order of probability)
{otherwise error code implicates hardware}
1. Medium
2. Heads

Suggestions for further action:

1. Rerun test & compare locations of failures
If same suspect medium, otherwise heads.

{Scenario 3:}

PASSED : Tape load
PASSED : Write test
FAILED : Read/verify

SUSPECT: (in descending order of probability)
1. Heads

{Scenario 4:}

PASSED : Tape load
PASSED : Write test
PASSED : Read/verify

NO PROBLEMS DETECTED

{If soft error count <= 2}

A total of nnnnnnn soft errors indicates a GOOD tape.

{If 2 < soft error count <= 10}

A total of nnnnnnn soft errors indicates an OK tape.

{If 10 < soft error count <= 50}

A total of nnnnnnn soft errors indicates a MARGINAL tape.

{If soft error count > 50}

A total of nnnnnnn soft errors indicates a BAD tape.

End of Section 13 -- EXTENDED R/W FUNCTION TROUBLE TREE

FOR HP INTERNAL USE ONLY

Section 50—INTERACTIVE EXTERNAL EXERCISER

The REELDIAG External Exerciser is an interactive program which provides the user with access to a set of internal diagnostics and utilities within an HP7979 or HP7980 tape drive. The purpose of this exerciser is to aid service-trained personnel in troubleshooting tape drives to a replaceable assembly level.

This exerciser is, for the most part, an implementation of the MPE-V diagnostic TPUTIL with certain enhancements, and some renaming and reorganizing of commands to facilitate the objectives of REELDIAG. The following commands will be implemented:

Displays:	HWSTATUS IDENTIFY LOGS ALL CONFIGURATION CONTROLLER CUMULATIVE FAULT MAINTENANCE RAW TAPE
Diagnostics:	LOOPBACK (hpib) MOTIONCHECK SELFTEST TREES IOPATH ELECTRONICS READWRITE MEDIA WORKOUT
Tape commands:	IRM LOADTAPE REWIND UNLOADTAPE
Utilities:	CLEARDEV CLEARLOG ALL CUMULATIVE FAULT AUTOLOAD REPOSITION TAPE CONFIGS DECODE

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**Exerciser
control:**

**CANCEL
EXIT
HELP
REFRESH
SUSPEND**

FOR HP INTERNAL USE ONLY

Commands For Interactive External Exerciser

When the external exerciser is invoked, the following prompt will be displayed to the user:

REELDIAG>

The prompt indicates that the exerciser is waiting for a command from the user. When the user enters a command that is recognized by the external exerciser, that command will then be processed according to the corresponding command description given below.

Some commands may not be available if the requested device could not be locked for exclusive access. Exit from the exerciser will be accomplished via the EXIT command. Syntax and usage help will be available via the HELP command.

If the user enters an unrecognized command the following error message with one or more of the applicable additional explanations will be displayed. The user will then be reprompted:

*** YOUR RESPONSE IS INVALID. (REELERR 05008)

- ! is an unrecognized command;
check spelling or type help for assistance.
- expected a numeric response.
- numeric response must fall between ! and !.
- response is not a valid integer number
- parameter "!" is unknown, is out of order,
or is invalid for the command !.



REELDIAG>

Some commands will require some additional information from the user. In many cases, this information can be supplied in parameters to the command. If an invalid parameter is supplied, the following error message will be displayed. The user will then be prompted for remaining information as described in the following paragraphs.

*** UNEXPECTED PARAMETER (!) ENCOUNTERED.

If an unexpected parameter is encountered or the command does not accept parameters, additional prompts for the needed information will be displayed. These data prompts will be displayed in mixed case and will end with the prompt symbol ">". They will also include a range or selection of choices enclosed in parentheses and, where appropriate, a default selection, enclosed by square brackets, supplied by the program upon entry of a simple carriage return (<CR>). For example:

Enter the configuration value. (off|1..99) [OFF]>

The text enclosed in the parentheses indicates that the user is to type either "off" or an integer value between 1 and 99 inclusive. Each option is separated by a "|". The default response "off", as indicated by [OFF], would be assumed if the user simply entered a carriage return. For items like configuration values, the current value will normally be displayed as the default. If a default is not shown, the user will not be allowed to "default" the input by only entering a <CR>.

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Keyword responses (e.g., command names) may be abbreviated but not below the minimum number of characters necessary to distinguish them from all other valid responses. Responses will not be case sensitive. In addition, some commands will have special 2 or 3 character abbreviations which will also be recognized. These abbreviations are listed next to the command name in help messages. Where possible, command names, abbreviations, and other characteristics will conform to similar commands in the proposed Support User Interface Standard.

The HELP keyword will be recognized at all prompts.

If an error is encountered as a result of issuing a command to the device, appropriate error messages as well as the hardware status that is returned by the device will be displayed. Status display will conform to that in in Section 6—Display Device Status. Note that some exerciser commands may issue several different device commands to the tape drive. Therefore, error messages may refer to command names other than those which are part of the exerciser.

Each command description below is in the following format:

COMMAND NAME:	The unabbreviated form of the command name.
USAGE:	Explanation of what the command does and when it should be used.
SYNTAX:	Listing of command syntax (including any special abbreviation) and any parameter descriptions.
DATA PROMPTS:	Prompts to be displayed for needed information not available from the command parameter list.
OUTPUT FORMAT:	Information printed as a result of this command being executed.
ERROR MESSAGES:	Any error messages worth noting that may be generated as a result of this command. Note that this does not imply that all possible error messages that may be generated are listed here, but rather, only those that are especially worth mentioning in relation to the command.

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There are several conventions used throughout the command output descriptions. They are as follows:

- n* - refers to a decimal digit
(a 4-digit number would be represented as *nnnn*).
- c* - refers to an ASCII character.
- h* - refers to a hexadecimal digit (0-F).
- o* - refers to an octal digit (0-8).
- b* - refers to a binary digit (0-1).

- text* - is a description of what will appear at that spot.

Comments in the input and output sequences are enclosed in curly brackets. These comments are only part of this document and are not output by the program. For example, a command description may contain the following:

Do you wish to continue? (Y|N)[N]>

{if response is "N" this command will terminate}

However, the actual output of the program would be only:

Do you wish to continue? (Y|N)[N]>

FOR HP INTERNAL USE ONLY

CLEARDEV

USAGE:

This command clears the selected device in a manner independent of the channel to which it is connected. This command causes the drive to be placed in a known condition as follows:

- Tape drive protocol will be restarted
- Data buffers will be cleared
- Current tape position will be retained
- Current tape status will be retained
- Current On/Off-Line status will be retained

SYNTAX:

CLEARDEV
CDEV

DATA PROMPTS:

None

OUTPUT FORMAT:

Device has been cleared.

FOR HP INTERNAL USE ONLY

CLEARLOG

USAGE:

This command is used to initialize (clear) various logs internal to the device. The user is given a choice of which log to clear or to clear all logs. This command can destroy valuable information and should be used with care.

SYNTAX:

CLEARLOG [*log specifier*]
CLOG

log specifier:

ALL - All of the following clears will be done
CUMULATIVE - Cumulative rate logs for all densities
FAULT - Hard error log
AUTOLOAD - Tape auto load statistics
REPOSITION - Drive repositioning statistics
TAPE - Soft error rate log

DATA PROMPTS:

Which log is to be initialized?

ALL
CUMULATIVE
FAULT
AUTOLOAD
REPOSITION
TAPE

Your selection [<cr> = none]>

OUTPUT FORMAT:

The specified log has been initialized.



FOR HP INTERNAL USE ONLY

CONFIGS

USAGE:

This command allows the user to read and/or set any standard device configuration value. The user will need access to and understanding of the documentation for the configurations which can be set (this can be found in the diagnostic ES for the device). Furthermore, many configuration items require passwords which are intended for restricted service personnel only.

The default value supplied for each configuration value prompt is the value as it currently exists in the device. If this default is taken, no change is even attempted so that power-on settings cannot be accidentally changed if power-on configuration by the host happens to be enabled. Thus, values for any configuration can safely be read without change by simply defaulting the new value (by entering <cr>) for the item selected.

SYNTAX:

```
CONFIGS [start# [/ end#]]
CNF
```

Where *start#* and *end#* are both valid configuration item numbers (>=40,<=207) and *start#* <= *end#*.

Note that *end#* is optional. Note also that some values may not be valid for the device. In this case, the next highest valid value will be used.

DATA PROMPTS:

NOTE: Default values = current setting. Configuration values will NOT be changed if the response is defaulted. {This note is issued only once at the beginning of each session}

{The following is issued for each configuration item.}

```
Configuration item #nn = nn.
Enter the new value      (0..255) [nnn]      >
```

{The following is issued if no range or an invalid range is given}

```
Enter configuration to set      (0..101) [<cr> = quit]>
Configuration item #nn = nn.
Enter the new value      (0..255) [nnn]      >
```

OUTPUT FORMAT:

Configuration item ! remains at !.

{or}

Configuration item ! is now at !.

FOR HP INTERNAL USE ONLY

DECODE

USAGE:

This command enables the user to interactively decode front panel error codes and FRU codes.

SYNTAX:

DECODE
DC

DATA PROMPTS:

{For HP7979/80}

Specify codes:

ERROR# (\$0..\$fff) [\$0]>
FRU 1# (0..255) [0]>
FRU 2# (0..255) [0]>
TEST # (0..255) [0]>

OUTPUT FORMAT:

Error Class - *error group according to device ERS*
[Detection - *while name of detecting action*]
[- *by name of detecting processor/program*]
[- *(nnn) name of detecting test*]
Explanation - *(hhh) error explanation as listed in device ERS*
Faulty FRUs - *(nn) FRU name as listed in device ERS*
[- *(nn) FRU name as listed in device ERS*]

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EXIT

USAGE:

This command terminates execution of the External Exerciser. It may be entered any time the REELDIAG> prompt appears.

SYNTAX:

EXIT

DATA PROMPTS:

None

OUTPUT FORMAT:

End of Section 50 -- INTERACTIVE EXTERNAL EXERCISER

FOR HP INTERNAL USE ONLY

HELP

USAGE:

This command provides the user with access to information concerning the commands that are available in the external exerciser. The user may request a list of all available commands accompanied by a brief description of each, or individual command descriptions. Individual command help contains a brief explanation of usage and describes command syntax.

SYNTAX:

HELP [*command name*|ALL]
?

OUTPUT FORMAT:

{If no parameter is specified, the following table of available commands will be displayed:}

DISPLAYS	TESTS	UTILITIES	COMMANDS	OTHER
HWSTATUS	LOOPBACK	CLEARDEV	IRM	CANCEL
IDENTIFY	MOTIONCHECK	CLEARLOG	LOADTAPE	EXIT
LOGS	SELFTEST	CONFIGS	REWIND	HELP
	TREES	DECODE	UNLOADTAPE	REFRESH
	WORKOUT			SUSPEND

FOR HP INTERNAL USE ONLY

{If ALL is specified, the following alphabetical list with brief explanations will be displayed: }

CLEARDEV	- Resets device to known state.
CANCEL	- Aborts the function for which the user is currently being prompted for data. (May be used at any prompt.)
CLEARLOG	- Resets user specified device internal log.
CONFIGS	- Allows internal reconfiguration of drive.
DECODE	- Decodes error messages as displayed on the front panel of the drive.
EXIT	- Terminates Interactive External Exerciser.
HELP	- Displays descriptions of exerciser commands.
HWSTATUS	- Obtains and displays device hardware status.
IDENTIFY	- Displays device identification information, including product code, firmware revs, etc.
IRM	- Enables/disables Immediate Response Mode.
LOGS	- Displays various device internal logs.
LOADTAPE	- Loads a tape (on auto-loading drives) and places drive on-line.
LOOPBACK	- Tests HPIB link to device.
MOTIONCHECK	- Exercises drive's ability to skip files & records.
REWIND	- Rewinds the loaded tape to BOT.
REFRESH	- Redispays the current prompt (and associated menu).
SELFTEST	- Executes of user specified sequence of device selftests.
SUSPEND	- Suspends execution of REELDIAG so that other DUI commands can be executed.
TREES	- Executes user specified REELDIAG diagnostic trouble tree.
UNLOADTAPE	- Rewinds and unloads a tape (auto-loading drives).
WORKOUT	- Checks drive's basic ability to write & read data.

{If a command name is specified, a message similar in form to the following for HELP (i.e., REELDIAG> help help) will be displayed:}

HELP [*command name*|ALL]

This command provides the user with access to information concerning the commands that are available in the external exerciser. The user may request a list of all available commands accompanied by a brief description of each, or individual command descriptions. Individual command help contains a brief explanation of usage and describes command syntax.

FOR HP INTERNAL USE ONLY

HWSTATUS

USAGE:

This command will obtain the current hardware status from the device and display it in readable text form.

On-line diagnostic utilities LOGTOOL and IOTT should be consulted for decoding status which has been obtained by other means.

SYNTAX:

HWSTATUS
HS

DATA PROMPTS:

None

OUTPUT FORMAT:

=====

DEVICE STATUS			
---------------	--	--	--

=====

RAW FORM:

Register	Hex Value	DIO Map	Decimal Value(s)
#1	hh	87654321	bbbbbbbb
#2	hh	bbbbbbbb	
#3	hh	bbbbbbbb	
#4	hh		nn, nn
#5	hh		nnn
#6	hh		nnn

INTERPRETED DRIVE STATUS:

Tape drive is [ON-line, OFF-line]
Immediate Response Mode is [ENABLED, DISABLED]
* Device has been CLEARED/POWERED-ON since last command
* Drive door is OPEN

INTERPRETED TAPE STATUS:

Tape is Write [ENABLED, PROTECTED]
Tape density is [800cpi, 1600cpi, 6250cpi, 6250-COMPRESSED,
UNKNOWN/INVALID, UNRECOGNIZED]
Tape position is [BOT, EOF, past EOT], UNKNOWN, UNRECOGNIZED]
* Tape RUNAWAY condition detected
* Data TIMING error detected

FOR HP INTERNAL USE ONLY

INTERPRETED I/O STATUS:

Last command was [REJECTED, ACCEPTED, ACCEPTED but FAILED]

- Last command was retried *nnn* times

* Reject Class : [DEVICE reject, PROTOCOL reject,
SELFTEST failure, #n]

* Error location : [CONTROLLER, SERVO, FORMATTER, UNRECOGNIZED]

* Error #*hhh* - *error explanation*

* HPIB Command Parity Error detected

* Unrecovered Data PARITY error detected

* Unrecovered Data/Format Error (NTE)

* RECOVERED error detected (STE)

* WARNING: The above status contains the following inconsistencies:

(one or more of the following as appropriate:)

- Conflicting tape density indicators
- Conflicting tape position indicators
- Conflicting error location indicators
- Conflicting retry count and/or error recovery flags
- Conflicting command status, reject reason, and/or error explanation
- A problem was indicated, but no explanation was provided in Register 5
- Register 5 implies a(n) [DEVICE reject,
FORMATTER,
CONTROLLER,
SERVO/tape position,
PROTOCOL reject,
unrecovered data/format]
error but this is not fully indicated.

FOR HP INTERNAL USE ONLY

IDENTIFY

USAGE:

This command requests device identification information from the drive. The HPIB code returned by the device as well as the product number (if determined) will be displayed. Note that since newer drives can masquerade as older drives with respect to HPIB, these two numbers may not necessarily be in agreement.

SYNTAX:

IDENTIFY
ID

DATA PROMPTS:

None

OUTPUT FORMAT:

```
===== DEVICE IDENTIFICATION =====  
  
HPIB code    = hhh - Device is recognized as a  
              reel tape drive.  
Product      = HPnnnc  
Available  
densities   :  
              density (e.g. 1600 PE)  
density (e.g. 1600 PE) :  
              :  
              :  
RAM          : nnn KBytes  
Firmware     :  
              processor name nn.nn.nn  
              processor name nn.nn.nn  
              :  
              :
```

{NOTE that this is identical to section 3 of REELDIAG}

ERROR MESSAGES:

The user will be informed if the device is either not a tape drive or is a tape drive but not diagnosed by REELDIAG.

Since complete identification involves several different tape commands, the failure of one command may make the determination of remaining items impossible.

FOR HP INTERNAL USE ONLY

IRM

USAGE:

This command is used to enable or disable immediate response mode on the drive. Drives will require this to be enabled in order to stream.

SYNTAX:

IRM

DATA PROMPTS:

Immediate Response Mode? (on|off) [!]>

OUTPUT FORMAT:

Immediate Response Mode is now !. {! = enabled|disabled}

FOR HP INTERNAL USE ONLY

LOADTAPE

USAGE:

This command causes the automatic loading to be initiated. The drive will also be placed on-line if not already so. The command makes sense only for those drives which automatically load tapes (i.e., command is not available for HP7974s or HP7978s).

SYNTAX:

LOADTAPE
LT

DATA PROMPTS:

None

OUTPUT FORMAT:

Tape was successfully LOAded.

FOR HP INTERNAL USE ONLY

LOGS

USAGE:

This command displays the contents of a portion of the device logs. The user must specify which portion or form is to be displayed. The displays will be identical to those obtained by running section 7 of REELDIAG.

SYNTAX:

LOGS [*log specifier*]

log specifier:

- ALL - All of the following logs will be displayed
- CONFIGS - Device power-on configuration values
- CONTROLLER - Device controller log (e.g. gains, drive repositioning stats, etc.)
- CUMULATIVE - Cumulative soft error rates
- FAULT - Hard errors
- MAINTENANCE - Maintenance info (e.g. tape odometer, device clock, battery date, etc.)
- RAW - The entire log in hex
- TAPE - Soft error rates for last 20 tapes

DATA PROMPTS:

Which log is to be displayed?

ALL
CONFIGS
CONTROLLER
CUMULATIVE
FAULT
MAINTENANCE
RAW
TAPE

Your selection [<cr> = none]>

FOR HP INTERNAL USE ONLY

OUTPUT FORMAT:

{For CONFIGS:}

 POWER-ON CONFIGURATION VALUES

```

FRONT PANEL
  Allow FP configuration change      ENABLED|DISABLED
  Front panel media removal          ENABLED|DISABLED

  Prompt for archival rewind         ENABLED|DISABLED
  Prompt for data compression        ENABLED|DISABLED
  Operator selection time-out        DISABLED|nn

  Front panel language               ENGLISH|GERMAN|FRENCH|SPANISH
  Activity indicator symbol          "-"|"--"|"*"
  Gauge usage                         "BOT ..... EOT"|
                                       "Data in buffer ....."|
                                       "Queued commands/reports....."

GENERAL CONTROL
  Allow FP configuration change      ENABLED|DISABLED
  Allow host configuration change    ENABLED|DISABLED

  Default write density              HOST|NONE|800|1600|
                                       6250|COMPRESSED
  FP density control lock            ENABLED|DISABLED
                                       [HOST override]
  Auto on-line                       ENABLED|DISABLED
  Archival rewind                    ENABLED|DISABLED
                                       [OVERRIDE prompt]
  Stop on failure                    ENABLED|DISABLED
  Report recovered errors            ENABLED|DISABLED

WRITE
  Immediate response mode            ENABLED|DISABLED
  Tape mark count to terminate
    immediate response mode         DISABLED|nn
  Retry count                         nn
  Gap size
    800cpi (NRZI)                   MIN = n.nn" MAX = n.nn"
    1600cpi (PE)                     MIN = n.nn" MAX = n.nn"
    6250cpi (GCR)                   MIN = n.nn" MAX = n.nn"
  EOT stop                           ENABLED|DISABLED
  Holdoff time-out                   nn
  Startup point (8ths of memory)     n
    
```

FOR HP INTERNAL USE ONLY

DATA COMPRESSION

Default	COMPRESSED UNCOMPRESSED [OVERRIDE prompt]
Front panel request	COMPRESSED UNCOMPRESSED
Host request	COMPRESSED UNCOMPRESSED
Host override of front panel	ENABLED DISABLED
Resulting request	COMPRESSED UNCOMPRESSED
Expansion Protection	ENABLED DISABLED
Max record size	nnn Kbytes
Max record tape marks	nnn
Max record bytes	nnnn Kbytes
Max access tape marks	nn
Max access bytes	nnnn Kbytes
Record optimization threshold	nn:1
DC optimization threshold	nn:1
DC optimization sample period	nnnn Bytes

READ

Readahead mode	ENABLED DISABLED
Tape mark count to terminate readahead mode	DISABLED nn
Retry count	nn
Trailing buffer	n records (nn Kbytes)
Startup point (8ths of memory)	n

INTERFACE

Unload after rewind off-line	ENABLED DISABLED
Device Emulation	HP7974 HP7978 HP7979 HP7980 HP7981



FOR HP INTERNAL USE ONLY

{For CONTROLLER:}

CONTROLLER STATISTICS

Drive Repositioning:

Forward reposition error - mean nn mils
Forward reposition error - variance nn mils squared

Reverse reposition error - mean nn mils
Reverse reposition error - variance nn mils squared

Tape Auto Load:

Loads attempted nnnnn
Successful loads nnn%
Successful loads requiring retries nnn%

Gap Gains:

	800 (NRZI)	1600 (PE)	6250 (GCR)
Track 1	hhhh	hhhh	hhhh
2	hhhh	hhhh	hhhh
3	hhhh	hhhh	hhhh
4	hhhh	hhhh	hhhh
5	hhhh	hhhh	hhhh
6	hhhh	hhhh	hhhh
7	hhhh	hhhh	hhhh
8	hhhh	hhhh	hhhh
9	hhhh	hhhh	hhhh
Average	hhhh	hhhh	hhhh

FOR HP INTERNAL USE ONLY

{For CUMULATIVE:}

 CUMULATIVE SOFT ERROR RATES

800cpi (NRZI)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	
	{and/or}		

1600cpi (PE)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	
	{and/or}		

6250cpi (GCR)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

FOR HP INTERNAL USE ONLY

{For FAULT:}

=====

ERROR LOG

=====

----- 01 -----

Error Class - error group according to device ERS
[Detection - while name of detecting action]
[- by name of detecting processor/program]
[- (nnn) name of detecting test]
Explanation - (hhh) error explanation as listed in device ERS
[Faulty FRUs - (nn) FRU name as listed in device ERS]
[- (nn) FRU name as listed in device ERS]
Cumltv Time - nnnnn:nn:nn
Lapsed Time - nnnnn:nn:nn
{or} Clock reset since last error
NOTE: Error occurred during power-on selftest.

----- 02 -----

:

:

----- nn -----

FOR HP INTERNAL USE ONLY

{For MAINTENANCE:}

MAINTENANCE INFO

```

Clock      : nnnnn:nn:nn
Tape odometer : nnnnnnnnnnnnn.n feet
RAM odometer : nnnnnnnnnn
Power cycles : nnnnn
Battery date : 'nn
Versions:
  processor  nn.nn.nn
           :
           :
           :
    
```

{For RAW}

RAW DUMP

```

          0  1  2  3  4  5  6  7  8  9
WORDS -----
0| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
10| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
20| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
   :   :   :   :   :   :   :   :   :   :
   :   :   :   :   :   :   :   :   :   :
    
```

{For TAPE:}

CURRENT TAPE ERROR RATE

nnnneci (ccc)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

FOR HP INTERNAL USE ONLY

ERROR RATE LOG

```
----- 01 -----  
  
nnncpi (ccc)      READ      WRITE      TOTAL  
-----  
Hard Errors      nnnnn      nnnnn      nnnnn  
Soft Errors      nnnnn      nnnnn      nnnnn  
Bytes Processed  n X 10**nn  n X 10**nn  n X 10**nn  
Bytes/Soft Error n X 10**nn  n X 10**nn  n X 10**nn  
  
Load Time      - nnnnn:nn:nn  
  
----- 02 -----  
:  
:  
----- nn -----
```

FOR HP INTERNAL USE ONLY

LOOPBACK

USAGE:

This command tests the HPIB Communication Link between the host and the selected tape drive. A 256 byte pattern is sent on the HPIB channel to the mag tape controller. The same number of bytes is read back out and the resulting pattern compared with the original.

SYNTAX:

LOOPBACK
LB

DATA PROMPTS:

None

OUTPUT FORMAT:

Tape Drive data channel checks out OK.

{OR}

The following transmission errors were detected during the channel loopback test:

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
-----	-----	-----	-----
nn	hh	hh	bbbbbbbb
{EXAMPLE:}			
12	56	54	00000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.
.	.	.	.

FOR HP INTERNAL USE ONLY

MOTIONCHECK

USAGE:

This command checks out basic tape movement functions of the drive. The tape will be partially erased and rewound. A set of 5 files (20 records each) will be written to tape and the tape rewound. The following sequence will then be executed:

```
+ = forward space
- = backward space

+ 1 files
  read record (to verify position : 2,1)
- 2 file
  read record (to verify position : 1,1)
+ 1 record
  read record (to verify position : 1,3)
- 2 records
  read record (to verify position : 1,2)
+ 3 files
- 4 files
+ 2 files
- 1 files
  read record (to verify position : 3,1)
+11 records
- 4 records
+11 records
-19 records
+ 2 records
  read record (to verify position : 3,4)
+ 4 files
  verify tape runaway
  rewind
- 2 records
  verify past BOT
- 2 files
  verify past BOT
```

Since this function may cause data to be written to or read from tape, REELDIAG will prompt the user for confirmation before reading or writing tape if a tape is found already loaded prior to the first R/W operation.

FOR HP INTERNAL USE ONLY

SYNTAX:

MOTIONCHECK
MC

DATA PROMPTS:

None

OUTPUT FORMAT:

No unexpected errors were encountered on Motion check.
{or}

Expected position : record #nn of file nn
Detected position : record #nn of file nn

*** MOTIONCHECK FAILED. (REELDIAG 05054)

FOR HP INTERNAL USE ONLY

REWIND

USAGE:

This command causes the tape mounted on the drive to be rewound to BOT. The user has the option of leaving the tape on-line or off-line at the end of the operation.

SYNTAX:

```
REWIND [OFFLINE|ONLINE]
RW
```

where:

```
OFFLINE - puts the drive off-line at the end of the rewind.
ONLINE  - leaves the drive on-line at the end of the rewind.
```

DATA PROMPTS:

{If the user does not provide a parameter, the following will be issued: }

```
How should drive be left? (ONLINE|OFFLINE) [ONLINE]>
```

OUTPUT FORMAT:

```
REWIND of tape was successful.
```


FOR HP INTERNAL USE ONLY

SELFTEST

USAGE:

This command will initiate internal diagnostic tests which reside in the tape drive. The tests which can be selected are device dependent and are fully described in the support documentation for each type of tape drive. The user will be prompted for all needed information but will require the aforementioned support documentation to select correct selftest numbers and parameter values.

The selftest may be automatically repeated up to 10,000 times. The execution count used is implemented at the diagnostic level and NOT within the device. The selftest request will be issued until the specified execution count is reached or until the selftest fails. The user can abort the selftest request by entering a loop count of 0. Once the selftest sequence has been started, the user may abort via the program interrupt which is conventional on the local system (CNTL-Y on MPEXL, CNTL-C on HPUX).

SYNTAX:

```
SELFTEST
ST
```

DATA PROMPTS:

```
Selftest number.      (0..255) [<cr>=quit>
{
{parameter prompts are conditional depending on the}
{selftest number}
Parm A                (0..255) [0]>
Parm B                (0..255) [0]>
Parm C                (0..255) [0]>
Specify loop count (0..10000|infinite)[1]>
```

{If the selected selftest is valid but requires manual interaction at }
{the device (other than loading a tape), the following will be issued:}

* Warning - Selftest (nnn) requires manual interaction at the device.

Do you wish to continue anyway? (yes|no) [NO]>

{If "yes" is selected}

This test will terminate in 7 minutes if you do not terminate it
sooner from the front panel of the device.

FOR HP INTERNAL USE ONLY

OUTPUT FORMAT:

nnnnnnnn out of nnnnnnnn iterations were completed.

{The following conforms to section 3.4.4 of this document.}
No faulty Field Replaceable Units (FRUs) were detected
by device diagnostic #nnn.

{or}

Device diagnostic #nnn detected the following failure:

```
      Error Class - error group according to device ERS
      [Detection  - while name of detecting action      ]
      [           - by name of detecting processor/program ]
      [           - (nnn) name of detecting test         ]
      Explanation - (hhh) error explanation as listed in device ERS
      Faulty FRUs - ( nn) FRU name as listed in device ERS
      [           - ( nn) FRU name as listed in device ERS ]
```

{or}

Device diagnostic #nnn was unable to either run to completion
and/or isolate an FRU. Error returned:

```
      Error Class - error group according to device ERS
      Explanation - (hhh) error explanation as listed in device ERS
```

ERROR MESSAGES:

Special warnings will be given the user upon selection of an invalid
selftest code, depending on the code selected. In most cases the user
will be prompted for a valid selftest.

***SELFTEST ! IS NOT IMPLEMENTED BY THE SELECTED DEVICE.

{or}

* Warning - Selftest (!) requires manual interaction at the device
and/or returns results only to the front panel.

Do you wish to continue anyway? (yes|no) [NO]>

{or}

*** SELFTEST ! IS NOT APPROPRIATE FROM A REMOTE TERMINAL.

```
-- Use CONFIGS instead.
-- Use SHOW LOGS instead.
-- Use IDENTIFY instead.
-- Remote command sequences are unimplemented.
```

FOR HP INTERNAL USE ONLY

SUSPEND

USAGE:

This command temporarily suspends running of the diagnostic, allowing the user to issue other DUI commands. This feature should be handy for retaining any default values accumulated by WORKOUT or other REELDIAG functions. To return to REELDIAG, the user simply enters "resume" at the DUI prompt.

SYNTAX:

SUSPEND

DATA PROMPTS:

None

OUTPUT FORMAT:

DUI>

FOR HP INTERNAL USE ONLY

TREES

USAGE:

This command causes one of REELDIAG's diagnostic trouble trees to be executed.

SYNTAX:

TREES [*tree specifier*]

tree specifiers:

ALL	- All of the following
IOPATH	- Does not require restrictive access to device.
ELECTRONICS	- Requires exclusive access to device.
READWRITE	- Requires exclusive access & operator assistance.
MEDIA	- Requires exclusive access & operator assistance.

DATA PROMPTS:

Which tree is to be executed?

ALL
IOPATH
ELECTRONICS
READWRITE
MEDIA

Your selection [<cr> = none]>

FOR HP INTERNAL USE ONLY

UNLOADTAPE

USAGE:

This command causes the automatic unloading to be initiated. The request will be honored even if the tape has not been rewound. The command makes sense only for those drives which automatically load tapes (i.e., command is not available for HP7974s or HP7978s).

SYNTAX:

UNLOADTAPE
ULT

DATA PROMPTS:

None

OUTPUT FORMAT:

Tape was successfully UNLOADed.

FOR HP INTERNAL USE ONLY

WORKOUT

USAGE:

Introduction

This command provides the user with a way to read and write to tape in a variety of ways. This function should be useful in isolating medium vs. drive problems, verifying media, isolating certain classes of read/write problems, and simulating system use of the tape drive.

This command will cause records to be written to tape, the tape rewound, and those same records read back off the tape. The user will have the option of whether or not to verify that the records read match those written earlier. The user will be able to vary the write density record sizes (file size will be a constant 20 records per file), record content, number of files per tape, and number of tapes. In addition, the command has certain built-in error count limits, but these can be overridden.

This command will always clear the drive's internal error log prior to writing to the tape. The user will be warned of this and may then back out of the command to look at and/or record the log by typing CANCEL at any prompt.

Since this function may cause data to be written to or read from tape, REELDIAG will prompt the user for confirmation before reading or writing tape if a tape is found already loaded prior to the first R/W operation. The tape will be rewound and left on-line at the end of this command.

Data Selection

Data will be written as constant 20 record files. However, file size can be varied indirectly by manipulating record size. The record size choice will be limited by the minimum and maximum record size for the selected device, selected write density, and interface (60K for HPIB0). Selection of the "MIXTURE" option will vary record sizes between different files. In this case, the following pattern will be repeated until the specified number of files (see below) is reached:

```
1 file MAX byte records
: : : : (in 16 Kbyte increments)
1 file 16 kbyte records
1 file 4 kbyte records
1 file 256 byte records
1 file MIN byte records
1 file 256 byte records
1 file 4 kbyte records
1 file 16 kbyte records
: : : : (in 16 kbyte increments)
1 file MAX byte records
: : : : (in 16 kbyte increments)
1 file MIN byte records
```

FOR HP INTERNAL USE ONLY

There will be a choice of byte patterns to be written to the tape. Each record will consist of repetitions of the pattern up to the record size limit specified. The "SEQUENTIAL" pattern writes the pattern 0,1, ... 254,255 (00.ff hex). The "ALTERNATING" pattern alternates between 00 and ff (all 0s and all 1s). The "BUTTERFLY" pattern attempts to change as many bits as possible in each successive non-repeating character - 0,255,1,254,3, ... (00,ff,01,fe,03, ...). If "SINGLE CHARACTER" is selected, the user will be prompted for a character (in hexadecimal representation). Each record is then filled with repetitions of that single character. "WORST CASE" data varies according to density format (i.e., NRZI, PE, GCR). Patterns to be sent in each of these cases are as follows:

```
NRZI (800 bpi) - 00,00,...
PE (1600 bpi) - ff,ff,ff,f0,0f,00,00,00
GCR (1600 bpi) - 04,20,98,bc,20,04,bc,00
```

The number of files to be written per tape must be specified. The EOT option will allow continuous writes to the end of tape, however many records that turns out to be. In addition the number of tapes to be written is specified. Any number between 1 and 10000 is valid. Note that in this context, a tape to be written does not refer to an actual medium change, but rather to the cycle of "write records, rewind, read records, and rewind".

Data Verification

The ultimate success of the write/read operation can be determined by specifying record verification. This option will compare each record read to what this program originally sent, displaying any discrepancies. The user should note that this option may have a substantial effect on streaming since it slows the rate at which REELDIAG can read and accept new records. Normally, the first 10 character mismatches for any given record will be sufficient to identify a problem. However, the user will be allowed to specify any mismatch display limit.

The user will be notified if verification is prematurely disabled for any reason. Verification will be disabled for the current tape when any of the following conditions occur:

- A hard read/write error occurs.
- The specified record write/read mismatch limit is reached.

FOR HP INTERNAL USE ONLY

Error Processing

REELDIAG sorts hard errors into three major categories - fatal, ignorable, and recoverable. Fatal errors are serious enough to cause the remainder of processing for a particular tape to be aborted. In such a case, the appropriate error message(s) will be issued and the user will be returned to the REELDIAG> prompt.

Recoverable hard errors are those which may be corrected by REELDIAG. These include:

HPIB error	REELDIAG action
5 -write protection	Correct or prompt user to do so
11 -drive not on-line	Correct or prompt user to do so
-tape runaway	Rewind & start next tape

Ignorable errors are read/write hard errors for which the drive has already performed retries and tape repositioning. The user will be able to specify the number of ignorable errors to tolerate for each tape before that tape is aborted. If the user specifies a limit greater than one, no recovery will be attempted, but the processing will continue, despite the fact that the drive may have purged many records from its buffer. In addition, record verification will be disabled for that tape. The following HPIB error codes are considered ignorable:

READ	WRITE
41	41
45	45
47	
48..49	48..49
50..54	50..54
57..64	57..64
103..106	103..106

The user should note that even a failure due to exceeding the retry limit is considered ignorable, even though this may result in a tape runaway condition on a subsequent read.

If any of the following conditions is met, execution of the defined sequence for the current tape will cease, the tape will be rewound and processing of the next tape will be initiated.

- The number of files specified by the user has successfully been processed.
- The specified limit of ignorable read/write hard errors has been reached.
- The specified limit of record write/read mismatches has been reached.

Normally, execution of this command will cease when any of the following conditions is met:

- The number of tapes specified by the user has been processed.
- A fatal hard error occurs (e.g., loss of tension, rewind failure, etc.).
- The user stops processing with the program interrupt which is conventional on the local system (CNTL-Y on MPEXL, CNTL-C on HPUX). The user will be returned to the REELDIAG> prompt.
- The specified number of fatal hard errors has been reached.

The device internal log is a circular queue, so that if the specified error limit has been reached, the most recent errors will be available when the command finally terminates.

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Sequences

The user will select one of several different read/write sequences. The user-defined sequence allows the user to select all of the pertinent parameters. The others run the workout with preselected values.

SHORT Sequence

The short sequence is intended to provide a brief checkout of basic functionality of the drive. Normally, the user will not suspect anything is wrong with the drive and will use this to verify that assumption.

For each of the content patterns listed below enough files will be written to tape to accommodate all of the record sizes in the mixture option. This will then be repeated for all densities available on the selected drive. The user will be able to select a loopcount for the entire sequence. The following values will be selected:

Write density	= (all available)
Record size	= mixture
Content pattern	= all 0s then all 1s then alternating then worst case
Number of files/tape	= 15
Number of tapes	= (user specified)
Soft error display	= no
Record verification	= yes
Mismatch display limit	= 10
Mismatch record limit	= 10
Ignorable hard error limit	= 1
Fatal hard error limit	= 1

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LONG Sequence

The long sequence is also intended to check out a drive which is not suspected of failing (i.e., new or just repaired). Since this sequence writes to end of tape several times, users should select a length of tape appropriate to their time constraints.

For each of the content patterns listed below, 16KByte records will be written to the end of tape (EOT). This will then be repeated for all densities available on the selected drive. The user will be able to select a loopcount for the entire sequence. The following values will be selected:

Write density	= (all available)
Record size	= 16KBytes
Content pattern	= all 0s then sequential then worst case
Number of files/tape	= EOT
Number of tapes	= (user specified)
Soft error display	= no
Record verification	= yes
Mismatch display limit	= 10
Mismatch record limit	= 10
Ignorable hard error limit	= 10
Fatal hard error limit	= 1



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MEDIACHECK Sequence

The mediacheck sequence checks an entire tape to determine if it is good. The user will select the density to be written to the tape. The number of any record which has been retried will be displayed along with the number of retries. Soft errors are tallied and displayed at the end as an indication of overall tape condition. The following values will be selected:

Write density	= (user specified)
Record size	= max
Content pattern	= all 1s
Number of files/tape	= EOT
Number of tapes	= 1
Soft error display	= yes
Record verification	= yes
Mismatch display limit	= 10
Mismatch record limit	= 10
Ignorable hard error limit	= 100
Fatal hard error limit	= 1

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SYNTAX:

WORKOUT [*workout specifier*]

WO

workout specifier

- SHORT - Quick check of read/write capabilities (<5min.)
- LONG - Extended check of read/write capabilities
- MEDIACHECK - Checks condition of loaded tape (destructive)
- USERDEFINED - User is prompted for read/write parameters

DATA PROMPTS:

{The defaults shown for all prompts are the initial values for the}
{first call to workout after entering the interactive section.}
{Thereafter, the values from the previous call will be default. }

{If the workout type is not specified as a command qualifier, the}
{user will be prompted for that information. }

Specify workout:

(short
long
mediacheck
userdefined)

Your selection [USERDEFINED] >

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{For all options, the following will be issued}

WARNING - This command clears the drive's internal hard error log.
If this is not desired, type "cancel" at any prompt.

{If "userdefined" is selected, the following prompts will obtain }
{the required parameters. The other media sequence options may }
{use one or more of these prompts as well. } }

Specify write density:
(NRZI800|PE1600|GCR6250|COMPRESSED) [PE1600]>
Specify record size in bytes:
(min..maz[mixture] [MIXTURE]>

Specify content pattern:
(sequential [ff,00,01,02,..fe]
alternating [00,ff,00,ff,..]
butterfly [00,ff,01,fe,..]
single [you will be prompted]
worst [density dependent])

Your selection [SEQUENTIAL]>

[Specify the desired character: (\$\$00..\$\$ff) [\$\$ff]>
Specify number of 20 record files per tape:
(1..10000|EOT) [10]>
Specify number of tapes (sequence repeats):
(1..10000|infinite) [1]>
Should soft error counts be displayed? (yes|no) [NO]>
Do you wish to verify records? (yes|no) [NO]>
[Specify verification display limit?
(mismatches per record): (1..10000) [10]>
Specify maximum error limits:
[Mismatched records/tape: (1..10000) [10]>
Ignorable r/w errors/tape: (1..10000) [1]>
Total fatal hard errors (max log size = nn): (1..10000) [1]>

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OUTPUT FORMAT:

{The user will be warned of any hard errors even if nonfatal}

*WARNING - A FATAL hard error occurred while attempting to
write record !. (REELWARN 07035)

*WARNING - An IGNOREABLE hard error occurred while attempting to
write record ! of file !. (REELWARN 07036)

*WARNING - A FATAL hard error occurred while attempting to
read record !. (REELWARN 07037)

*WARNING - An IGNOREABLE hard error occurred while attempting to
read record !. (REELWARN 07038)

{If soft error display is selected, the following display will occur:}

Record nnnnnnnn of file nnn was retried nn times

Record nnnnnnnn of file nnn was retried nn times

: : : : :
: : : : :

A total of nnnnnnnn retries were made on nnnnnnnn records.

{If verification mode was selected, any mismatches found during the
read phase will be shown as follows:}

*** RECORD READ DOES NOT MATCH THE DATA ORIGINALLY SENT. (REELERR 50xx)

File : nnnnnnnnn Bytes written : nnnnn
Record : nn Bytes read : nnnnn

Byte #	Hex Value Written	Hex Value Read	Erroneous bits
nnnnnn	hh	hh	bbbbbbbb

{EXAMPLE:}

12	56	54	00000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.

{If the specified mismatch display limit is exceeded, the }
{following message will be displayed: }

Verification display has been SUPPRESSED for the rest of this record.

{Any time verification has been disabled, one or more of the
following messages will be displayed as appropriate:}

* WARNING - Data verification has been DISABLED for the rest of
this tape. (REELWARN 7034)

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- nnnnn records failed verification.
- fatal hard error encountered.
- write operation produced ignorable hard errors.

{One of the following summary messages will be displayed as appropriate:}

- WORKOUT complete - nnnnn fatal hard errors were detected.
- nnnnn ignorable hard errors were detected.
 - nnnnn records failed verification.
 - nnnnn records were retried.

{OR}

- *** WORKOUT ABORTED -- HARD ERROR LIMIT REACHED. (REELERR 5047)
- nnnnn fatal hard errors were detected.
 - nnnnn ignorable hard errors were detected.
 - nnnnn records failed verification.
 - nnnnn records were retried.

Error and Warning Messages

The following are general error/warning messages which may be encountered during the execution of REELDIAG. The system dependent error messages may be displayed by the subsystem along with any error message generated by this diagnostic. All error messages without the (REELERR #) trailer are generated by the subsystem. Errors which have explanatory notes (preceded by --) will normally display only one of the notes listed here. The "!" indicates the point at which context-dependent information is to be placed.

05000	*** THE SUPPLIED BUFFER IS TOO SMALL FOR REQUESTED TRANSFER OF ! BYTES. (REELERR 05000)
CAUSE	The device attempted to return more data than the program was capable of receiving. Normally, the program should know how many bytes to expect for each message, so this is indicative of either 1) a device problem, or 2) a device update which has not yet been incorporated into the diagnostic program.
ACTION	Isolate which of the above causes applies. If 2, then notify your support engineer.
05001	*** TAPE DRIVE FAILED TO COMPLY WITH REQUEST. (REELERR 05001) RESULTING HARDWARE STATUS:
CAUSE	The tape drive has acknowledged a request but refuses to comply. Normally the reason for the refusal is contained in the I/O status block which is displayed following this message.
ACTION	Correct any problems indicated by the status display (e.g. remove write ring from tape, place drive on-line, etc.) and then retry the diagnostic.
05002	*** REELDIAG ABORTING DUE TO FATAL ERROR. (REELERR 05002)
CAUSE	This diagnostic has detected an error from which it cannot or should not recover.
ACTION	Correct problems indicated by previous error messages and then rerun the diagnostic if appropriate.
05003	*** UNABLE TO OBTAIN COMPLETE IDENTIFICATION OF DEVICE. (REELERR 05003)
CAUSE	REELDIAG was unable to obtain device logs from the drive. Therefore, some identification information could not be determined. However, the device did respond to an identify command (supplied HPIB code).
ACTION	The program will attempt to do all functions possible with the information it does have. If this is not satisfactory, take further action based on I/O status returned.
05004	*** UNEXPECTED ERROR RETURNED BY THE DIAGNOSTIC SYSTEM. (REELERR 05004)
CAUSE	An unexpected condition arose which is indicative of a problem outside this program.
ACTION	Report any immediately preceding errors to your support engineer.

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05005	*** UNEXPECTED ERROR ENCOUNTERED - LIKELY REELDIAG PROGRAM ERROR. REELDIAG ERROR LOCATION CODE = !. (REELERR 05005)
CAUSE	An unexpected condition arose which is indicative of an internal problem in this program. The error location code has meaning only to a support engineer in the context of the program source code.
ACTION	Notify your support engineer.
<hr/>	
05006	*** RECEIVED INVALID RESPONSE FROM DRIVE. A DATA PATH OR DEVICE ERROR IS INDICATED. (REELERR 05006)
CAUSE	A response was received from the device but is not recognized by this diagnostic.
ACTION	Further diagnosis of the drive is necessary. Run the loopback test (Section 4) to attempt to isolate the problem to the data path. If the device being tested is new and returns previously unused codes, modification of this program may eventually be necessary. In this case, notify your support engineer.
<hr/>	
05007	*** YOUR RESPONSE IS NOT A VALID INTEGER NUMBER. (REELERR 05007)
CAUSE	REELDIAG expected but did not receive an integer number as a response to a prompt for information.
ACTION	You should be reprompted for the same information. Check your previous entry for non-numeric characters and/or an invalid base indicator and enter numeric digits only.
<hr/>	
05008	*** YOUR RESPONSE IS INVALID. (REELERR 05008)
CAUSE	A response was entered by the user which was in some way inappropriate for the prompt given. One of the following submessages will be provided as a detailed explanation:
	-- ! is an unrecognized command; check spelling or type help for assistance.
	-- expected a numeric response.
	-- numeric response must fall between ! and !.
	-- response is not a valid integer number
	-- parameter "!" is unknown, is out of order, or is invalid for the command !.
ACTION	Re-enter requested data or type "HELP" for prompt specific information. Data prompts often contain a range of valid responses enclosed in parentheses.
<hr/>	
05009	*** AN HPIB CODE OF ! WAS RETURNED WHICH IS DIFFERENT FROM THE PREVIOUS CODE. (REELERR 05009)
CAUSE	The HPIB identification of the accessed device has changed in the middle of the diagnosis. This would be expected if a different device is physically substituted (via cable connections) for the original device. Otherwise a problem in the device, driver, or HPIB interface is indicated.
ACTION	REELDIAG considers this problem to be the same as being unable to identify the device at all and aborts further diagnosis. Cable connections should be checked for correctness.



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05010	*** DEVICE HARDWARE STATUS COULD NOT BE OBTAINED. (REELERR 05010)
CAUSE	REELDIAG is unable to obtain the device hardware status in either a response to a request or as an explanation of a failed request. Additional messages which further isolate the problem should precede this.
ACTION	Action is dependent on preceding error message(s). NOTE: This is an expected response for a loopback write failure. That is, when the device receives a faulty pattern from REELDIAG, it simply returns a failure status - neither a reply pattern nor an explanatory hardware status is returned.
<hr/>	
05011	*** UNABLE TO SATISFY REQUEST TO !. (REELERR 05011)
CAUSE	Some program request (substituted for !) could not be executed. Other explanatory messages should precede this. If the root cause was drive failure (REELERR 05001), this message will be preceded by a listing of the current hardware status for the drive. Note: Some sections make several different requests to the drive so that requests seemingly unrelated to the users actual request may be may fail. For example, section 3 (Identify) involves both an "identification" request and a "read log" request. In these cases, an additional error message will specify the actual failed request, made by the program on behalf of the user.
ACTION	Action is dependent on preceding error message(s) and device state as indicated in hardware status.
<hr/>	
05012	*** IMPRACTICAL OR IMPOSSIBLE TO COMPLETE REMAINDER OF SECTION !. (REELERR 05012)
CAUSE	The previous error was fatal to successful completion of the current section.
ACTION	Fix cause of previous error(s) and rerun this section of the diagnostic, if desired.
<hr/>	
05013	*** IMPRACTICAL OR IMPOSSIBLE TO COMPLETE REMAINDER OF STEP !. (REELERR 05013)
CAUSE	The previous error was fatal to successful completion of the current step.
ACTION	Fix cause of previous error(s) and rerun this step of the diagnostic, if desired.
<hr/>	
05014	*** UNABLE TO RETRIEVE REQUESTED INFORMATION FROM DATA BUFFER. (REELERR 05014)
CAUSE	The drive complied with the current request, but REELDIAG was unable to access information returned by the drive.
ACTION	Advisory only. Action dependent on preceding error message(s).
<hr/>	
05015	*** UNABLE TO OBTAIN DATA BUFFERS FOR TALKING WITH THE TAPE DRIVE. (REELERR 05015)
CAUSE	An area for data transfer between the device and REELDIAG could not be established in memory. Additional details should precede this message. The most likely cause is insufficient system resources (memory).
ACTION	Action dependent on preceding error message(s).
<hr/>	

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05016	*** UNABLE TO CONTINUE EXECUTION OF REQUESTED DIAGNOSTICS. (REELERR 05016)
CAUSE	Either access to the device could not be obtained, and/or fatal error internal to the diagnostic system occurred while trying to establish access to the device.
ACTION	Correct any immediately preceding error conditions and rerun the diagnostic if desired.
05017	*** UNABLE TO RETRIEVE ONE OR MORE COMMANDS FROM THE MESSAGE CATALOG. EXECUTION WILL PROCEED USING NUMBER CODED INPUT ONLY: NO : 20003 YES : 20004 Numbered panel commands are entered as usual. (REELERR 05017)
CAUSE	Either the message catalog is incorrect/corrupted or one or more commands are missing from the catalog.
ACTION	You will be given the choice to continue on a number code basis or not (you must answer in the numeric codes for yes/no). In any case, your support engineer should ensure that all commands and keywords are properly listed in the system catalog.
05018	*** UNABLE TO COMPLETELY DECODE HARDWARE STATUS. (REELERR 05018)
CAUSE	Some diagnostic program service unexpectedly failed, preventing complete decoding of device hardware status.
ACTION	The hardware status displayed should be consulted but with the understanding that some information may be misleading or missing. This is normally not expected so your support engineer should be notified.
05019	*** FAILED TO RECEIVE REPLY FROM THE DEVICE AFTER ! SECONDS. (REELERR 05019)
CAUSE	A reply from the selected device was not received within the specified time-out interval. Although this could result from extremely heavy system usage, the device or some intermediate hardware/software is probably not functioning properly.
ACTION	If you selected the "ERRPAUSE" parameter in the RUN command, you will be given the opportunity to retry the function by answering "YES" to the continuation prompt. More than one retry will probably be fruitless.
05020	*** SPECIFIED ERROR COUNT LIMIT HAS BEEN REACHED. (REELERR 05020)
CAUSE	The error limit specified in the "ERRCOUNT" parameter of RUN command has been reached, causing the diagnostic to abort further processing.
ACTION	If this is not desired, either omit the ERRCOUNT parameter or set it to a higher value.
05022	*** THE REQUESTED FUNCTION IS NOT CURRENTLY AVAILABLE ON THE SELECTED DRIVE. (REELERR 05022)
CAUSE	The requested function is not currently implemented by the diagnostic system for the device being tested.
ACTION	If this is unexpected, notify your support engineer.

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05023	*** THE REQUESTED COMMAND REQUIRES ! MODE. (REELERR 05023)
CAUSE	The user either did not or was not able to request a restrictive enough operation mode (exclusive) to execute the requested function.
ACTION	Consult the Diagnostic Program Development Guide for information on operation modes and how to request them. You may need to obtain additional security clearance from your system manager.
<hr/>	
05024	*** UNABLE TO RUN A DEVICE INTERNAL DIAGNOSTIC TEST. (REELERR 05024)
CAUSE	A selftest/diagnostic which REELDIAG requested the device to execute was either invalid or did not run to completion.
ACTION	Action is dependent on accompanying error messages and returned hardware status. If the requested test was not recognized by the device, an adjustment to REELDIAG may be necessary and your support engineer should be notified.
<hr/>	
05025	*** THE TIME STAMP RETURNED BY THE DEVICE WAS LARGER THAN EXPECTED BY REELDIAG AND THEREFORE COULD NOT BE DECODED. (REELERR 05025)
CAUSE	A time stamp greater than 6.8 years was found. Time stamps this large are not expected from any device.
ACTION	If this is not an error for the device being diagnosed, consult your support engineer.
<hr/>	
05026	*** UNABLE TO VERIFY DEVICE ID FOR DEVICE DEPENDENT OPERATION. (REELERR 05026)
CAUSE	REELDIAG was attempting to perform a function which requires knowledge of specific device identification information. That information could not be obtained, and therefore, REELDIAG could not take the appropriate action(s).
ACTION	Correct problems described by preceding messages and rerun diagnostic if desired.
<hr/>	
05027	*** REELDIAG WAS ASKED TO EXECUTE AN UNRECOGNIZED SECTION (!). (REELERR 05027)
CAUSE	This is strictly an internal error for REELDIAG or for the diagnostic subsystem.
ACTION	Non-fatal advisory. Notify your support engineer.
<hr/>	
05028	*** THE DRIVE REFERENCED A LOG ENTRY (!) WHICH IS LARGER THAN THE TOTAL NUMBER OF ENTRIES IN THE LOG (!). (REELERR 05028)
CAUSE	The log header in the drive's memory specifies both the total number of entries in the log and the number of the most recent entry. These two numbers were found to conflict with one another. No entries will be displayed.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.

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05029	*** THE DEVICE DIRECTLY OR INDIRECTLY SPECIFIED A LOCATION (!) WHICH IS LARGER THAN THE TOTAL NUMBER OF BYTES IN THE LOG (!). THE LOG IS PROBABLY CORRUPTED AND SOME OR ALL OF THE FOLLOWING DATA MAY BE INVALID. (REELERR 05029)
CAUSE	The drive returns a limited number of bytes of information for a log dump request. A pointer was found which directly or indirectly refers to a location past the last byte returned.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.
<hr/>	
05030	*** THE NUMBER OF BYTES IN THE LOG ARE LESS THAN THE MINIMUM LOG SIZE FOR THIS DEVICE. (REELERR 05030)
CAUSE	A certain portion of any log dump contains a fixed size portion (in later devices this is the index to the variable portion of the log). Not all of this fixed size portion was returned.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.
<hr/>	
05031	*** REELDIAG CANNOT PROPERLY COMMUNICATE WITH THE USER. (REELERR 05031)
CAUSE	The diagnostic subsystem could not obtain and/or return the the user's reply to REELDIAG.
ACTION	This error is unexpected and probably indicates an error in the diagnostic subsystem itself. A support engineer should be consulted.
<hr/>	
05032	*** A SERIOUS LOG CORRUPTION HAS PRECLUDED DISPLAY OF THIS LOG. (REELERR 05032)
CAUSE	A invalid log internal pointer or other value has been detected which precludes display of this particular portion of the log.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.
<hr/>	
05033	*** REELDIAG HAS DETECTED AN INCONSISTENCY BETWEEN THE PRODUCT CODE (!) AND THE HPIB CODE (!) RETURNED BY THE DEVICE. (REELERR 05033)—This particular combination is known but is not supported.
CAUSE	The device is masquerading as some other device by returning the hpiib code of that other device. This particular combination is recognized as a valid possibility for the drive but is not supported on this system.
ACTION	REELDIAG will prompt you for continuation permission. Further attempts to diagnose the device will result in unpredicted results. This configuration can be changed by your support engineer.

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05034	*** REELDIAG HAS DETECTED AN INCONSISTENCY BETWEEN THE PRODUCT CODE (!) AND THE HP1B CODE (!) RETURNED BY THE DEVICE. (REELERR 05034)—This particular combination indicates a device hardware problem.
CAUSE	The device is masquerading as some other device by returning the hp1b code of that other device. This particular combination is invalid for any device known to REELDIAG and is not supported.
ACTION	REELDIAG will prompt you for continuation permission. Further attempts to diagnose the device will result in unpredicted results. This configuration can be changed by your support engineer.

05035	*** THIS DEVICE IS NOT YET DIAGNOSED BY REELDIAG. USE DIAGNOSTIC "DIAG7478" INSTEAD. (REELERR 05035)
CAUSE	REELDIAG has not yet been enhanced to cover HP7974s & HP7978s. This enhancement is scheduled.
ACTION	Run the proper diagnostic for the device selected.

05036	***YOU CURRENTLY HAVE ! ACCESS TO THE DEVICE. ! ACCESS IS REQUIRED TO EXECUTE THIS FUNCTION. (REELERR 05036)
CAUSE	Normally, this will result from an attempt to execute a function which requires exclusive access to the device when that access mode has not been granted. It is probable that either you do not have sufficient security clearance or that someone else was probably using the device when you activated REELDIAG.
ACTION	Exit REELDIAG, attempt to prevent other processes from using the device, and rerun REELDIAG. If you need a higher security level, contact your system administrator. If you do not feel either of these is the problem, consult your support engineer.

05037	*** THE SPECIFIED DENSITY IS NOT AVAILABLE ON THE CURRENTLY SELECTED DEVICE. (REELERR 05037)
CAUSE	A valid density was specified, but is not implemented by the device currently being diagnosed.
ACTION	The IDENTIFY command should provide you with a list of available densities.

05038	*** REELDIAG IS UNABLE TO POINT TO THE EXACT LOCATION OF THE FOLLOWING ERROR. (REELERR 05038)
CAUSE	REELDIAG failed to obtain a pointer to the last parsed location in the users reply.
ACTION	This error is unexpected and probably indicates an error in REELDIAG or the diagnostic subsystem itself. A support engineer should be consulted.

05039	*** CONFIGURATIONS ACCESS IS NOT AVAILABLE ON THE SELECTED DEVICE. (REELERR 05039)
CAUSE	Accessible device configurations are only available on some tape drives. REELDIAG has detected that the selected drive is not one of those.
ACTION	If you feel certain this should have been issued, it is possible REELDIAG does not have current device identification data. In this case request device identify (section 3 or identify command) and retry.

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05040	*** TAPE COULD NOT BE LOADED. (REELERR 05040)
CAUSE	An attempt to load a tape on the selected device failed. Probable causes include the user not making a tape available to the device to load or requesting a load on a device which does not have autoloading capability.
ACTION	If the device has autoloading capability and a tape is available, take action based on other messages displayed.
<hr/>	
05041	*** TAPE COULD NOT BE UNLOADED. (REELERR 05041)
CAUSE	An attempt to unload a tape on the selected device failed. Probable causes include a tape not currently loaded or requesting an unload on a device which does not have autoloading capability.
ACTION	If the device has autoloading capability and a tape is loaded, take action based on other messages displayed.
<hr/>	
05042	*** TAPE DRIVE COULD NOT BE PLACED ONLINE. (REELERR 05042)
CAUSE	An attempt to place the tape on-line failed. This is expected if a tape is not loaded.
ACTION	Ensure that a tape is loaded on the drive. Take other action as suggested by other messages displayed.
<hr/>	
05043	*** ! LOG(S) COULD NOT BE CLEARED. (REELERR 05043)
CAUSE	An attempt to initialize an internal device log failed. Usually, this will result from trying to clear a log which is not maintained on the device or trying to clear a log on a device which does not support log clears.
ACTION	Retry with a valid log for the device. If the device and your selection are verified, this may indicate a device problem.
<hr/>	
05044	*** CONFIGURATION ITEM ! COULD NOT BE SET. (REELERR 05044)
CAUSE	The request to set a configuration item was rejected by the device.
ACTION	Take action based on other error messages displayed.
<hr/>	
05045	*** TAPE WAS FOUND IN AN UNEXPECTED, ERRONEOUS POSITION (!). (REELERR 05045)
CAUSE	The tape was found in an unexpected position, e.g. BOT after successfully writing a record to tape or at EOT after a successful rewind.
ACTION	This indicates a device problem.
<hr/>	
05046	*** TAPE IS UNEXPECTEDLY AT THE EOT MARK. (REELERR 05046)
CAUSE	The EOT marker was encountered when not expected. This may be the result of a device read error but will also happen if the user has not loaded a tape large enough to satisfy the requested number of record reads or writes.
ACTION	If this occurs on the read cycle of a workout command or trouble tree, a device problem should be suspected. Otherwise, if the user has specified a number of files other than "EOT", a larger tape is probably needed.

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05047 *** WORKOUT ABORTED -- HARD ERROR LIMIT REACHED. (REELERR
05047)
CAUSE A workout sequence was prematurely aborted. This normally occurs when the
specified limit of fatal errors has been exceeded.
ACTION Correct device problem based on accompanying messages.

05048 *** MOTION CHECK COULD NOT BE PERFORMED - UNABLE TO WRITE MOTION CHECK
SEQUENCE TO TAPE. (REELERR 05048)
CAUSE The motioncheck function requires that a set of files be written to tape. It is this set of
files on which the tape movement functions are tested. REELDIAG was unable to
complete the write and therefore aborted the remainder of the check.
ACTION Take action based on the cause displayed for the write error.

05049 *** RECORD READ DOES NOT MATCH THE DATA ORIGINALLY SENT. (REELERR
05049)

 Record : ! Bytes written : !
 File : ! Bytes read : !

CAUSE A record read from the tape drive was expected to match the record written in a
previous operation but did not. The mismatched bytes are listed following this
message.
ACTION Fix tape drive.

05050 *** FILE 2! CONTAINED FEWER THAN THE EXPECTED 1! RECORDS. (REELERR
05050)
CAUSE An end of file mark was found before expected.
ACTION Fix tape drive.

05051 *** FILE ! CONTAINED MORE THAN THE EXPECTED ! RECORDS. (REELERR 05051)
CAUSE A data record was found where an end of file marker was expected.
ACTION Fix tape drive.

05052 *** UNABLE TO VERIFY TAPE POSITION DOWN TO RECORD NUMBER. (REELERR
05052)
CAUSE REELDIAG attempted to determine the exact position of the tape by reading a record
with the file and record number in the header of the record. This read in some way
failed.
ACTION The problem is probably in the device hardware. Take action based on the messages
previous to this one.

05053 *** AN END OF FILE WAS EXPECTED BUT NOT DETECTED. (REELERR 05053)
CAUSE REELDIAG was expecting to be at the end of file on the tape, but some other tape
position (e.g. valid data record or end of tape) was found. This is indicative of a drive
problem.
ACTION Service tape drive as appropriate.

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05054	*** MOTIONCHECK FAILED. (REELERR 05054)
CAUSE	The sequence of motioncheck commands did not proceed as expected.
ACTION	Service tape drive as appropriate.
<hr/>	
05055	*** THIS SECTION REQUIRES A WRITABLE (WRITE RING INSTALLED) TAPE TO BE LOADED ON THE DRIVE AT BOT AND THE DRIVE TO BE ON-LINE. (REELERR 05055)
CAUSE	A section of REELDIAG was requested which requires writing to tape. It is not considered appropriate here to prompt for corrections, so the section is aborted.
ACTION	Load a tape with write ring installed, place the drive on-line, and retry the section. If all this is done correctly, suspect drive hardware problem.
<hr/>	
07001	*WARNING - The I/O path to the drive may be faulty. Any results (good or bad) shown below might not originate at the drive. (REELWARN 07001)
CAUSE	The I/O path between memory and the drive was not verified. This can result from a system internal error, an unimplemented test program, or an actual failure of the test, in which case a faulty field replaceable unit (FRU) should be displayed.
ACTION	If the test failed, further testing of the I/O path should be done. In any case, communication with the drive should be considered unreliable from this point on.
<hr/>	
07002	*WARNING - The selected device was not designed to perform this step. (REELWARN 07002)
CAUSE	A step was selected (perhaps as a default) which does not apply to the selected device.
ACTION	Advisory only. If this turns out to be unexpected or incorrect, a program adjustment may be needed - consult your support engineer.
<hr/>	
07003	*WARNING - Conversions of very large numbers are done in base 10 only. (REELWARN 07003)
CAUSE	REELDIAG attempted to display a number greater than 214783647 or less than -2147483648 in a base other than base 10.
ACTION	Advisory only. The number will be displayed in base 10. If this is unsatisfactory, notify your support engineer.
<hr/>	
07004	*WARNING - An HPIB code of ! was returned. However, the device will continue to be diagnosed as though "!" had been returned. (REELWARN 07004)
CAUSE	When the user directs the program to treat an unrecognized device as a known one, the device is labeled as experimental. This message will be issued upon each retry of the diagnostic when either the LOOPCOUNT or AUTORESTART parameters were specified in the DUI's RUN command.
ACTION	None, advisory only.
<hr/>	

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07005	*WARNING - Unable to mark tape drive as defective. (REELWARN 07005)
CAUSE	REELDIAG detected a serious problem with the selected device and attempted to block further use of it by the system. This attempt failed.
ACTION	The device should be electronically or physically removed from the system until it is repaired or deemed operational again by this diagnostic.
<hr/>	
07006	*WARNING - Unable to convert number to readable form. (REELWARN 07006)
CAUSE	A numeric quantity could not be converted to its corresponding character string form for display purposes. The most likely cause is that the number was too bit to fit into the designated space. In any case, asterisks will be substituted for the number.
ACTION	This problem is not fatal to execution of the program, but a displayed message may lack part of its informational content as a result. This is normally unexpected and your support engineer should be notified.
<hr/>	
07007	*WARNING - The selected device is not diagnosed by this program. HP1B code returned = !. (REELWARN 07007)
CAUSE	The identification information returned by the device indicates that it is recognized as a reel type tape drive, but that REELDIAG was not designed to diagnose it.
ACTION	If in auto-diagnostic mode, the device will be treated as an HP7980 and diagnosis will continue on that basis. Otherwise, upon the original issue of this warning, the user will be given the opportunity to either exit or select a known device which REELDIAG will then pretend it is diagnosing.
<hr/>	
07008	*WARNING - The selected device is not recognized as a reel tape drive. HP1B code returned = !. (REELWARN 07008)
CAUSE	The identification information returned by the device indicates that it is not a magnetic reel type tape drive and, therefore, it is not diagnosed by REELDIAG.
ACTION	If in auto-diagnostic mode, the device will be treated as an HP7980 and diagnosis will run on that basis. Otherwise, upon the original issue of this warning, the user will be given the opportunity to either exit or select a known device which REELDIAG will then pretend it is diagnosing.
<hr/>	
07009	*WARNING - The tape drive referenced an error log which is larger than this program is capable of handling. The log will be truncated to ! entries. (REELWARN 07009)
CAUSE	Either the drive has errored in maintaining its non-volatile memory or the specification for the maximum size of logs has changed. In either case, as many entries as indicated will be decoded.
ACTION	If drive error is suspected, execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. If the log is expected to be longer than the value given in the message, notify your support engineer.

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07010	*WARNING - Data buffers granted this program by the diagnostic system were not as large as requested. One or more diagnostic functions may fail at a later time. (REELWARN 07010)
CAUSE	REELDIAG did not receive as much data transfer memory as was requested.
ACTION	This is normally a system restriction which you may not be able to overcome. Some diagnostic functions may work just fine with a less than maximum needed area and REELDIAG will attempt to limp along on that basis. Other or all functions may fail for this reason. You may wish to notify your support engineer.
<hr/>	
07011	*WARNING - The density of this mounted tape remains incompatible. Analysis requiring this density will be skipped. (REELWARN 07011)
CAUSE	The user failed or refused to rectify a density conflict after being given a reasonable number of opportunities to do so.
ACTION	Advisory only. If this was not intentional on the part of the user, REELDIAG should be rerun with a tape of the requested density loaded on the drive.
<hr/>	
07012	*WARNING - The drive remains in incorrect mode. Analysis requiring on-line status will be skipped. (REELWARN 07012)
CAUSE	The user failed or refused, after a reasonable number of opportunities, to place the drive on-line or off-line as requested by REELDIAG.
ACTION	Advisory only. If this was not intentional on the part of the user, REELDIAG should be rerun and the drive placed in the requested mode as directed.
<hr/>	
07013	*WARNING - The mounted tape remains write protected. Analysis requiring write enable will be skipped. (REELWARN 07013)
CAUSE	The user failed or refused to place a write ring on the mounted tape.
ACTION	Advisory only. If this was not intentional on the part of the user, the tape should be dismantled, a write ring inserted, and REELDIAG rerun.
<hr/>	
07014	*WARNING - Only the first ! bytes returned by the drive will be processed. (REELWARN 07014)
CAUSE	The drive returned more data than REELDIAG expected. In this case the smaller, expected number of bytes will be processed. This will yield incomplete and/or erroneous information, but is given as a partial aid to the user.
ACTION	Your support engineer needs to be informed of this problem. The diagnostic will continue, processing the smaller, expected number of bytes. However, this will yield incomplete and/or erroneous information, but is given as a partial aid to the user.
<hr/>	

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07015	*WARNING - Expscted ! bytes of response from the tape drive. Received ! bytes instead. (REELWARN 07015)
CAUSE	The amount of data returned by the device was not what REELDIAG expected. This might be reasonable for a new device under development. However, it can also result from a problem with the drive or any intervening hardware/software.
ACTION	Either error message 05018 or warning message 7014 is normally issued depending on the nature of the discrepancy. If this is unexpected, your support engineer should be notified.
<hr/>	
07016	*WARNING - The number of entries in the log is greater than expected for this drive. (REELWARN 07016)
CAUSE	Either the drive has erored in maintaining its nonvolatile memory or the specification for the maximum size of logs has changed. In either case, REELDIAG will attempt to display as many entries as indicated, even if some do not make sense.
ACTION	If drive error is suspected, execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. If the log is expected to be longer than the value given in the message, notify your support engineer.
<hr/>	
07017	*WARNING - The value (!) of configuration item #! is outside the expected range of ! - !. (REELWARN 07017)
CAUSE	REELDIAG checks configuration values returned by the device against specified ranges for the device. If the value returned is less than the lower range value or greater than the higher range value, this warning is issued. REELDIAG will attempt to process the value in any case. The item number can be found in maintenance documents for the device.
ACTION	Check the specified range against device documentation. If the range is valid, a device error is indicated; otherwise, REELDIAG may need to be updated to new specifications. In either case, notify your support engineer.
<hr/>	
07018	*WARNING - Density ! is not considered valid for the selected device. (REELWARN 07018)
CAUSE	REELDIAG checks density requests against product capabilities. If the value requested density is not implemented on the device, this message will be displayed. REELDIAG will normally have forwarded the request to the device anyway. This message may also be displayed when decoding hardware status.
ACTION	Verify device identification and capabilities. If these are correct, a device hardware problem may be assumed. If associated with hardware status display, REELDIAG may need to be updated.
<hr/>	
07019	*WARNING - An unexpected change in device identification was detected. (REELWARN 07019)
CAUSE	The device returned and hpbid identification code which is different that the previous one returned.
ACTION	None. If REELDIAG recognizes the new code, execution will continue on the basis of that new identity, otherwise, the user will be prompted for a substitute ID.
<hr/>	

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07020	*WARNING - REELDIAG was not able to determine if the drive is equipped DATA COMPRESSION. The default is NOT EQUIPPED. (REELWARN 07020) The buffer board of the drive could not be determined.
CAUSE	None. REELDIAG will continue as though the data compression option is not present.
ACTION	
07021	*WARNING - REELDIAG was not able to determine if the drive is equipped to handle 800bpi(NRZI) tapes. The default is NOT EQUIPPED. (REELWARN 07021) The read/write board of the drive could not be determined.
CAUSE	None. REELDIAG will continue as though this option is not present.
ACTION	
07022	*WARNING - REELDIAG was not able to determine if the drive is equipped with an 8 or 16 bit processor. The default is 16 BIT. (REELWARN 07022) The buffer board of the drive could not be determined.
CAUSE	None. REELDIAG will continue as though the drive is equipped with a 16 bit processor.
ACTION	
07023	*WARNING - Hardware identification was not obtained from the device . Diagnosis will continue on the basis of the HPIB code returned by the device. (REELWARN 07023) The device either did not recognize or could not comply with the request for hardware identification. The former condition is expected for HP7974s & HP7978s.
CAUSE	None. Diagnosis will continue as far as possible based on the hardware normally associated with the HPIB code returned.
ACTION	
07024	*WARNING - Full identity of the physical device could not be obtained. Default values have been supplied as follows: (REELWARN 07024) The describe command (or some portion of the describe command simulation for earlier devices) failed. Rather than abort at this point, REELDIAG has chosen to continue with certain default information. Those default values are included in the identification information following this message.
CAUSE	Diagnosis will continue as far as possible based on any other information available. If this is not desired, you may interrupt via the interrupt combination for the current operating system (e.g. CNTL-Y for MPE-XL, CNTL-B for HPUX).
ACTION	
07025	*WARNING - The log contained an unrecognized buffer controller ID code (!) Log decoding will proceed assuming an ID code of !. (REELWARN 07025) The first byte of the log did not contain a value recognized as valid by REELDIAG. This could be the result of a change in the device for which REELDIAG has not yet been updated.
CAUSE	Diagnosis will continue as far as possible based on the latest version of the hardware known to REELDIAG. If this is an expected code for the device, contact your support engineer for correction of the diagnostic.
ACTION	

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07026	*WARNING - The allocated io buffer is too small to handle the requested data transfer. (REELWARN 07026)
CAUSE	This should only occur when the system was not able to grant an io buffer as large as requested by REELDIAG.
ACTION	Since this involves system allocation of memory resources, no specific action can be recommended here other than to rerun the diagnostic. If necessary, consult your support engineer.
<hr/>	
07027	*WARNING - The data sent to the device has been truncated. (REELWARN 07027)
CAUSE	This warning will always be preceded by REELWARN 07027. In this case, REELDIAG has determined that it is reasonable to attempt to continue.
ACTION	The user should be wary of results of the operation.
<hr/>	
07028	*WARNING - Extra and/or invalid command parameters were encountered. These items will be ignored. (REELWARN 07028)
CAUSE	The user has either incorrectly specified parameters in a command or supplied more parameters than expected. If an incorrect parameter was specified, all others, even correct ones will be ignored.
ACTION	This is non fatal. Extra parameters will be ignored and you will be prompted for any needed data.
<hr/>	
07029	*WARNING - REELDIAG was unable to return data buffer resources to the system. (REELWARN 07029)
CAUSE	REELDIAG did not succeed in releasing its hold on system memory resources.
ACTION	None - Advisory only. This is of no major consequence if you are exiting REELDIAG, but should be reported to your support engineer. If you are not exiting, REELDIAG will attempt to use that buffer if needed rather than requesting new resources.
<hr/>	
07030	*WARNING - This command clears the drive's internal hard error log. If this is not desired, type "cancel" at any prompt. REELWARN 07030)
CAUSE	The user has requested an operation which clears (initializes) the selected tape drive's internal error logs so that data may data may be accumulated from scratch.
ACTION	None - Advisory only. If the user has not already examined the error logs via REELDIAG's section 7 or 'displaylogs' command, typing 'cancel' at the next subsequent prompt will abort the clear and its associated task.
<hr/>	
07031	*WARNING - Selftest ! does not return valid results to REELDIAG. The result of this test must be read at the front panel of the device. (REELWARN 07031)
CAUSE	Certain selftest (especially interactive ones) always return a successful status when called remotely. REELDIAG believes the specified test is one of those.
ACTION	The results of this selftest must be read at the front panel of the device.

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07032	*WARNING - Selftest ! requires manual interaction at the device. (REELWARN 07032)
CAUSE	The specified selftest is interactive and requires physical manipulation of the tape drive. Furthermore, the reset button on the device front panel must be pressed before the device will return control to REELDIAG.
ACTION	Cause the required mechanical manipulation to be performed to the device. When done, press the reset button on the front panel of the device to cause it to return control to REELDIAG. If nothing is done, REELDIAG will time out after a reasonable period of time (usually about 5 minutes);
<hr/>	
07033	*WARNING - An end of file was passed on a record skip request. (REELWARN 07033)
CAUSE	A skip of the specified number of records resulted in the skip crossing over into the next file.
ACTION	Advisory only.
<hr/>	
07034	*WARNING - Data verification has been DISABLED for the rest of this tape. (REELWARN 07034)
CAUSE	Data verification is disabled for a tape whenever write or read operation creates a complex recovery situation or when the user specified limit of record mismatches for the tape has been reached.
ACTION	Correct causes of fatal/ignorable hard errors or specify a higher mismatched records limit, as appropriate.
<hr/>	
07035	*WARNING - A FATAL hard error occurred while attempting to write record !. (REELWARN 07035)
CAUSE	The requested tape write operation failed in such a way that continuing to write to tape is senseless.
ACTION	Advisory only.
<hr/>	
07036	*WARNING - An IGNORABLE hard error occurred while attempting to write record ! of file !. (REELWARN 07036)
CAUSE	The requested tape write operation failed but the failure is no considered to serious enough to stop writing. Record verification for this tape, however, will be turned off.
ACTION	Advisory only.
<hr/>	
07037	*WARNING - A FATAL hard error occurred while attempting to read record !. (REELWARN 07037)
CAUSE	The requested tape read operation failed in such a way that continuing to reread the tape is senseless.
ACTION	Advisory only.

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07038	*WARNING - An IGNOREABLE hard error occurred while attempting to read record !. (REELWARN 07038)
CAUSE	The requested tape read operation failed but the failure is no considered to serious enough to stop reading. Record verification for this tape, however, will be turned off.
ACTION	Advisory only.

07039	*WARNING - Invalid command parameter encountered. (REELWARN 07039)
CAUSE	User has supplied a parameter along with a valid command. Either the command does not take parameters, the parameter was invalid in the specified context, or the parameter was not recognized.]
ACTION	Follow correct syntax for specified command. If you do not supply any parameter, you will be prompted for the needed information.

07040	*WARNING - Selftest with parameters not yet supported. (REELWARN 07040)
CAUSE	
ACTION	

07041	*WARNING - Current access to device does not allow selftest ! to be executed. (REELWARN 07041)
CAUSE	The user was not granted a high enough diagnostic security clearance upon entering REELDIAG. This can be due either to the user's capabilities or the access mode to the device which was granted. Program initialization messages should have clarified this.
ACTION	If after insuring that the device is not being used by another process and after attempting to rerun REELDIAG does not solve the problem, consult your system administrator for sufficient capabilities or consult your support engineer to determine how to get needed access to the device.





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SCSI Reel Tape Diagnostic

Introduction

The SCSI Reel Tape Diagnostic (SCSIREEL) is used to test HP 7980S tape drives on HP-UX systems. It is not intended for testing HP7974A, HP7978A, or HP7978B tape drives, since these drives do not have SCSI interfaces. SCSIREEL will do the following:

- Set the selected tape drive to a known condition.
- Identify the drive as a 7980S.
- Test the SCSI Communication Link between the host and the device.
- Request the device to run certain internal selftests.
- Obtain and decode hardware status and selftest results.
- Obtain and decode the device internal logs.
- Verify basic tape functions, e.g., density, read, write.
- Test common tape drive operations.
- Provide an interactive user section which will allow the user to obtain more device specific information and to assemble device specific tests.
- Provide a set of trouble trees which will automatically diagnose the device as far as possible given a set of user interaction limitations.
- Provide the user with remote configuration capabilities.

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing Product Number 30600-10047.

Minimum Configuration

The SCSI reel tape diagnostic runs on an HP Precision Architecture RISC computer with minimum memory, a SCSI interface, a channel adapter, and a HP7980S magnetic reel tape drive.

The online diagnostics subsystem must also be supported.

Auto-Diagnostics

The magnetic reel tape diagnostic program can be invoked by the I/O system for auto-diagnostic purposes when an unrecoverable drive error has been detected. In auto-diagnostics mode, this diagnostic program will execute the following sections and steps:

- Section 2: Clear
- Section 3: Inquiry
- Section 4: Loopback
- Section 10: I/O path trouble tree
- Section 11: Drive electronics trouble tree

Operating Instructions

Before attempting to run the diagnostics, ensure that the tape drive to be tested is powered on. If the sections which test tape movement and write/read operations are to be run, ensure that a scratch tape is loaded.

Default Tests

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

Section 10 : Non-destructive I/O path trouble tree

Section 11 : Drive electronics trouble tree

RUN Command

To start the Online Diagnostics, enter the following command at the system prompt:

sysdiag

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

DUI >

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

The program will allow the user to select which testing functions are to be executed, but the default set can also be invoked by not making any section or step specification. In addition, only certain sections/steps will be performed when called as an auto-diagnostic. For security reasons, no auto-diagnostic section will cause any tape reads or writes.

example, to run the diagnostic, you might enter:

```
DUI >RUN SCSIREEL pdev=4.2.2 <RUN Command Options>
      |           |
      |   none required for
      |   default test suite
      |
      |
      |   insert physical location of
      |   device to be tested here;
```

Various error options are used by the **RUN** command. A detailed description can be obtained by referring to the DUI chapter of this manual.

FOR HP INTERNAL USE ONLY

Test Execution

When SCSIREEL is executed, the following welcome message will be displayed:

```
*****
*****
*****          SCSI MAGNETIC REEL TAPE DIAGNOSTIC          *****
*****                      FOR THE 7980S                      *****
*****
*****          (C) Copyright Hewlett Packard Co. 1990          *****
*****                      All Rights Reserved.                *****
*****                      Version A.02.00                      *****
*****
*****
```

Welcome, Today is MON, October 23, 1989 at 9:00 AM

{Output from sections and steps executed}

SCSIREEL EXITING ...

Upon completion of all sections and steps selected by the user or upon a fatal error condition, control will be returned to the Diagnostic User Interface (DUI).

Unless the program is being called simply to decode status, the diagnostic will first request access to the device from the diagnostics subsystem. If access to the drive is not obtained, error messages from the subsystem as well as this diagnostic will appear and the program will terminate.

If access to the device is obtained, the diagnostic will automatically invoke a diagnostic subsystem routine to test the I/O path to the tape drive. This is necessary since SCSIREEL has no knowledge of intermediate hardware connecting the host to the drive. If the status returned from this routine is not "successful", a warning message will be displayed but the diagnostic will continue.

If the I/O path tests out okay, the diagnostic will automatically ask the device to identify itself. If the device fails to respond to the request the program will automatically activate the appropriate trouble tree to either clear the device or display suspected FRUs. If an unexpected identification code is received, an appropriate warning message will be displayed but execution will continue so as to allow development devices to be diagnosed. In this case, the user will be prompted, as follows, for one of the known, valid identification codes to use to diagnose the device:

```
*WARNING - The selected device is recognized as a reel tape drive,
           but is not supported by this diagnostic.
           Product ID returned = hhhh.
                                           (REELWARN 7007)
```

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If the device correctly identifies itself, the sections and steps specified by the user in the **DUI RUN** command will be executed. If the user does not specify sections and steps to be run, the default sections will be executed.

If, during the execution of any program section or step, the diagnostic request fails, the appropriate error will be displayed. If at any time, the number of errors generated reaches the limit specified by the user in the **ERRCOUNT** parameter of the **RUN** command, an error will be displayed and the diagnostic will terminate.

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 whether the test should continue. If the response is **Yes** (default) then the test will be resumed; if the response is **No**, the program will terminate.

Test Section Descriptions

The following list specifies what sections are available for execution in this diagnostic program:

- Section 2 :** Clear
- Section 3 :** Inquiry
- Section 4 :** Loopback
- Section 5 :** Selftest
- Section 6 :** Display device status
- Section 7 :** Display log information
- Section 10 :** Non-destructive trouble tree
- Section 11 :** Drive electronics trouble tree
- Section 12 :** R/W function trouble tree
- Section 13 :** Media trouble tree
- Section 50 :** Interactive external exerciser

Following are detailed descriptions of each section and step which exist within SCSIREEL. Each section will be presented in the following format:

- An overview of the purpose of the section.
- How the section is broken down into functional steps.
- Detailed explanations as to what generic tape drive functions will be executed in that section.
- An example of the output of that section.
- Examples of messages which will be displayed to the user during normal execution.
- Error messages of special note and circumstances under which each would be generated.

Variable output in the output examples is represented by one of the following codes (note the italics font):

- n* - refers to a decimal digit (a 4 digit number would be represented as *nnnn*).
- c* - refers to an ASCII character.
- h* - refers to a hexadecimal digit (0-F).
- o* - refers to an octal digit (0-8).
- b* - refers to a binary digit (0-1).
- text* - is a description of what will appear at that spot.

In addition, an exclamation point (!) in error messages and warnings is normally a symbol representing the point at which certain context sensitive words, phrases, or numbers will be inserted.

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Many sections provide generic information displays which cover both the older and newer tape drives. In cases where a particular information item is not available from the machine by design, the phrase na (Not Available) will be displayed in its place. Likewise, the value of certain states and counters in some drives must be initialized, and until they are, contain all Fs (hex) indicating their unset state. This value will be displayed as nv (no value) by SCSIREEL. Neither of these are to be considered error conditions unless other values are definitely expected.

Any test which requires the tape drive to be on-line, or that a tape be write enabled or of a certain density (e.g., write at 1600 bpi), will first check to ensure that the device and tape are in the correct state. If they are not, then the applicable of the following messages may be displayed:

```
ATTENTION --The tape drive is currently OFF-LINE.  
If you wish to continue, load a scratch tape  
(if necessary) and place the drive ON-LINE.  
Continue? (yes|no) [YES]>
```

```
ATTENTION --Mounted tape is WRITE PROTECTED.  
If you wish to continue, place a write ring on the tape  
and reload it.  
Continue? (yes|no) [YES]>
```

If the user answers yes, the diagnostic will check to see if the device/tape is in the correct state. If so, processing will continue normally; otherwise, the warning will be redisplayed and the user will be reprompted. If the user answers no, the current function requiring the specified state will be skipped and one of the following messages issued:

Analysis requiring on-line status will be skipped.

Analysis requiring write enable will be skipped.

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Section 2—CLEAR

This command clears the selected device in a manner independent of the channel to which it is connected. This command causes the drive to be placed in a known condition as follows:

- Tape drive protocol will be restarted
- Data buffers will be cleared
- Current tape position will be retained
- Current tape status will be retained
- Drive is placed offline

The appropriate commands to selectively clear the device are sent. However, the device response to these commands is not tested. To test the response, use other sections such as Identify, Loopback and Device Status.

OUTPUT :

```
Section 2 -- CLEAR
End of Section 2 -- CLEAR
```

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Section 3—INQUIRY

This section requests the specified tape drive to identify itself in order to determine whether it is responding. If not, an error message will be displayed and the program aborted. Otherwise, the user will be informed of the device identity. The peripheral device type and the current firmware revision number for each FRU will be displayed.

If the code does not match that of the HP 7980S, a warning will be issued and the program SCSIREEL will terminate. Otherwise, the execution will continue on the selected provisional basis.

OUTPUT :

Section 3 -- INQUIRY

```
===== INQUIRY DATA =====  
Peripheral Device Type = 01 - Device is recognized as a  
sequential access device.  
Controller Version.Revision : Processor Name (Number), FRU ID:  
  
03.02 : Fp - Front Panel(8), FRU ID 00  
03.87 : Dc - Drive Controller(3), FRU ID 03  
03.87 : Db - Data Buffer(4), FRU ID 04  
03.05 : Ss - SCSI Single Ended Interface(15), FRU ID 35
```

End of Section 3 -- INQUIRY

Section 4—LOOPBACK

This section will test the SCSI Communication Link between the host and selected tape drive.

The Loopback operation will perform both a read and write loopback test. Both operations test the functionality of the SCSI Bus and control circuitry on the SCSI Interface PCA.

The read operation involves receiving a bit pattern (512 byte string) on the SCSI channel from the mag tape controller, and comparing those bytes to a known number of bytes. The write loopback involves sending a known set of data bytes (512 byte string) to the mag tape controller. In this case, the target will determine if the proper bytes have been received.

OUTPUT:

Section 4 -- LOOPBACK

Tape Drive data channel checks out OK.

End of Section 4 -- LOOPBACK


{OR}

Section 4 -- LOOPBACK

The following transmission errors were detected during the loopback test:

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
nn	hh	hh	bbbbbbb
12	56	54	0000010
33	7F	3D	0100010
.	.	.	.
.	.	.	.

End of Section 4 -- LOOPBACK

Note  Entries in the preceding table will be displayed for as many errors as were detected, unless the ERRCOUNT parameter of the RUN command has been exceeded.

Section 5—SELFTEST

This section will attempt to isolate and identify a problem by requesting the device to run its own built-in selftests. It is impossible to provide a separate step for every possible combination of device dependent selftests which a user may wish to run. Therefore, this section concentrates on assembling combinations of device dependent selftests which check out large, generic blocks of drive functions. Section 50 of this diagnostic is available for the selection of other selftest sequences by the user.

In order to actually qualify as a selftest, the request to the device must return a pass/fail status as well as an indication as to the location (FRU) of any problems in a selftest status. "Selftests" which do not return status or which require user interaction at the device do not qualify. Many of these other diagnostic commands will be utilized under sections of this diagnostic which perform exercising functions.

Error class is a general classification of the type of error according to one of the following:

- Runtime error
- Protocol error
- Diagnostic error
- Multi-processor error

Runtime and protocol errors will not normally detect faulty FRUs, whereas multi-processor errors test the communication between processors and may list more than one FRU since the problem cannot be isolated exactly. In that case, FRUs will be listed in order of probability of failure (if known).

If the unit being tested is not capable, by design, of doing a particular selected step, the following message will be issued and execution will continue with the next selected step, if any:

*WARNING - The device selected was not designed to perform this step.
(REELWARN nnnnn)

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Tape drive diagnostics are ordered hierarchically, such that some tests call many others. This implies that when a failure is detected, the remaining tests in the checkout may not be run. In other words, secondary and tertiary problems might not be detected until the first problem is fixed since the reporting of the first problem cancels the remaining tests. The details of each step within this section follows:

Step 20 - **Complete electronics checkout.** This step will request a set of selftests which cause the device to check itself out as thoroughly as possible without requiring any interaction with a mounted tape and without intentionally causing RAM data destruction. Tests which require an inordinate amount of time to run (such as the Complete RAM Test for the 7980) will not be included here.

The following selftest will be run:

HP7980S - Test Sequence #0

Step 23 - **Basic tape function checkout.** This step will request a set of selftests which cause the device to perform certain tape writing, reading, and other manipulations which verify basic functionality. This test is not intended to be an exhaustive exerciser. Such may be found in other sections of this diagnostic.

This test will require that a tape be mounted.

Note



It is recommended that the user mount a short tape to help speed up operation of this test.

The following selftests will be run:

HP7979 - Tests #165, 75, 95, 2, 97, 100, 166

HP7980A - Tests #165, 75, 95, 2, 97, 100, 166

HP7980XC - Tests #165, 75, 95, 2, 97, 100, 166



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OUTPUT:

Section 5 -- SELFTEST

No faulty Field Replaceable Units (FRUs) were detected
by device diagnostic #*nnn*.

{or}

Device diagnostic #*nnn* detected the following failure:

Error Class - *error group according to device ERS*
[Detection - *while name of detecting action*]
[- *by name of detecting processor/program*]
[- (*nnn*) *name of detecting test*]
Explanation - (*hhh*) *error explanation as listed in device ERS*
Faulty FRUs - (*nn*) *FRU name as listed in device ERS*
[- (*nn*) *FRU name as listed in device ERS*]

{or}

Device diagnostic #*nnn* was unable to either run to completion
and/or isolate an FRU. Error returned:

Error Class - *error group according to device ERS*
Explanation - (*hhh*) *error explanation as listed in device ERS*

End Step *nn* - {step name}

End of Section 5 -- SELFTEST

Note



This is a generalized example and except for the section header/trailer will be repeated for each step selected for execution. Note that selftest numbers will be displayed in decimal; error and FRU numbers in hex.

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Section 6—DISPLAY DEVICE STATUS

This section will obtain, decode, and display the request sense data and the mode sense data returned by the Request Sense and Mode Sense commands, respectively.

This section will cause the display of both the raw, uninterpreted values of each status register as well as several messages which will reflect, in words, the status of the drive. Status flags returned which simply indicate status and not necessarily an error condition will generate a message regardless of their value. Error condition flags will cause message display only when set to true and their messages will be preceded by an asterisk(*).

Finally, the status will be checked for combinations of flag and error number settings which should not occur. An appropriate warning will be issued for each implausible combination.

The phrase UNRECOGNIZED will be applied to all items which have a value that is not known to SCSI REEL (i.e., invalid). These values are unexpected and will normally refer to a problem in the device itself or a change in the format of hardware status.

OUTPUT:

Section 6 -- DISPLAY DEVICE STATUS

----- DEVICE STATUS -----

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh hh hh hh hh hh
16	hh hh hh hh hh hh hh hh hh hh hh hh hh
32	hh hh hh hh hh hh hh hh

Interpreted Data:

No error was reported by the drive.
BOP / BOM detected.

Tape position is BOT.
- Last command was retried 0 times.

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----- MODE SENSE DATA -----

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh

Interpreted Data:

Tape is write ENABLED.
Tape density is 6250bpi (GCR).
Drive buffered mode is BUFFERED.

End of Section 6 -- DISPLAY DEVICE STATUS

Section 7—DISPLAY DEVICE LOG

This section will obtain, decode, and display pertinent information from the logs maintained by the tape drive itself. The information will be broken into logical groupings which are activated by separate steps. Also available is a step which displays the log dump in uninterpreted form.

Device memory organization is product dependent, but will be translated to fit the common display interface specified below. Display items which do not apply to a particular device will display the value **NA** for “not available”. If an entire step does not apply to the selected device, a special message indicating so will be displayed and the remainder of the display ignored. The phrase **UNRECOGNIZED** will be applied to all items which have a value that is not known to **SCSIREEL**. These values are unexpected and will normally refer to a problem in the device itself.

Step 60 - Maintenance info This step will display the contents of normal operation counters and other information not contained in the error logs. This will include tape odometer, RAM odometer, current clock setting, number of power cycles, battery date, and version numbers. The string **NA** will be displayed for any information item which, by design, is not available from a particular device.

Step 61 - Configuration This step will indicate how the device is currently configured; i.e. selected gap size, write retry count, whether or not archival rewind is enabled, etc.

The string **NA** will be displayed for any information item which, by design, is not available from a particular device. If the value of a particular configuration item has not been set (value = **FF**), the string **nv** will be displayed.

A warning will be issued for any configuration item which contains a value outside the documented range for that value for the selected device. A number will be supplied in the message which refers to the corresponding configuration value. Also, in this case, coded values will be displayed as **UNRECOGNIZED** or ******; whereas uncoded numeric values will be displayed despite the apparent error.

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Step 62 - Fault log Each error recorded in the device's hard error log will be displayed in succession. Information from other drives will be adjusted to fit this format to provide a uniform interface. The interpreted displays will include error class/subclass, error explanation text, the name of the offending FRU, and lapsed time since last error.

Error class is a general classification of the type of error according to one of the following:

- Runtime error
- Protocol error
- Diagnostic error
- Multi-processor error
- Read/write hardware status
- Read electronics status

Different types of log entries will often require different interpretations and/or different display formats. Runtime and protocol errors will not normally detect faulty FRUs, whereas multi-processor errors test the communication between processors and may list more than one FRU since the problem cannot be isolated exactly. In that case, FRUs will be listed in order of probability of failure (if known).

The items delimited with square brackets ([]) in the output below are displayed only if there is a pertinent value to be shown.

The actual number of entries which will be displayed will vary according to the number actually logged and the device itself. The maximum number of entries which should be displayed is as follows:

HP7980S - 30 entries

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**Step 63 -
Error rates**

In addition to the error log, which records serious, usually fatal errors, the error rate log keeps track of the number of errors from which the device was able to recover on its own. Each loading of a tape generates a new entry. These entries will be shown in an interpreted format by the program.

The display will consist of 3 major sections. The first lists cumulative error rates for the device; the second lists error rates for the current loaded tape (if any); and the third displays the contents of the rest of the log (error rates for previous tapes).

The actual number of entries which will be displayed will vary according to the number actually logged and the device itself. The maximum number of entries which should be displayed is as follows:

HP7980S - 20 entries

**Step 69 - Raw
Dump**

This section will display the entire memory dump as a table of paired hex values. No attempt will be made to group the characters according to the logical units from the drive's point of view (the other steps effectively do most of that). Rather, the display is to be entirely device independent except for the number of bytes returned by the device, as follows:

HP7980S - 1287 bytes

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OUTPUT:

Section 7 -- DISPLAY DEVICE LOGS

MAINTENANCE INFO

Clock : nnnn:nn:nn
Tape odometer : nnnnnnnnnnnn.n feet
RAM odometer : nnnnnnnnnn
Power cycles : nnnnn
Battery date : 'nn
Versions:
processor nn.nn.nn
:
:
:
:

End Step 60 - Maintenance Info

POWER-ON CONFIGURATION VALUES

(*) -- Current configuration value is different from that listed.

FRONT PANEL

Allow FP configuration change ENABLED|DISABLED
Front panel media removal ENABLED|DISABLED

Prompt for archival rewind ENABLED|DISABLED
Prompt for data compression ENABLED|DISABLED
Operator selection time-out nn

Front panel language ENGLISH|GERMAN|FRENCH|SPANISH
Activity indicator symbol "-|"-"|"*"
Gauge usage "BOT EOT"|
 "Data in buffer"|
 "Queued commands/reports....."

GENERAL CONTROL

Allow FP configuration change ENABLED|DISABLED
Allow host configuration change ENABLED|DISABLED

Default write density HOST|NONE|800|1600|
 6250|COMPRESSED
FP density control lock ENABLED|DISABLED
 [HOST override]
Auto on-line ENABLED|DISABLED
Archival rewind ENABLED|DISABLED
 [OVERRIDE prompt]
Stop on failure ENABLED|DISABLED
Report recovered errors ENABLED|DISABLED

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WRITE

Immediate response mode	ENABLED DISABLED
Tape mark count to terminate immediate response mode	DISABLED nn
Retry count	nn
Gap size	
800bpi (NRZI)	MIN = n.nn" MAX = n.nn"
1600bpi (PE)	MIN = n.nn" MAX = n.nn"
6250bpi (GCR)	MIN = n.nn" MAX = n.nn"
EOT stop	ENABLED DISABLED
Holdoff time-out	nn
Startup point (8ths of memory)	n
Write control	nn
Write skip start	n

DATA COMPRESSION

Default	ENABLED DISABLED NA
Front panel request	ENABLED DISABLED NA
Host request	ENABLED DISABLED NA
Host override of front panel	ENABLED DISABLED NA
Resulting request	ENABLED DISABLED NA
Expansion protection	ENABLED DISABLED NA
Max compressed record size	NA nnnn Kbytes
Max record tape marks	ENABLED DISABLED NA
Max uncompressed record size	ENABLED DISABLED NA
Max access tape marks	NA n
Max access bytes	NA nnnn Kbytes
Record optimization threshold	ENABLED DISABLED NA
DC optimization threshold	NA nn:n
DC optimization sample period	NA nnnn bytes

READ

Readahead mode	ENABLED DISABLED
Tape mark count to terminate read ahead mode	DISABLED nn
Retry count	nn
Trailing buffer	n records (nn bytes)
Startup point (8ths of memory)	n

INTERFACE - HP-CS

Allow interface address changes	ENABLED DISABLED
Allow interface to change non-volatile ram	ENABLED DISABLED

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Block length	n
Bus inactivity limit	n
Disconnect time limit	n
Disconnect length	n
Inquiry field	nnn
Interface only reset	ENABLED DISABLED
Read EGM reported	ENABLED DISABLED
SCSI II compatible	ENABLED DISABLED
EOT reporting modes	n
SCSI parity checking	ENABLED DISABLED
Vendor unique density reporting	ENABLED DISABLED
Suppress illegal length	DISABLED n

(*) -- Current configuration value is different from that listed.

End Step 61 - Power-on Configuration Values

=====

ERROR LOG

=====

----- 01 -----

Error Class - error group according to device ERS

[Detection - while name of detecting action]

[- by name of detecting processor/program]

[- (nnn) name of detecting test]

Explanation - (hhh) error explanation as listed in device ERS

[Faulty FRUs - (nn) FRU name as listed in device ERS]

[- (nn) FRU name as listed in device ERS]

Cumltv Time - nnnnn:nn:nn

Lapsed Time - nnnnn:nn:nn

{or} Clock reset since last error

[*NOTE: Error occurred during power-on selftest.]

----- 02 -----

:

:

----- nn -----

End Step 62 - Fault Log

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CUMULATIVE SOFT ERROR RATES

800bpi (NRZI)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

{and/or}

1600bpi (PE)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

{and/or}

6250bpi (GCR)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

CURRENT TAPE ERROR RATE

nnnnbpi (ccc)	READ	WRITE	TOTAL
Hard Errors	nnnnn	nnnnn	nnnnn
Soft Errors	nnnnn	nnnnn	nnnnn
Bytes Processed	n X 10**nn	n X 10**nn	
Bytes/Soft Error	n X 10**nn	n X 10**nn	

ERROR RATE LOG

----- 01 ----- nnnnbpi (ccc)	READ	WRITE	TOTAL
---------------------------------	------	-------	-------

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```
-----  
Hard Errors      nnnnn      nnnnn      nnnnn  
Soft Errors     nnnnn      nnnnn      nnnnn  
Bytes Processed n X 10**nn  n X 10**nn  
Bytes/Soft Error n X 10**nn  n X 10**nn
```

Load Time - nnnnn:nn:nn

```
----- 02 -----  
:  
:  
----- nn -----
```

End Step 63 - Error Rates

=====
RAW DUMP
=====

```
WORDS 0 1 2 3 4 5 6 7 8 9  
0| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh  
10| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh  
20| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh  
: : : : : : : : : :  
: : : : : : : : : :
```

End Step 69 - Raw Dump

End of Section 7 -- DISPLAY DEVICE LOGS

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Section 10—IO PATH TROUBLE TREE

This section will check out the device as thoroughly as possible without requiring exclusive level access to the device. The trouble tree will determine whether the device is up and responding and whether the SCSI channel appears to be free of problems.

This section is non-destructive since the tests will not clear data buffers or otherwise reset the device.

Note This trouble tree is NON-DESTRUCTIVE. This trouble tree does NOT require on-site manual assistance.



The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

The output listed below for this section refers to and is representative of anticipated conditions, but may not be fully inclusive of all possible situations.

OUTPUT:

Section 10 -- IO PATH TROUBLE TREE

{Scenario 1:}

TIME-OUT : Device identification

SUSPECT: (in descending order of probability)

1. Device powerfail
2. Device not at specified address
3. SCSI cable/cable connection
4. SCSI interface
5. SCSI adapter
6. Bad channel

{Scenario 2a:}

REJECTED : Device identification

SUSPECT: (in descending order of probability)

1. SCSI interface
2. SCSI adapter
3. Bad channel

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{Scenario 2b:}

FAILED : Device identification

SUSPECT: (in descending order of probability)

1. SCSI interface
2. SCSI adapter
3. Bad channel

{Scenario 3:}

PASSED : Device identification

REJECTED : SCSI Loopback test

SUSPECT: (in descending order of probability)

1. SCSI cable
2. SCSI interface
3. SCSI adapter
4. Channel adapter

{Scenario 4:}

PASSED : Device identification

FAILED : SCSI Loopback test

SUSPECT: (in descending order of probability)

1. SCSI cable
2. SCSI interface
3. Data buffer
4. SCSI adapter
5. Channel adapter

{Scenario 5:}

PASSED : Device identification

PASSED : SCSI Loopback test

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Run electronics checkout trouble tree.

End of Section 10 -- IO PATH TROUBLE TREE

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Section 11—DRIVE ELECTRONICS TROUBLE TREE

This section will check out the device as thoroughly as possible without on-site assistance (tape handling) and without taking excessively long to complete. The trouble tree will determine whether the device is up and responding, whether the SCSI channel appears to be free of problems, and whether the basic data processing hardware of the device reports that it is functioning correctly.

This section is destructive since the tests may clear data buffers and otherwise reset the device or even declare it unuseable by processes other than diagnostics. The tree is not designed to read from or write to tape.

Note This trouble tree is DESTRUCTIVE. This trouble tree does NOT require on-site manual assistance.

The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

The output listed below for this section refers to and is representative of anticipated conditions, but may not be fully inclusive of all possible situations.

OUTPUT:

Section 11 -- DRIVE ELECTRONICS TROUBLE TREE

{Scenario 1:}

TIME-OUT : Device identification

SUSPECT: (in descending order of probability)

1. Device powerfail
2. Device not at specified address
3. SCSI cable/cable connection
4. SCSI interface
5. SCSI adapter
6. Bad channel

{Scenario 2a:}

REJECTED : Device identification

SUSPECT: (in descending order of probability)

1. SCSI interface
2. SCSI adapter
3. Bad channel

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{Scenario 2b:}

FAILED : Device identification

SUSPECT: (in descending order of probability)

1. SCSI interface
2. SCSI adapter
3. Bad channel

{Scenario 3:}

PASSED : Device identification

REJECTED : SCSI Loopback test

SUSPECT: (in descending order of probability)

1. SCSI cable
2. SCSI interface
3. SCSI adapter
4. Channel adapter



{Scenario 4:}

PASSED : Device identification

FAILED : SCSI Loopback test

SUSPECT: (in descending order of probability)

1. SCSI cable
2. SCSI interface
3. Data buffer
4. SCSI adapter
5. Channel adapter

{Scenario 5:}

PASSED : Device identification

PASSED : SCSI Loopback test

REJECTED : Power-on selftest sequence

SUSPECT: (in descending order of probability)

1. Drive controller

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{Scenario 6:}

PASSED : Device identification
PASSED : SCSI Loopback test
FAILED : Power-on selftest sequence

SUSPECT: (in descending order of probability)
1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU

{Scenario 7:}

PASSED : Device identification
PASSED : SCSI Loopback test
PASSED : Power-on selftest sequence

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Read logs; use exerciser to run specific tests for log problems.
2. RUN R/W trouble tree

End of Section 11 -- DRIVE ELECTRONICS TROUBLE TREE

Section 12—R/W FUNCTION TROUBLE TREE

This tree is intended to diagnose major tape transport and read/write problems in a short period of time. Normally, the electronics trouble tree (section 11) should have already been run with a "pass" status. Any failures will be isolated as far as possible without an undue expenditure of time. If an intermittent and/or media problem is suspected after running this tree, the media check trouble tree, which can take a substantial amount of time to complete, may be run.

Since this tree may cause data to be written to or read from tape, SCSIREEL will prompt the user for confirmation before reading or writing tape if a tape is found already loaded prior to the first R/W operation.

Note This trouble tree is DESTRUCTIVE. This trouble tree requires on-site MANUAL ASSISTANCE.



The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

The output listed below for this section refers to and is representative of anticipated conditions, but may not be fully inclusive of all possible situations.

OUTPUT:

Section 12 -- R/W FUNCTION TROUBLE TREE

{Scenario 1:}

REJECTED : Power-on selftest sequence

SUSPECT: (in descending order of probability)

1. Data path
2. Drive controller

Suggestions for further action:

1. Run electronics trouble tree

{Scenario 2:}

FAILED : Power-on selftest sequence

SUSPECT: (in descending order of probability)

1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU

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{Scenario 3:}

PASSED : Power-on selftest sequence
FAILED : Servo test

SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU
{or otherwise}
1. Drive controller
2. Encoder/capstan
3. Motor
4. Power supply

{Scenario 4:}

PASSED : Power-on selftest sequence
PASSED : Servo test
FAILED : Data buffer test

SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU
{or otherwise}
1. Data Buffer

{Scenario 5:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
FAILED : R/W formatter test

SUSPECT: (in descending order of probability)
{if FRUs given}
1. FRU - name of suspected failing component/FRU
2. FRU - name of suspected failing component/FRU
{or otherwise}
1. R/W FRU
2. Formatter

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{Scenario 6:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
PASSED : R/W formatter test
FAILED : Actual R/W test - general
FAILED : Actual R/W test - detailed

SUSPECT: (in descending order of probability)

{if FRUs given}

1. FRU - *name of suspected failing component/FRU*
2. FRU - *name of suspected failing component/FRU*

{or otherwise}

1. Heads/head connectors
2. R/W board

Suggestions for further action:

1. Clean heads and run this trouble tree again

{Scenario 7:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
PASSED : R/W formatter test
FAILED : Actual R/W test - general
PASSED : Actual R/W test - detailed

SUSPECT: (in descending order of probability)

{if FRUs given}

1. FRU - *name of suspected failing component/FRU*
2. FRU - *name of suspected failing component/FRU*

{or otherwise}

1. Media
2. Heads

Suggestions for further action:

1. Run media trouble tree
2. Clean heads and run this trouble tree again

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{Scenario 8:}

PASSED : Power-on selftest sequence
PASSED : Servo test
PASSED : Data buffer test
PASSED : R/W formatter test
PASSED : Actual R/W test - general
PASSED : Actual R/W test - detailed

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Run media trouble tree

End of Section 12 -- R/W FUNCTION TROUBLE TREE

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Section 13—MEDIA TROUBLE TREE

This trouble tree will attempt to distinguish defective media from drive read/write hardware problems. It may also serve to identify and isolate intermittent hardware problems.

Large amounts of data must be written, read, and verified, making execution time only a minor constraining factor. It is expected that the electronics and read/write hardware trouble trees will have already passed before running this section.

If a branch in the tree is reached which requires an extensive period of time to complete (e.g., verifying the medium, erasing the tape, etc.), the user will be informed of how to break and abort that process.

Since this tree may cause data to be written to or read from tape, SCSI REEL will prompt the user for confirmation before reading or writing tape if a tape is found already loaded prior to the first R/W operation.

Note This trouble tree is DESTRUCTIVE. This trouble tree requires on-site MANUAL ASSISTANCE.



The user will be informed of the status (PASSED, FAILED, or REJECTED) of each node of the trouble tree as it is executed until a terminus is reached. At that point, a list of suspected problems and/or a list of follow-up suggestions will be displayed.

The output listed below for this section refers to and is representative of anticipated conditions, but may not be fully inclusive of all possible situations.

OUTPUT:

Section 13 -- MEDIA TROUBLE TREE

{Scenario 1:}

FAILED : Tape load

SUSPECT: (in descending order of probability)

1. Human error
2. Servo
3. BOT sensor
4. Medium
5. Drive controller
6. Door sensor

Suggestions for further action:

1. Manually correct tape load
2. Run manual selftests 84-87,90-93
3. Run manual selftest 94
4. Run manual selftest 88

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{Scenario 2:}

PASSED : Tape load
FAILED : Write test

SUSPECT: (in descending order of probability)
{otherwise error code implicates hardware}
1. Medium
2. Heads

Suggestions for further action:

1. Rerun test & compare locations of failures
If same suspect medium, otherwise heads.

{Scenario 3:}

PASSED : Tape load
PASSED : Write test
FAILED : Read/verify

SUSPECT: (in descending order of probability)
1. Heads

{Scenario 4:}

PASSED : Tape load
PASSED : Write test
PASSED : Read/verify

NO PROBLEMS DETECTED

{If soft error count <= 2}

A total of nnnnnnn soft errors indicates a GOOD tape.

{If 2 < soft error count <= 10}

A total of nnnnnnn soft errors indicates an OK tape.

{If 10 < soft error count <= 50}

A total of nnnnnnn soft errors indicates a MARGINAL tape.

{If soft error count > 50}

A total of nnnnnnn soft errors indicates a BAD tape.

End of Section 13 -- MEDIA TROUBLE TREE

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Section 50—INTERACTIVE EXTERNAL EXERCISER

The SCSIREEL External Exerciser is an interactive program which provides the user with access to a set of internal diagnostics and utilities within an HP7980S tape drive. The purpose of the exerciser is to aid service-trained personnel in troubleshooting tape drives to a replaceable assembly level.

The following commands are implemented:

Displays:	DRIVESTATUS REVISIONS INQUIRY LOGS ALL CONFIGURATION FAULT MAINTENANCE RAW TAPE MODESENSE REQUEST
Diagnostics:	LOOPBACK (SCSI) MOTIONCHECK SELFTTEST TREES IOPATH ELECTRONICS READWRITE MEDIA TUR WORKOUT LONG SHORT MEDIACHECK USERDEFINED
Tape commands:	LOADTAPE UNLOADTAPE REWIND

FOR HP INTERNAL USE ONLY

Utilities: CLEARLOG
ALL
FAULT
TAPE
CONFIGS
DECODE
RESET

Exerciser
control: CANCEL
EXIT
HELP
REFRESH
SUSPEND

When the external exerciser is invoked, the following prompt will be displayed to the user:

SCSIREEL>

The prompt indicates that the exerciser is waiting for a command from the user. When the user enters a command that is recognized by the external exerciser, that command will then be processed as according to the corresponding command description given below.

Some commands may not be available if the requested device could not be locked for exclusive access. Exit from the exerciser will be accomplished via the EXIT command. Syntax and usage help will be available via the HELP command.

Help will be available at every prompt and will address details associated with that prompt. More details on help are included in the description for the HELP (?) command. If the prompt or menu associated with a prompt becomes obscured for any reason (system message, clear screen, etc.), the prompt and its header may be redisplayed by typing REFRESH (*). In addition, the user may back out of any prompt or group of prompts by typing CANCEL at the prompt.

FOR HP INTERNAL USE ONLY

If the user enters an unrecognized command the following error message with one or more of the applicable additional explanations will be displayed. The user will then be reprompted:

```
*** YOUR RESPONSE IS INVALID. (REELERR 05008)

-- ! is an unrecognized command;
   check spelling or type help for assistance.

-- expected a numeric response.

-- numeric response must fall between ! and !.

-- response is not a valid integer number

-- parameter "!" is unknown, is out of order,
   or is invalid for the command !.
```

SCSIREEL>

Some commands will require some additional information from the user. In many cases, this information can be supplied in parameters to the command. If an invalid parameter is supplied, the following error message will be displayed. The user will then be prompted for remaining information as described in the following paragraphs.

```
*** UNEXPECTED PARAMETER (!) ENCOUNTERED.
```

If an unexpected parameter is encountered or the command does not accept parameters, additional prompts for the needed information will be displayed. These data prompts will be displayed in mixed case and will end with the prompt symbol >. They will also include a range or selection of choices enclosed in parentheses and, where appropriate, a default selection, enclosed by square brackets, supplied by the program upon entry of a simple carriage return (<CR>). For example:

```
Enter the configuration value. (off|1..99) [OFF]>
```


FOR HP INTERNAL USE ONLY

The text enclosed in the parentheses indicates that the user is to type either *off* or an integer value between 1 and 99 inclusive. Each option is separated by a |. The default response *off*, as indicated by [OFF], would be assumed if the user simply entered a carriage return. For items like configuration values, the current value will normally be displayed as the default. If a default is not shown, the user will not be allowed to "default" the input by only entering a <CR>.

Keyword responses (e.g., command names) may be abbreviated but not below the minimum number of characters necessary to distinguish them from all other valid responses. Responses will not be case sensitive. In addition, some commands will have special 2 or 3 character abbreviations which will also be recognized. These abbreviations are listed next to the command name in help messages. Where possible, command names, abbreviations, and other characteristics will conform to similar commands in the proposed Support User Interface Standard.

The HELP keyword will be recognized at all prompts.

If an error is encountered as a result of issuing a command to the device, appropriate error messages as well as the hardware status that is returned by the device will be displayed. Note that some exerciser commands may issue several different device commands to the tape drive. Therefore, error messages may refer to command names other than those which are part of the exerciser.

Each command description below is in the following format:

Command Name

USAGE:

Explanation of what the command does and when it should be used.

SYNTAX:

Listing of command syntax (including any special abbreviation) and any parameter descriptions.

DATA PROMPTS:

Prompts to be displayed for needed information not available from the command parameter list.

OUTPUT FORMAT:

Information printed as a result of this command being executed.

ERROR MESSAGES:

Any error messages worth noting that may be generated as a result of this command. Note that this does not imply that all possible error messages that may be generated are listed here, but rather, only those that are especially worth mentioning in relation to the command.

FOR HP INTERNAL USE ONLY

There are several conventions used throughout the command output descriptions. They are as follows:

n - refers to a decimal digit
(a 4 digit number would be represented as *nnnn*).

c - refers to an ASCII character.

h - refers to a hexadecimal digit (0-F).

o - refers to an octal digit (0-8).

b - refers to a binary digit (0-1).

text - is a description of what will appear at that spot.

Comments in the input and output sequences are enclosed in curly brackets. These comments are only part of this document and are not output by the program. For example, a command description may contain the following:

Do you wish to continue? (Y|N) [N]>
{if response is "N" this command will terminate}

However, the actual output of the program would be only:

Do you wish to continue? (Y|N) [N]>

FOR HP INTERNAL USE ONLY

CLEARLOG

USAGE:

This command is used to initialize (clear) various logs internal to the device. The user is given a choice of which log to clear or to clear all logs. This command can destroy valuable information and should be used with care.

SYNTAX:

CLEARLOG [*log specifier*]
CLOG

log specifier:

ALL	- All of the following logs will be cleared.
FAULT	- Hard error log
TAPE	- Soft error rate log

DATA PROMPTS:

Which log is to be cleared?

ALL
FAULT
TAPE

Your selection [*<cr>* = none]

OUTPUT FORMAT:

The specified log has been cleared.

FOR HP INTERNAL USE ONLY

CONFIGS

USAGE:

This command allows the user to read and/or set any standard device configuration value. The user will need access to and understanding of the documentation for the configurations which can be set. Furthermore, many configuration items require passwords which are intended for restricted service personnel only.

The default value supplied for each configuration value prompt is the value as it currently exists in the device. If this default is taken, no change is even attempted so that power-on settings cannot be accidentally changed if power-on configuration by the host happens to be enabled. Thus, values for any configuration can safely be read without change by simply defaulting the new value (by entering <cr>) for the item selected.

SYNTAX:

CONFIGS [start# [/ end#]]

CNF

Where start# and end# are both valid configuration item numbers (>=40,<=207) and start# <= end#.

Note that end# is optional. Note also that some values may not be valid for the device. In this case, the next highest valid value will be used.

DATA PROMPTS:

NOTE: Default values = current setting. Configuration values will NOT be changed if the response is defaulted.
{This note is issued only once at the beginning of each session}

{The following is issued for each configuration item.}

Configuration item #nn = nn.
Enter the new value (0..255) [nnn] >

{The following is issued if no range or an invalid range is given}

Enter configuration to set (0..101) [<cr> = quit]>
Configuration item #nn = nn.
Enter the new value (0..255) [nnn] >

FOR HP INTERNAL USE ONLY

OUTPUT FORMAT:

Configuration item *nn* remains at *nn*.

{or}

Configuration item *nn* is now at *nn*.

FOR HP INTERNAL USE ONLY

DECODE

USAGE:

This command enables the user to interactively decode error and FRU numbers as they appear on the front panel of the device. For the HP7980S, the error number and FRU & test numbers, if present, are identified as such on the front panel display. Note that the hexadecimal form for the error number and decimal form for the others also corresponds to the front panel display.

SYNTAX:

DECODE
DC

DATA PROMPTS:

{For HP7980S}

Specify codes:

ERROR # (\$0..\$fff) [0]>
FRU 1 # (0..255) [0]>
FRU 2 # (0..255) [0]>
TEST # (0..255) [0]>

OUTPUT FORMAT:

Error Class - error group according to device ERS
[Detection - while name of detecting action]
[- by name of detecting processor/program]
[- (nnn) name of detecting test]
Explanation - (hhh) error explanation as listed in device ERS
Faulty FRUs - (nn) FRU name as listed in device ERS
[- (nn) FRU name as listed in device ERS]

FOR HP INTERNAL USE ONLY

DRIVESTATUS

USAGE:

This command will obtain the current drive status from the device and display it in readable text form.

SYNTAX:

DRIVESTATUS
DRI

DATA PROMPTS:

None

OUTPUT FORMAT:

===== DRIVE STATUS =====

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh hh hh hh hh hh hh
16	hh hh hh hh

Interpreted Data:

CCL ID = 1
Tape [is | not] loaded
Tape is write [enabled | protected]
Tape format is [not] blocked
Tape format is [not] data compressed
Data compression is [enabled | disabled]
Media removal is [enabled | disabled]
Readheads are [enabled | disabled]
Immediate response is [enabled | disabled]

FOR HP INTERNAL USE ONLY

EXIT

USAGE:

This command terminates execution of the External Exerciser. It may be entered any time the SCSTIREEL> prompt appears.

SYNTAX:

EXIT

DATA PROMPTS:

None

OUTPUT FORMAT:

End of Section 50 -- INTERACTIVE EXTERNAL EXERCISER

FOR HP INTERNAL USE ONLY

HELP

USAGE:

This command provides the user with access to information concerning the commands that are available in the external exerciser. The user may request a list of all available commands accompanied by a brief description of each, or individual command descriptions. Individual command help contains a brief explanation of usage and describes command syntax.

SYNTAX:

HELP [*command name*|ALL]
?

OUTPUT FORMAT:

{If no parameter is specified, the following table of available commands will be displayed:}

DISPLAYS	TESTS	UTILITIES	COMMANDS	OTHER
DRIVESTATUS	LOOPBACK	CLEARLOG	LOADTAPE	CANCEL
REVISIONS	MOTIONCHECK	CONFIGS	UNLOADTAPE	EXIT
INQUIRY	SELFTEST	DECODE	REWIND	HELP
LOGS	TREES	RESET		REFRESH
MODESENSE	TUR			SUSPEND
REQUEST	WORKOUT			

{If ALL is specified, the following alphabetical list with brief explanations will be displayed: }

- CANCEL - Aborts the function for which the user is currently being promoted for data. (May be used at any prompt.)
- CLEARLOG - Resets user specified device internal log.
- CONFIGS - Allows internal reconfiguration of drive.
- DECODE - Decodes error messages as displayed on the front panel of the drive.
- DRIVESTATUS - Displays drive and tape information.
- EXIT - Terminates Interactive External Exerciser.
- HELP - Displays descriptions of exerciser commands.
- INQUIRY - Displays device identification information, including product code, etc.
- LOGS - Displays various device internal logs.
- LOADTAPE - Loads a tape (on auto-loading drives) and places drive on-line.
- LOOPBACK - Tests SCSI link to device.
- MODESENSE - Displays the mode sense data, including tape density.
- MOTIONCHECK - Exercises drive's ability to skip files & records.

FOR HP INTERNAL USE ONLY

REFRESH - Redisplays the current prompt (and associated menu).
REQUEST - Obtains and displays device mode sense data.
RESET - Resets device to known state.
REVISIONS - Display firmware revisions for each FRU.
REWIND - Rewinds the loaded tape to BOT.
SELFTEST - Executes of user specified sequence of device selftests.
SUSPEND - Suspends execution of SCSIREEL so that other DUI commands can be executed.
TREES - Executes user specified SCSIREEL diagnostic trouble tree.
TUR - Test Unit Ready.
UNLOADTAPE - Rewinds and unloads a tape (auto-loading drives).
WORKOUT - Checks drive's basic ability to write & read data.

{If a command name is specified, a message similar in form to the following for HELP (i.e., SCSIREEL> help help) will be displayed:}

HELP [*command name*][ALL]

This command provides the user with access to information concerning the commands that are available in the external exerciser. The user may request a list of all available commands accompanied by a brief description of each, or individual command descriptions. Individual command help contains a brief explanation of usage and describes command syntax.



FOR HP INTERNAL USE ONLY

INQUIRY

USAGE:

This command will obtain the inquiry data, including vendor and product identification string, from the drive and display it in readable text form.

SYNTAX:

INQUIRY
IN

DATA PROMPTS:

None

OUTPUT FORMAT:

----- INQUIRY DATA -----

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh hh hh hh hh hh hh
16	hh hh hh hh hh hh hh hh hh hh hh hh hh hh
32	hh hh hh hh

Interpreted Data:

Peripheral Device Type = 01 - Device is recognized as a sequential access device.
Vendor Identification = HP
Product Identification = 7980S
Product Revision Level = A305

FOR HP INTERNAL USE ONLY

LOADTAPE

USAGE:

This command causes the automatic loading to be initiated. The drive will also be placed on-line if not already so.

SYNTAX:

LOADTAPE
LT

DATA PROMPTS:

None

OUTPUT FORMAT:

Tape was successfully LOAded.

FOR HP INTERNAL USE ONLY

LOGS

USAGE:

This command displays the contents of a portion of the device logs. The user must specify which portion or form is to be displayed. The displays will be identical to those obtained by running section 7 of SCSIREEL.

SYNTAX:

LOGS [*log specifier*]

log specifier:

- ALL - All of the following logs will be displayed
- CONFIGS - Device power-on configuration values
- FAULT - Hard errors
- MAINTENANCE - Maintenance info (e.g. tape odometer, device clock, battery date, etc.)
- RAW - The entire log in hex
- TAPE - Soft error rates for last 20 tapes

DATA PROMPTS:

Which log is to be displayed?

ALL
CONFIGS
FAULT
MAINTENANCE
RAW
TAPE

Your selection [<cr> = none]>

FOR HP INTERNAL USE ONLY

OUTPUT FORMAT:

{For CONFIGS:}

=====

POWER-ON CONFIGURATION VALUES

=====

FRONT PANEL

Allow FP configuration change	ENABLED DISABLED
Front panel media removal	ENABLED DISABLED
Prompt for archival rewind	ENABLED DISABLED
Prompt for data compression	ENABLED DISABLED
Operator selection time-out	nn
Front panel language	ENGLISH GERMAN FRENCH SPANISH
Activity indicator symbol	"-" "_" "*"
Gauge usage	"BOT EOT" "Data in buffer" "Queued commands/reports....."

GENERAL CONTROL

Allow FP configuration change	ENABLED DISABLED
Allow host configuration change	ENABLED DISABLED
Default write density	HOST NONE 800 1600 6250 COMPRESSED
FP density control lock	ENABLED DISABLED [HOST override]
Auto on-line	ENABLED DISABLED
Archival rewind	ENABLED DISABLED
Stop on failure	ENABLED DISABLED [OVERRIDE prompt]
Report recovered errors	ENABLED DISABLED

WRITE

Immediate response mode	ENABLED DISABLED
Tape mark count to terminate immediate response mode	DISABLED nn
Retry count	nn
Gap size	
800bpi (NRZI)	MIN = n.nn" MAX = n.nn"
1600bpi (PE)	MIN = n.nn" MAX = n.nn"
6250bpi (GCR)	MIN = n.nn" MAX = n.nn"
EOT stop	ENABLED DISABLED
Holdoff time-out	nn
Startup point (8ths of memory)	n
Write control	nn
Write skip start	n

FOR HP INTERNAL USE ONLY

DATA COMPRESSION	
Default	ENABLED DISABLED NA
Front panel request	ENABLED DISABLED NA
Host request	ENABLED DISABLED NA
Host override of front panel	ENABLED DISABLED NA
Resulting request	ENABLED DISABLED NA
Expansion protection	
	ENABLED DISABLED NA
Max compressed record size	NA nnnn Kbytes
Max record tape marks	ENABLED DISABLED NA
Max uncompressed record size	ENABLED DISABLED NA
Max access tape marks	NA n
Max access bytes	NA nnnn Kbytes
Record optimization threshold	ENABLED DISABLED NA
DC optimization threshold	NA nn:n
DC optimization sample period	NA nnnn bytes
READ	
Readahead mode	ENABLED DISABLED
Tape mark count to terminate read ahead mode	DISABLED nn
Retry count	nn
Trailing buffer	n records (nn bytes)
Startup point (8ths of memory)	n
INTERFACE - HP-CS	
Allow interface address changes	ENABLED DISABLED
Allow interface to change non-volatile ram	ENABLED DISABLED
Block length	n
Bus inactivity limit	n
Disconnect time limit	n
Disconnect length	n
Inquiry field	nnn
Interface only reset	ENABLED DISABLED
Read EOM reported	ENABLED DISABLED
SCSI II compatible	ENABLED DISABLED
EOT reporting modes	n
SCSI parity checking	ENABLED DISABLED
Vendor unique density reporting	ENABLED DISABLED
Suppress illegal length	DISABLED n

FOR HP INTERNAL USE ONLY

{For FAULT:}

=====

ERROR LOG

=====

----- 01 -----

Error Class - error group according to device ERS

[Detection - while name of detecting action]

[- by name of detecting processor/program]

[- (nnn) name of detecting test]

Explanation - (hhh) error explanation as listed in device ERS

[Faulty FRUs - (nn) FRU name as listed in device ERS]

[- (nn) FRU name as listed in device ERS]

Cumltv Time - nnnnn:nn:nn

Lapsed Time - nnnnn:nn:nn

{or} Clock reset since last error

[*NOTE: Error occurred during power-on selftest.]

----- 02 -----

:

:

----- nn -----

{For MAINTENANCE:}

=====

MAINTENANCE INFO

=====

Clock : nnnnn:nn:nn

Tape odometer : nnnnnnnnnnnnn.n feet

RAM odometer : nnnnnnnnnn

Power cycles : nnnnn

Battery date : 'nn

Versions:

processor nn.nn.nn

:

:

FOR HP INTERNAL USE ONLY

{For RAW}

```

=====
                                RAW DUMP
=====
WORDS      0  1  2  3  4  5  6  7  8  9
0|  hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
10| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
20| hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh hhhh
:   :   :   :   :   :   :   :   :   :   :
:   :   :   :   :   :   :   :   :   :   :
  
```

{For TAPE:}

```

=====
                                CURRENT TAPE ERROR RATE
=====
nnnnbpi (ccc)      READ      WRITE      TOTAL
-----
Hard Errors        nnnnn      nnnnn      nnnnn
Soft Errors        nnnnn      nnnnn      nnnnn
Bytes Processed    n X 10**nn  n X 10**nn
Bytes/Soft Error   n X 10**nn  n X 10**nn
  
```

```

=====
                                ERROR RATE LOG
=====
----- 01 -----
nnnnbpi (ccc)      READ      WRITE      TOTAL
-----
Hard Errors        nnnnn      nnnnn      nnnnn
Soft Errors        nnnnn      nnnnn      nnnnn
Bytes Processed    n X 10**nn  n X 10**nn
Bytes/Soft Error   n X 10**nn  n X 10**nn

Load Time         - nnnnn:nn:nn

----- 02 -----
:
:
----- nn -----
  
```

FOR HP INTERNAL USE ONLY

LOOPBACK

USAGE:

The Loopback operation will perform both a read and write loopback test. Both operations test the functionality of the SCSI Bus and control circuitry on the SCSI Interface pca. The read operation involves receiving a bit pattern 512 byte string) on the SCSI channel from the mag tape controller, and comparing those bytes to a known number of bytes. The write loopback involves sending a known set of data bytes (512 byte string) to the mag tape controller. In this case, the target will determine if the proper bytes have been received.

SYNTAX:

LOOPBACK
LB

DATA PROMPTS:

None

OUTPUT FORMAT:

Tape Drive data channel checks out OK.

{OR}

The following transmission errors were detected during the channel loopback test:

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits 01234567
===== nn	===== hh	===== hh	===== bbbbbbbb
{EXAMPLE:}			
12	56	54	00000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.

FOR HP INTERNAL USE ONLY

MODESENSE

USAGE:

This command will obtain the current mode sense data from the device and display it in readable text form.

SYNTAX:

MODESENSE

DATA PROMPTS:

None

OUTPUT FORMAT:

----- MODE SENSE DATA -----

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh hh hh hh hh hh hh

Interpreted Data:

Tape is write [ENABLED | DISABLED].
Tape density is [800bpi (NRZI) | 1600bpi (PE) | 6250bpi (GCR) |
6250-COMPRESSED].
Drive buffered mode is [UN]BUFFERED.
[800bpi (NRZI)]
[1600bpi (PE)]
[6250bpi (GCR)]
[6250-COMPRESSED]

FOR HP INTERNAL USE ONLY

MOTIONCHECK

USAGE:

This command checks out basic tape movement functions of the drive. The tape will be partially erased and rewind. A set of 5 files (20 records each) will be written to tape and the tape rewind. Each record will contain a header identifying the file and record number which will be verified at key times to ensure that the tape is in the expected position. The following sequence will then be executed for a number of times specified by the user:

```
+ = forward space
- = backward space

+ 1 files
  read record (to verify position : 2,1)
- 2 file
  read record (to verify position : 1,1)
+ 1 record
  read record (to verify position : 1,3)
- 2 records
  read record (to verify position : 1,2)
+ 3 files
- 4 files
+ 2 files
- 1 files
  read record (to verify position : 3,1)
+11 records
- 4 records
+11 records
-19 records
+ 2 records
  read record (to verify position : 3,4)
+ 4 files
  verify tape runaway
  rewind
- 2 records
  verify past BOT
- 2 files
  verify past BOT
```

Since this function may cause data to be written to or read from tape, SCSIREEL will prompt the user for confirmation before reading or writing tape if a tape is found already loaded prior to the first r/w operation.

FOR HP INTERNAL USE ONLY

SYNTAX:

MOTIONCHECK
MC

DATA PROMPTS:

Specify loop count: (1..10000|infinite) [1]>

OUTPUT FORMAT:

No unexpected errors were encountered on Motion check.

{or}

Expected position : record #nn of file nn
Detected position : record #nn of file nn

*** MOTIONCHECK FAILED. (REELERR 05054)

FOR HP INTERNAL USE ONLY

REQUEST

USAGE:

This command will obtain the current request sense data from the device and display it in readable text form.

SYNTAX:

REQUEST

DATA PROMPTS:

None

OUTPUT FORMAT:

----- REQUEST SENSE DATA -----

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh hh hh hh hh hh
16	hh hh hh hh hh hh hh hh hh hh hh hh hh
32	hh hh hh hh hh hh hh hh

Interpreted Data:

No error was reported by the drive.
BOP / BOM detected.

Tape position is BOT.
- Last command was retried 0 times.

FOR HP INTERNAL USE ONLY

RESET

USAGE:

This command clears the selected device in a manner independent of the channel to which it is connected. This command causes the drive to be placed in a known condition as follows:

- o Tape drive protocol will be restarted
- o Data buffers will be cleared
- o Current tape position will be retained
- o Current tape status will be retained
- o Drive is placed offline

SYNTAX:

RESET

DATA PROMPTS:

None

OUTPUT FORMAT:

Device has been cleared.

FOR HP INTERNAL USE ONLY

REVISIONS

USAGE:

This command will obtain the revisions of the code used on each fru
in the device under test.

SYNTAX:

REVISIONS

DATA PROMPTS:

None

OUTPUT FORMAT:

===== IDENTIFY FIRMWARE REVISIONS DATA =====

Raw Data:

Byte #	Hex Value
0	hh hh hh hh hh hh hh hh hh hh hh hh hh
16	hh hh hh hh hh hh hh hh hh hh

Interpreted Data:

Controller Version.Revision : Processor Name (Number), FRU ID:

03.02 : Fp - Front Panel(8), FRU ID 00
03.87 : Dc - Drive Controller(3), FRU ID 03
03.87 : Db - Data Buffer(4), FRU ID 04
03.05 : Ss - SCSI Single Ended Interface(15), FRU ID 35

FOR HP INTERNAL USE ONLY

REWIND

USAGE:

This command causes the tape mounted on the drive to be rewound to BOT.

SYNTAX:

REWIND
RW

DATA PROMPTS:

None

FOR HP INTERNAL USE ONLY

SELFTEST

USAGE:

This command will initiate internal diagnostic tests which reside in the tape drive. The tests which can be selected are device dependent and are fully described in the support documentation for each type of tape drive. The user will be prompted for all needed information but will require the aforementioned support documentation to select correct selftest numbers and parameter values.

Note



If parameters are possible, prompts for all parameters will be issued even if SCSIREEL does not consider them to be appropriate for that selftest. Furthermore, any value between 0 and 255 will be passed to the device even if SCSIREEL recognizes it as invalid for the selected selftest. If either the selftest or any parameter is rejected by the device, an appropriate error message will be displayed.

Certain selftests are designed such that the results are available only from the front panel of the device. Access to these tests will be allowed but no test results will be displayed by this diagnostic program.

Certain selftests require manual interaction at the device itself. These tests do not terminate until the reset button is pressed at the front panel. Furthermore, like other front panel checks, these tests always return a successful status, the results being available either at the front panel or by observing some other action on the device. Any of these tests which require a reset at the front panel of the device to terminate will trigger the program to verify the intent to run that diagnostic. If the user opts to continue, he will have a maximum time of 7 minutes to perform the manual manipulations and hit the reset button. After that, the request will be automatically terminated by the diagnostic subsystem.

The selftest may be automatically repeated. The execution count used is implemented at the diagnostic level and NOT within the device. The selftest request will be issued until the specified execution count is reached or until the selftest fails. The iteration count of the number of successful tries (> 1) will be displayed. The user can abort the selftest request by entering a loop count of 0. Once the selftest sequence has been started, the user may abort via the program interrupt which is conventional on the local system (CNTRL-Y on MPEXL, CNTRL-C on HPUX).

FOR HP INTERNAL USE ONLY

SYNTAX:

SELFTEST
ST

DATA PROMPTS:

```
Selftest number.      (0..255) [<cr>=quit]>
{
{parameter prompts are conditional depending on the}
{selftest number}
Parm A                (0..255) [0]>
Parm B                (0..255) [0]>
Parm C                (0..255) [0]>
Specify loop count
  1 - Run 1 time
  2 - Run 10 times
  3 - Run 100 times
  4 - Run 1000 times
  0 - Infinite looping (0..4) [1]>
```

{If the selected selftest is valid but requires manual interaction at }
{the device (other than loading a tape), the following will be issued:}

* Warning - Selftest (nnn) requires manual interaction at the device.

Do you wish to continue anyway? (yes|no) [N0]>

{If "yes" is selected}

This test will terminate in 7 minutes if you do not terminate it
sooner from the front panel of the device.

FOR HP INTERNAL USE ONLY

OUTPUT FORMAT:

nnnnnnnn out of nnnnnnnn iterations were completed.

{The following conforms to section 3.4.4 if this document.}

No faulty Field Replaceable Units (FRUs) were detected
by device diagnostic #nnn.

{or}

Device diagnostic #nnn detected the following failure:

Error Class - error group according to device ERS
[Detection - while name of detecting action]
[- by name of detecting processor/program]
[- (nnn) name of detecting test]
Explanation - (hhh) error explanation as listed in device ERS
Faulty FRUs - (nn) FRU name as listed in device ERS
[- (nn) FRU name as listed in device ERS]

{or}

Device diagnostic #nnn was unable to either run to completion
and/or isolate an FRU. Error returned:

Error Class - error group according to device ERS
Explanation - (hhh) error explanation as listed in device ERS

{or}

Results for selftest nnn are available at the physical device only.

FOR HP INTERNAL USE ONLY

SUSPEND

USAGE:

This command temporarily suspends running of the diagnostic, allowing the user to issue other DUI commands. This feature should be handy for retaining any default values accumulated by WORKOUT or other SCSIREEL functions. To return to SCSIREEL, the user simply enters "resume" at the DUI prompt.

SYNTAX:

SUSPEND

DATA PROMPTS:

None

OUTPUT FORMAT:

DUI>

FOR HP INTERNAL USE ONLY

TREES

USAGE:

This command causes one of SCSIREEL's diagnostic trouble trees to be executed.

SYNTAX:

TREES [*tree specifier*]

tree specifiers:

- | | |
|-------------|--|
| ALL | - All of the following. |
| IOPATH | - Does not require restrictive access to device. |
| ELECTRONICS | - Requires exclusive access to device. |
| READWRITE | - Requires exclusive access & operator assistance. |
| MEDIA | - Requires exclusive access & operator assistance. |

DATA PROMPTS:

Which tree is to be executed?

ALL
IOPATH
ELECTRONICS
READWRITE
MEDIA

Your selection [<cr> = none]>

FOR HP INTERNAL USE ONLY

TUR

USAGE:

This command issues Test Unit Ready to the device. If the device is not ready, the sense data reflecting the current state of the device is displayed.

SYNTAX:

TUR

DATA PROMPTS:

None

FOR HP INTERNAL USE ONLY

UNLOADTAPE

USAGE:

This command causes the automatic unloading to be initiated.
The request will be honored even if the tape has not been rewound.

SYNTAX:

UNLOADTAPE
ULT

DATA PROMPTS:

None

OUTPUT FORMAT:

Tape was successfully UNLOADed.

FOR HP INTERNAL USE ONLY

WORKOUT

USAGE:

Introduction

This command provides the user with a way to read and write to tape in a variety of ways. This function should be useful in isolating medium vs. drive problems, verifying media, isolating certain classes of read/write problems, and simulating system use of the tape drive.

This command will cause records to be written to tape, the tape rewind, and those same records read back off the tape. The user will have the option of whether or not to verify that the records read match those written earlier. The user will be able to vary the write density record sizes (file size will be a constant 20 records per file), record content, number of files per tape, and number of tapes. In addition, the command has certain built-in error count limits, but these can be overridden.

This command will always clear the drive's internal error log prior to writing to the tape. The user will be warned of this and may then back out of the command to look at and/or record the log by typing CANCEL at any prompt.

Since this function may cause data to be written to or read from tape, SCSIREEL will prompt the user for confirmation before reading or writing tape if a tape is found already loaded prior to the first r/w operation. The tape will be rewind and left on-line at the end of this command.

Data Selection

Data will be written as constant 20 record files. However, file size can be varied indirectly by manipulating record size. The record size choice will be limited by the minimum and maximum record size for the selected device, selected write density, and interface.

FOR HP INTERNAL USE ONLY

Selection of the MIXTURE option will vary record sizes between different files. In this case, the following pattern will be repeated until the specified number of files (see below) is reached:

```
1 file MAX byte records
: : : : (in 16 Kbyte increments)
1 file 16 kbyte records
1 file 4 kbyte records
1 file 256 byte records
1 file MIN byte records
1 file 256 byte records
1 file 4 kbyte records
1 file 16 kbyte records
: : : : (in 16 kbyte increments)
1 file MAX byte records
1 file MIN byte records
```

There will be a choice of byte patterns to be written to the tape. Each record will consist of repetitions of the pattern up to the record size limit specified. The SEQUENTIAL pattern writes the pattern 0,1,...254,255 (00..ff hex). The ALTERNATING pattern alternates between 00 and ff (all 0s and all 1s). The BUTTERFLY pattern attempts to change as many bits as possible in each successive non-repeating character - 0,255,1,254,3,... (00,ff,01,fe,03,...). If SINGLE CHARACTER is selected, the user will be prompted for a character (in hexadecimal representation). Each record is then filled with repetitions of that single character. WORST CASE data varies according to density format (i.e., NRZI, PE, GCR). Patterns to be sent in each of these cases is as follows:

```
NRZI (800 bpi) - 00,00,...
PE (1600 bpi) - ff,ff,ff,f0,0f,00,00,00
GCR (6250 bpi) - 04,20,98,bc,20,04,bc,00
```

The number of files to be written per tape must be specified. The EOT option will allow continuous writes to the end of tape, however many records that turns out to be. In addition the number of tapes to be written is specified. Any number between 1 and 100,000 is valid. Note that in this context, a tape to be written does not refer to an actual medium change, but rather to the cycle of "write records, rewind, read records, and rewind".

FOR HP INTERNAL USE ONLY

Data Verification

The ultimate success of the write/read operation can be determined by specifying record verification. This option will compare each record read to what this program originally sent, displaying any discrepancies. The user should note that this option may have a substantial effect on streaming since it slows the rate at which SCSIREEL can read and accept new records. Normally, the first 10 character mismatches for any given record will be sufficient to identify a problem. However, the user will be allowed to specify any mismatch display limit.

The user will be notified if verification is prematurely disabled for any reason. Verification will be disabled for the current tape when any of the following conditions occur:

- o A hard read/write error occurs.
- o The specified record write/read mismatch limit is reached.

Error Processing

SCSIREEL sorts hard errors into three major categories - fatal, ignorable, and recoverable. Fatal errors are serious enough to cause the remainder of processing for a particular tape to be aborted. In this case, the appropriate error message(s) will be issued and the user will be returned to the SCSIREEL> prompt.

Recoverable hard errors are those which may be corrected by SCSIREEL. These include:

SCSI error	SCSIREEL action
5 -write protection	Correct or prompt user to do so
11 -drive not on-line	Correct or prompt user to do so
-tape runaway	Rewind & start next tape

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Ignoreable errors are read/write hard errors for which the drive has already performed retries and tape repositioning. The user will be able to specify the number of ignoreable errors to tolerate for each tape before that tape is aborted. If the user specifies a limit greater than one, no recovery will be attempted, but the processing will continue, despite the fact that the drive may have purged many records from its buffer. In addition, record verification will be disabled for that tape. The following SCSI error codes are considered ignoreable:

READ	WRITE
41	41
45	45
47	
48..49	48..49
50..54	50..54
57..64	57..64
103..106	103..106

The user should note that even a failure due to exceeding the retry limit is considered ignoreable even though this may result in a tape runaway condition on a subsequent read.

If any of the following conditions is met, execution of the defined sequence for the current tape will cease, the tape will be rewound and processing of the next tape will be initiated.

- o The number of files specified by the user has successfully been processed.
- o The specified limit of ignoreable read/write hard errors has been reached.
- o The specified limit of record write/read mismatches has been reached.

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Normally, execution of this command will cease when any of the following conditions is met:

- o The number of tapes specified by the user has been processed.
- o A fatal hard error occurs (e.g., loss of tension, rewind failure, etc.).
- o The user stops processing with the program interrupt which is conventional on the local system (CRTL-Y on MPEXL, CRTL-C on HPUX). The user will be returned to the SCSIREEL> prompt.
- o The specified number of fatal hard errors has been reached.

The device internal log is a circular queue, so that if the specified error limit has been reached, the most recent errors will be available when the command finally terminates.

Sequences

The user will select one of several different read/write sequences. The user defined sequence allows the user to select all of the pertinent parameters. The others run the workout with preselected values.

FOR HP INTERNAL USE ONLY

SHORT sequence

The "short" sequence is intended to provide a brief checkout of basic functionality of the drive. Normally, the user will not suspect anything is wrong with the drive and will use this to verify that assumption.

For each of the content patterns listed below enough files will be written to tape to accommodate all of the record sizes in the MIXTURE option. This will then be repeated for all densities available on the selected drive. The user will be able to select a loopcount for the entire sequence. The following values will be selected:

Write density	= (all available)
Record size	= mixture
Content pattern	= all 0s then all 1s then alternating then worst case
Number of files/tape	= 15
Number of tapes	= (user specified)
Soft error display	= no
Record verification	= yes
Mismatch display limit	= 10
Mismatched record limit	= 10
Ignorable hard error limit	= 1
Fatal hard error limit	= 1



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LONG sequence

The "long" sequence is also intended to check out a drive which is not suspected of failing (i.e., new or just repaired). Since this sequence writes to end of tape several times, users should select a length of tape appropriate to their time constraints.

For each of the content patterns listed below, 16Kbyte records will be written to end of tape (EOT). This will then be repeated for all densities available on the selected drive. The user will be able to select a loopcount for the entire sequence. The following values will be selected:

Write density	= (all available)
Record size	= 16Kbytes
Content pattern	= all 0s then sequential then worst case
Number of files/tape	= EOT
Number of tapes	= (user specified)
Soft error display	= no
Record verification	= yes
Mismatch display limit	= 10
Mismatched record limit	= 10
Ignorable hard error limit	= 10
Fatal hard error limit	= 1

FOR HP INTERNAL USE ONLY

MEDIACHECK sequence

The mediacheck sequence checks an entire tape to determine if it is good. The user will select the density to be written to the tape. The number of any record which has been retried will be displayed along with the number of retries. Soft errors are tallied and displayed at the end as an indication of overall tape condition. The following values will be selected:

Write density	= (user specified)
Record size	= max
Content pattern	= all 1s
Number of files/tape	= EOT
Number of tapes	= 1
Soft error display	= yes
Record verification	= yes
Mismatch display limit	= 10
Mismatched record limit	= 10
Ignorable hard error limit	= 100
Fatal hard error limit	= 1

FOR HP INTERNAL USE ONLY

SYNTAX:

WORKOUT [*workout specifier*]

WO

workout specifier:

SHORT - Quick check of read/write capabilities (<5 in.)
LONG - Extended check of read/write capabilities
MEDIACHECK - Checks condition of loaded tape (destructive)
USERDEFINED - User is prompted for read/write parameters

DATA PROMPTS:

{The defaults shown for all prompts are the initial values for the}
{first call to workout after entering the interactive section. }
{Thereafter, the values from the previous call will be default. }

{If the workout type is not specified as a command qualifier, the }
{user will be prompted for that information. }

Specify workout:

(short
long
mediacheck
userdefined)

Your selection [USERDEFINED] >

{For all options, the following will be issued}

WARNING - This command clears the drive's internal hard error log.
If this is not desired, type "cancel" at any prompt.

{If "userdefined" is selected, the following prompts will obtain }
{the required parameters. The other media sequence options may }
{use one or more of these prompts as well. }

Specify write density:

(NRZI800|PE1600|GCR6250|COMPRESSED) [PE1600]>

Specify record size in bytes:

(min..max[mixture] [MIXTURE]>

Specify content pattern:

(sequential [ff,00,01,02,..fe]
alternating [00,ff,00,ff,..]
butterfly [00,ff,01,fe...]
single [you will be prompted]
worst [density dependent])

Your selection [SEQUENTIAL]>

[Specify the desired character:

(\$0..\$ff) [\$ff]>]

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Specify number of 20 record files per tape:
(1..10000|EDT) [10]>
Specify number of tapes (sequence repeats):
(1..10000|infinite) [1]>
Should soft error counts be displayed?
(yes|no) [NO]>
Do you wish to verify records?
(yes|no) [NO]>
[Specify verification display limit
(mismatches per record):
(1..10000) [10]>
Specify maximum error limits:
[Mismatched records/tape:
(1..10000) [10]>
Ignorable r/w errors/tape:
(1..10000) [1]>
Total fatal hard errors (max log size = nn):
(1..10000) [1]>

OUTPUT FORMAT:

{The user will be warned of any hard errors even if nonfatal}

*WARNING - A FATAL hard error occurred while attempting to
write record !. (REELWARN 07035)

*WARNING - An IGNORABLE hard error occurred while attempting to
write record ! of file !. (REELWARN 07036)

*WARNING - A FATAL hard error occurred while attempting to
read record !. (REELWARN 07037)

*WARNING - An IGNORABLE hard error occurred while attempting to
read record !. (REELWARN 07038)

{If soft error display is selected, the following display will occur:}

Record nnnnnnnn of file nnn was retried nn times
Record nnnnnnnn of file nnn was retried nn times
: : : : : :
: : : : : :

A total of nnnnnnnn retriees were made on nnnnnnn records.

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{If verification mode was selected, any mismatches found during the read phase will be shown as follows:}

*** RECORD READ DOES NOT MATCH THE DATA ORIGINALLY SENT. (REELERR 5049)

File : nnnnnnnnn Bytes written : nnnnn
Record : nn Bytes read : nnnnn

Byte #	Hex Value Written	Hex Value Read	Erroneous bits
-----	-----	-----	-----
nnnnnn	hh	hh	bbbbbbbb
{EXAMPLE:}			
12	56	54	00000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.
.	.	.	.

{If the specified mismatch display limit is exceeded, the }
{following message will be displayed: }

Verification display has been SUPPRESSED for the rest of this record.

{Any time verification has been disabled, one or more of the
following messages will be displayed as appropriate:}

* WARNING - Data verification has been DISABLED for the rest of
this tape. (REELWARN 5034)
- nnnnn records failed verification.
- fatal hard error encountered.
- write operation produced ignorable hard errors.

{One of the following summary messages will be displayed as appropriate:}
WORKOUT complete - nnnnn fatal hard errors were detected.
- nnnnn ignorable hard errors were detected.
- nnnnn records failed verification.
- nnnnn records were retried.

{OR}
*** WORKOUT ABORTED -- HARD ERROR LIMIT REACHED. (REELERR 5047)
- nnnnn fatal hard errors were detected.
- nnnnn ignorable hard errors were detected.
- nnnnn records failed verification.
- nnnnn records were retried.

FOR HP INTERNAL USE ONLY

Error Messages

The following are general error/warning messages which may be encountered during the execution of SCSIREEL. Note, however, that system dependent error messages may be displayed by the subsystem along with any error message generated by this diagnostic. All error message without the (REELERR #) trailer are generated by the subsystem.

Errors which have explanatory notes (preceded by “—”) will normally display only one of the notes listed here. The exclamation point (!) is a symbol used to indicate the point at which context dependent information is to be placed.

05000	*** THE SUPPLIED BUFFER OF ! BYTES WAS TOO SMALL FOR THE REQUESTED TRANSFER OF ! BYTES. (REELERR 05000)
CAUSE	The device attempted to return more data than the program was capable of receiving. Normally, the program should know how many bytes to expect for each message, so this is indicative of either 1) a device problem, or 2) a device update which has not yet been incorporated into the diagnostic program.
ACTION	Isolate which of the above causes applies. If 2, then notify your support engineer.

05001	*** TAPE DRIVE FAILED TO COMPLY WITH REQUEST. (REELERR 05001)
CAUSE	The tape drive has acknowledged a request but refuses to comply. Normally the reason for the refusal is contained in the I/O status block which is displayed following this message.
ACTION	Correct any problems indicated by the status display (e.g. remove write ring from tape, place drive on-line, etc.) and then retry the diagnostic.

05002	*** SCSIREEL ABORTING DUE TO FATAL ERROR. (REELERR 05002)
CAUSE	This diagnostic has detected an error from which it cannot or should not recover.
ACTION	Correct problems indicated by previous error messages and then rerun the diagnostic if appropriate.

05003	*** UNABLE TO OBTAIN COMPLETE IDENTIFICATION OF DEVICE. (REELERR 05003)
CAUSE	SCSIREEL was unable to obtain device logs from the drive. Therefore, some identification information could not be determined. However, the device did respond to an inquiry command.
ACTION	The program will attempt to do all functions possible with the information it does have. If this is not satisfactory, take further action based on I/O status returned.

05004	*** UNEXPECTED ERROR WAS RETURNED BY THE DIAGNOSTIC SUBSYSTEM. (REELERR 05004)
CAUSE	An unexpected condition arose which may be indicative of a problem outside this program.
ACTION	Report any immediately preceding errors to your support engineer.

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05005	*** UNEXPECTED ERROR ENCOUNTERED - LIKELY SCSIREEL PROGRAM ERROR. SCSIREEL ERROR LOCATION CODE = !. (REELERR 05005)
CAUSE	An unexpected condition arose which is indicative of an internal problem in this program. The error location code has meaning only to a support engineer in the context of the program source code.
ACTION	Notify your support engineer.
<hr/>	
05006	*** RECEIVED INVALID RESPONSE FROM DRIVE. A DATA PATH OR DEVICE ERROR IS INDICATED. (REELERR 05006)
CAUSE	A response was received from the device but is not recognized by this diagnostic.
ACTION	Further diagnosis of the drive is necessary. Run the loopback test (Section 4) to attempt to isolate the problem to the data path. If the device being tested is new and returns previously unused codes, modification of this program may eventually be necessary. In this case, notify your support engineer.
<hr/>	
05007	*** YOUR RESPONSE IS NOT A VALID INTEGER NUMBER. (REELERR 05007)
CAUSE	SCSIREEL expected but did not receive an integer number as a response to a prompt for information.
ACTION	You should be reprompted for the same information. Check your previous entry for non-numeric characters and/or an invalid base indicator and enter numeric digits only.
<hr/>	
05008	*** YOUR RESPONSE IS NOT CORRECT. (REELERR 05008)
CAUSE	A response was entered by the user which was in some way inappropriate for the prompt given. One of the following listed submessages should be provided as a detailed explanation:—expected numeric response—unrecognized command, type help for assistance—numeric response must fall between ! and !.
ACTION	Re-enter requested data or type "HELP" for prompt specific information. Data prompts often contain a range of valid responses enclosed in parentheses.
<hr/>	
05010	*** DEVICE HARDWARE STATUS COULD NOT BE OBTAINED. (REELERR 05010)
CAUSE	SCSIREEL is unable to obtain the device hardware status in either a response to a request or as an explanation of a failed request. Additional messages which further isolate the problem should precede this.
ACTION	Action is dependent on preceding error message(s).
	NOTE: This is an expected response for a loopback write failure. That is, when the device receives a faulty pattern from SCSIREEL, it simply returns a failure status - neither a reply pattern nor an explanatory hardware status is returned.

FOR HP INTERNAL USE ONLY

05011	*** UNABLE TO SATISFY REQUEST TO "!". (REELERR 05011)
CAUSE	Some program request (substituted for !) could not be executed. Other explanatory messages should precede this. If the root cause was drive failure (REELERR 05001), this message will be preceded by a listing of the current hardware status for the drive.
	NOTE: Some sections make several different requests to the drive so that requests seemingly unrelated to the users actual request may be may fail. For example, section 3 (inquiry) involves both an "identification" request and a "read log" request. In these cases, an additional error message will specify the actual failed request, made by the program on behalf of the user.
ACTION	Action is dependent on preceding error message(s) and device state as indicated in hardware status.
<hr/>	
05012	*** IMPRACTICAL OR IMPOSSIBLE TO COMPLETE REMAINDER OF SECTION !. (REELERR 05012)
CAUSE	The previous error was fatal to successful completion of the current section.
ACTION	Fix cause of previous error(s) and rerun this section of the diagnostic, if desired..
<hr/>	
05013	*** IMPRACTICAL OR IMPOSSIBLE TO COMPLETE REMAINDER OF STEP !. (REELERR 05013)
CAUSE	The previous error was fatal to successful completion of the current step.
ACTION	Fix cause of previous error(s) and rerun this step of the diagnostic, if desired..
<hr/>	
05014	*** UNABLE TO RETRIEVE REQUESTED INFORMATION FROM DATA BUFFER. (REELERR 05014)
CAUSE	The drive complied with the current request, but SCSIREEL was unable to access information returned by the drive.
ACTION	Advisory only. Action dependent on preceding error message(s).
<hr/>	
05015	*** UNABLE TO OBTAIN DATA BUFFERS FOR TALKING WITH THE TAPE DRIVE. (REELERR 05015)
CAUSE	An area for data transfer between the device and SCSIREEL could not be established in memory. Additional details should precede this message. The most likely cause is insufficient system resources (memory).
ACTION	Action dependent on preceding error message(s).
<hr/>	

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05016	*** UNABLE TO CONTINUE EXECUTION OF REQUESTED DIAGNOSTICS. (REELERR 05016)
CAUSE	Either access to the device could not be obtained, and/or fatal error internal to the diagnostic system occurred while trying to establish access to the device.
ACTION	Correct any immediately preceding error conditions and rerun the diagnostic if desired.
<hr/>	
05017	*** UNABLE TO RETRIEVE ONE OR MORE COMMANDS FROM THE MESSAGE CATALOG. SUSPECT CORRUPTION OF DIAGNOSTIC SUBSYSTEM. (REELERR 05017)
CAUSE	Either the message catalog is incorrect/corrupted or one or more commands are missing from the catalog.
ACTION	You will be given the choice to continue on a number code basis or not (you must answer in the numeric codes for yes/no). In any case, your support engineer should ensure that all commands and keywords are properly listed in the system catalog.
<hr/>	
05018	*** UNABLE TO COMPLETELY DECODE DEVICE HARDWARE STATUS. (REELERR 05018)
CAUSE	Some diagnostic program service unexpectedly failed, preventing complete decoding of device hardware status.
ACTION	The hardware status displayed should be consulted but with the understanding that some information may be misleading or missing. This is normally unexpected so your support engineer should be notified.
<hr/>	
05019	*** FAILED TO RECEIVE REPLY FROM THE DEVICE AFTER ! SECONDS. (REELERR 05019)
CAUSE	A reply from the selected device was not received within the specified time-out interval. Although this could result from extremely heavy system usage, the device or some intermediate hardware/software is probably not functioning properly.
ACTION	If you selected the "errpause" parameter in the run command, you be will given the opportunity to retry the function by answering "YES" to the continuation prompt. More than one retry will probably be fruitless.
<hr/>	
05020	*** SPECIFIED ERROR COUNT LIMIT HAS BEEN REACHED. (REELERR 05020)
CAUSE	The error limit specified in the "ERRCOUNT" parameter of "RUN" command has been reached, causing the diagnostic to abort further processing.
ACTION	If this is not desired, either omit the ERRCOUNT parameter or set it to a higher value.
<hr/>	

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05021	*** AN UNEXPECTED DEVICE DEVELOPMENT STATUS WAS ENCOUNTERED. (REELERR 05021)
CAUSE	Device development status is a concept internal to this program. This error, therefore, probably represents a problem internal to SCSIREEL.
ACTION	Notify your support engineer.
<hr/>	
05022	*** THE REQUESTED FUNCTION IS NOT CURRENTLY AVAILABLE ON THE SELECTED DRIVE. (REELERR 05022)
CAUSE	The requested function is not currently implemented by the diagnostic system for the device being tested.
ACTION	If this is unexpected, notify your support engineer.
<hr/>	
05023	*** THE REQUESTED COMMAND REQUIRES ! MODE. (REELERR 05023)
CAUSE	The user either did not or was not able to request a restrictive enough operation mode (exclusive) to execute the requested function.
ACTION	Consult the Diagnostic Program Development Guide for information on operation modes and how to request them. You may need to obtain additional security clearance from your system manager.
<hr/>	
05024	*** UNABLE TO A RUN DEVICE INTERNAL DIAGNOSTIC TEST. (REELERR 05024)
CAUSE	A selftest/diagnostic which SCSIREEL requested the device to execute was either invalid or did not run to completion.
ACTION	Action is dependent on accompanying error messages and returned hardware status. If the requested test was not recognized by the device, an adjustment to SCSIREEL may be necessary and your support engineer should be notified.
<hr/>	
05025	*** THE TIME STAMP RETURNED BY THE DEVICE WAS LARGER THAN EXPECTED BY SCSIREEL AND THEREFORE COULD NOT BE DECODED. (REELERR 05025)
CAUSE	A time stamp greater than 6.8 years was found. Time stamps this large are not expected from any device.
ACTION	If this is not an error for the device being diagnosed, consult your support engineer.
<hr/>	

FOR HP INTERNAL USE ONLY

05026	*** UNABLE TO VERIFY DEVICE ID FOR DEVICE DEPENDENT OPERATION. (REELERR 05026)
CAUSE	SCSIREEL was attempting to perform a function which requires knowledge of specific device identification information. That information could not be obtained, and therefore, SCSIREEL could not take the appropriate action(s).
ACTION	Correct problems described by preceding messages and rerun diagnostic if desired.
<hr/>	
05027	*** SCSIREEL WAS ASKED TO EXECUTE AN UNRECOGNIZED SECTION (!). (REELERR 05027)
CAUSE	This is strictly an internal error for SCSIREEL or for the diagnostic subsystem.
ACTION	Non-fatal advisory. Notify your support engineer.
<hr/>	
05028	*** THE DRIVE REFERENCED A LOG ENTRY (!) WHICH IS LARGER THAN THE TOTAL NUMBER OF ENTRIES IN THE LOG (!). (REELERR 05028)
CAUSE	The log header in the drive's memory specifies both the total number of entries in the log and the number of the most recent entry. These two numbers were found to conflict with one another. No entries will be displayed.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.
<hr/>	
05029	*** THE DEVICE DIRECTLY OR INDIRECTLY SPECIFIED A LOCATION (!) WHICH IS LARGER THAN THE TOTAL NUMBER OF BYTES IN THE LOG (!). THE LOG IS PROBABLY CORRUPTED AND SOME OR ALL OF THE FOLLOWING DATA MAY BE INVALID. (REELERR 05029)
CAUSE	The drive returns a limited number of bytes of information for a log dump request. A pointer was found which directly or indirectly refers to a location past the last byte returned.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.
<hr/>	
05030	*** THE NUMBER OF BYTES IN THE LOG ARE LESS THAN THE MINIMUM LOG SIZE FOR THIS DEVICE. (REELERR 05030)
CAUSE	A certain portion of any log dump contains a fixed size portion (in later devices this is the index to the variable portion of the log). Not all of this fixed size portion was returned.
ACTION	This is indicative of a problem internal to the device. Execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. Also, the raw dump of the controller memory (section 7, step 69) may be of use in determining the exact source of the problem.
<hr/>	

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05031	*** SCSIREEL CANNOT PROPERLY COMMUNICATE WITH THE USER. (REELERR 05031)
CAUSE	The diagnostic subsystem could not obtain and/or return the the user's reply to SCSIREEL.
ACTION	This error is unexpected and probably indicates an error in the diagnostic subsystem itself. A support engineer should be consulted.
<hr/>	
05032	*** THE FOLLOWING ERROR STATUS WAS RETURNED INSTEAD OF A VALID HARDWARE IDENTIFICATION CODE: (REELERR 05032)
CAUSE	Hardware identification on HP7979/80s is accomplished via a selftest request and the result passed back as a 5 byte selftest status. If the status is other than successful or unimplemented selftest (expected for older devices) then, some problem is indicated. In this case, the identification result is decoded and displayed as a selftest error.
ACTION	This is quite unexpected. Use the displayed result as a guide to the problem.
<hr/>	
05036	*** YOU CURRENTLY HAVE ! ACCESS TO THE DEVICE. ! ACCESS IS REQUIRED TO EXECUTE THIS FUNCTION. (REELERR 05036)
CAUSE	Normally, this will result from an attempt to execute a function which requires exclusive access to the device when that access mode has not been granted. It is probable that either you do not have sufficient security clearance or that someone else was probably using the device when you activated SCSIREEL.
ACTION	Exit SCSIREEL, attempt to prevent other processes from using the device, and rerun SCSIREEL. If you need a higher security level, contact your system administrator. If you do not feel either of these is the problem, consult your support engineer.
<hr/>	
05037	*** THE SPECIFIED DENSITY IS NOT AVAILABLE ON THE CURRENTLY SELECTED DEVICE. (REELERR 05037)
CAUSE	A valid density was specified, but is not implemented by the device currently being diagnosed.
ACTION	The MODESENSE command should provide you with a list of available densities.
<hr/>	
05038	*** SCSIREEL IS UNABLE TO POINT TO THE EXACT LOCATION OF THE FOLLOWING ERROR. (REELERR 05038)
CAUSE	SCSIREEL failed to obtain a pointer to the last parsed location in the users reply.
ACTION	This error is unexpected and probably indicates an error in SCSIREEL or the diagnostic subsystem itself. A support engineer should be consulted.
<hr/>	

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05039	*** CONFIGURATIONS ACCESS IS NOT AVAILABLE ON THE SELECTED DEVICE. (REELERR 05039)
CAUSE	Accessible device configurations are only available on some tape drives. SCSIREEL has detected that the selected drive is not one of those.
ACTION	If you feel certain this should have been issued, it is possible SCSIREEL does not have current device identification data. In this case request device inquiry (section 3 or inquiry command) and retry.
<hr/>	
05040	*** TAPE COULD NOT BE LOADED. (REELERR 05040)
CAUSE	An attempt to load a tape on the selected device failed. Probable causes include the user not making a tape available to the device to load or requesting a load on a device which does not have autoloading capability.
ACTION	If the device has autoloading capability and a tape is available, take action based on other messages displayed.
<hr/>	
05041	*** TAPE COULD NOT BE UNLOADED. (REELERR 05041)
CAUSE	An attempt to unload a tape on the selected device failed. Probable causes include a tape not currently loaded or requesting an unload on a device which does not have autoloading capability.
ACTION	If the device has autoloading capability and a tape is loaded, take action based on other messages displayed.
<hr/>	
05042	*** TAPE DRIVE COULD NOT BE PLACED ON-LINE. (REELERR 05042)
CAUSE	An attempt to place the tape on-line failed. This is expected if a tape is not loaded.
ACTION	Ensure that a tape is loaded on the drive. Take other action as suggested by other messages displayed.
<hr/>	
05043	*** ! LOG(S) COULD NOT BE CLEARED. (REELERR 05043)
CAUSE	An attempt to initialize an internal device log failed. Usually, this will result from trying to clear a log which is not maintained on the device or trying to clear a log on a device which does not support log clears.
ACTION	Retry with a valid log for the device. If the device and your selection are verified, this may indicate a device problem.
<hr/>	

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05044	*** CONFIGURATION ITEM ! COULD NOT BE SET. (REELERR 05044)
CAUSE	The request to set a configuration item was rejected by the device.
ACTION	Take action based on other error messages displayed.
<hr/>	
05045	*** TAPE WAS FOUND IN AN UNEXPECTED, ERRONEOUS POSITION (!). (REELERR 05045)
CAUSE	The tape was found in an unexpected position, e.g. BOT after successfully writing a record to tape or at EOT after a successful rewind.
ACTION	This indicates a device problem.
<hr/>	
05046	*** TAPE IS UNEXPECTEDLY AT THE EOT MARK. (REELERR 05046)
CAUSE	The EOT marker was encountered when not expected. This may be the result of a device read error but will also will happen if the user has not loaded a tape large enough to satisfy the requested number of record reads or writes.
ACTION	If this occurs on the read cycle of a workout command or trouble tree, a device problem should be suspected. Otherwise, if the user has specified a number of files other than "EOT", a larger tape is probably needed.
<hr/>	
05047	*** WORKOUT ABORTED -- HARD ERROR LIMIT REACHED. (REELERR 05047)
CAUSE	A workout sequence was prematurely aborted. This normally occurs when the specified limit of fatal errors has been exceeded.
ACTION	Correct device problem based on accompanying messages.
<hr/>	
05048	*** MOTION CHECK COULD NOT BE PERFORMED - UNABLE TO WRITE MOTION CHECK SEQUENCE TO TAPE. (REELERR 05048)
CAUSE	The motioncheck function requires that a set of files be written to tape. It is this set of files on which the tape movement functions are tested. SCSIREEL was unable to complete the write and therefore aborted the remainder of the check.
ACTION	Take action based on the cause displayed for the write error.
<hr/>	

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05049	*** RECORD READ DOES NOT MATCH THE DATA ORIGINALLY SENT. (REELERR 05049)
CAUSE	Record : !2 Bytes written : !3 File : !1 Bytes read : !4 A record read from the tape drive was expected to match the record written in a previous operation but did not. The mismatched bytes are listed following this message.
ACTION	Fix tape drive.
<hr/>	
05050	*** FILE !2 CONTAINED FEWER THAN THE EXPECTED !1 RECORDS. (REELERR 05050)
CAUSE	An end of file mark was found before expected.
ACTION	Fix tape drive.
<hr/>	
05051	*** FILE !2 CONTAINED MORE THAN THE EXPECTED !1 RECORDS. (REELERR 05051)
CAUSE	A data record was found where an end of file marker was expected.
ACTION	Fix tape drive.
<hr/>	
05052	*** UNABLE TO VERIFY TAPE POSITION DOWN TO RECORD NUMBER. (REELERR 05052)
CAUSE	SCSIREEL attempted to determine the exact position of the tape by reading a record with the file and record number in the header of the record. This read in some way failed.
ACTION	The problem is probably in the device hardware. Take action based on the messages previous to this one.
<hr/>	
05053	*** AN END OF FILE WAS EXPECTED BUT NOT DETECTED. (REELERR 05053)
CAUSE	SCSIREEL was expecting to be at the end of file on the tape, but some other tape position (e.g. valid data record or end of tape) was found. This is indicative of a drive problem.
ACTION	Service tape drive as appropriate.
<hr/>	

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05054 ***** MOTIONCHECK FAILED. (REELERR 05054)**
CAUSE The sequence of motioncheck commands did not proceed as expected.
ACTION Service tape drive as appropriate.

05055 ***** THIS SECTION REQUIRES A WRITABLE (WRITE RING INSTALLED) TAPE TO BE LOADED ON THE DRIVE AT BOT AND THE DRIVE TO BE ON-LINE. (REELERR 05055)**
CAUSE A section of SCSIREEL was requested which requires writing to tape. It is not considered appropriate here to prompt for corrections, so the section is aborted.
ACTION Load a tape with write ring installed, place the drive on-line, and retry the section. If all this is done correctly, suspect drive hardware problem.

05056 ***** NO DEVICE HAS BEEN SELECTED. (REELERR 05056)**
CAUSE A device must be selected when invoking SCSIREEL.
ACTION At the DUI> prompt, use the pdev or ldev command modifiers with the SCSIREEL command.

07001 ***WARNING - The I/O path to the tape drive may be faulty.
Any results (good or bad) shown below might not originate at the drive.**

(REELWARN

07001)
CAUSE The I/O path between memory and the drive was not verified. This can result from a system internal error, an unimplemented test program, or an actual failure of the test, in which case a faulty field replaceable unit (FRU) should be displayed.
ACTION If the test failed, further testing of the I/O path should be done. In any case, communication with the drive should be considered unreliable from this point on.

07002 ***WARNING - The selected device was not designed to perform this step.**

(REELWARN

07002)
CAUSE A step was selected (perhaps as a default) which does not apply to the selected device.
ACTION Advisory only. If this turns out to be unexpected or incorrect, a program adjustment may be needed - consult your support engineer.

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07003	*WARNING - Conversions of very large numbers are done in base 10 only. (REELWARN 07003)
CAUSE	SCSIREEL attempted to display a number greater than 214783647 or less than -2147483648 in a base other than base 10.
ACTION	Advisory only. The number will be displayed in base 10. If this is unsatisfactory, notify your support engineer.
07004	*WARNING - A product id of ! was returned. However, the device will continue to be diagnosed as though "!" had been returned. (REELWARN 07004)
CAUSE	This message is to be issued only when SCSIREEL is running in auto_diagnostic mode and an unrecognized product identify code is returned by the device. Normally the user would select a substitute device, but in this case, SCSIREEL must select a default value.
ACTION	None, advisory only.
07005	*WARNING - Unable to mark the tape drive as defective. (REELWARN 07005)
CAUSE	SCSIREEL detected a serious problem with the selected device and attempted to block further use of it by the system. This attempt failed.
ACTION	The device should be electronically or physically removed from the system until it is repaired or deemed operational again by this diagnostic.
07006	*WARNING - Unable to convert number to readable form. (REELWARN 07006)
CAUSE	A numeric quantity could not be converted to its corresponding character string form for display purposes. The most likely cause is that the number was too bit to fit into the designated space. In any case, asterisks will be substituted for the number.
ACTION	This problem is not fatal to execution of the program, but a displayed message may lack part of its informational content as a result. This is normally unexpected and your support engineer should be notified.
07007	*WARNING - The selected device is recognized as a reel tape drive, but is not supported by this diagnostic. Product ID returned = !. (REELWARN 07007)
CAUSE	The identification information returned by the device indicates that it is recognized as a reel type tape drive, but that SCSIREEL was not designed to diagnose it.
ACTION	If in auto-diagnostic mode, the device will be treated as an HP7980 and diagnosis will continue on that basis. Otherwise, upon the original issue of this warning, the user will be given the opportunity to either exit or select a known device which SCSIREEL will then pretend it is diagnosing.

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07009	*WARNING - The tape drive referenced an error log which is larger than this program is capable of handling. The log will be truncated to ! entries. (REELWARN 07009)
CAUSE	Either the drive has erred in maintaining its nonvolatile memory or the specification for the maximum size of logs has changed. In either case, as many entries as indicated will be decoded.
ACTION	If drive error is suspected, execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. If the log is expected to be longer than the value given in the message, notify your support engineer.
<hr/>	
07010	*WARNING - Data buffers granted to this program by the diagnostic system were not as large as requested. One or more diagnostic functions may fail at a later time. (REELWARN 07010)
CAUSE	SCSIREEL did not receive as much data transfer memory as was requested.
ACTION	This is normally a system restriction which you may not be able to overcome. Some diagnostic functions may work just fine with a less than maximum needed area and SCSIREEL will attempt to limp along on that basis. Other or all functions may fail for this reason. You may wish to notify your support engineer.
<hr/>	
07011	*WARNING - The density of the mounted tape remains incompatible. Analysis requiring this density will be skipped. (REELWARN 07011)
CAUSE	The user failed or refused to rectify a density conflict after being given a reasonable number of opportunities to do so.
ACTION	Advisory only. If this was not intentional on the part of the user, SCSIREEL should be rerun with a tape of the requested density loaded on the drive.
<hr/>	
07012	*WARNING - The drive remains in an incorrect mode. Analysis requiring on-line status will be skipped. (REELWARN 07012)
CAUSE	The user failed or refused, after a reasonable number of opportunities, to place the drive on-line or off-line as requested by SCSIREEL.
ACTION	Advisory only. If this was not intentional on the part of the user, SCSIREEL should be rerun and the drive placed in the requested mode as directed.
<hr/>	
07013	*WARNING - The mounted tape remains write protected. Analysis requiring write enable will be skipped. (REELWARN 07013)
CAUSE	The user failed or refused to place a write ring on the mounted tape.
ACTION	Advisory only. If this was not intentional on the part of the user, the tape should be dismounted, a write ring inserted, and SCSIREEL rerun.

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07014	*WARNING - Only the first ! bytes returned by the tape drive will be processed.	(REELWARN
	07014)	
CAUSE	The drive returned more data than SCSIREEL expected. In this case the smaller, expected number of bytes will be processed. This will yield incomplete and/or erroneous information, but is given as a partial aid to the user.	
ACTION	Your support engineer needs to be informed of this problem. The diagnostic will continue, processing the smaller, expected number of bytes. However, this will yield incomplete and/or erroneous information, but is given as a partial aid to the user.	
<hr/>		
07015	*WARNING - Expected ! bytes of response from the tape drive. Received ! bytes instead.	(REELWARN
	07015)	
CAUSE	The amount of data returned by the device was not what SCSIREEL expected. This might be reasonable for a new device under development. However, it can also result from a problem with the drive or any intervening hardware/software.	
ACTION	Either error message 05018 or warning message 7014 is normally issued depending on the nature of the discrepancy. If this is unexpected, your support engineer should be notified.	
<hr/>		
07016	*WARNING - The number of entries in the log is greater than expected for this drive.	(REELWARN
	07016)	
CAUSE	Either the drive has erred in maintaining its nonvolatile memory or the specification for the maximum size of logs has changed. In either case, SCSIREEL will attempt to display as many entries as indicated, even if some do not make sense.	
ACTION	If drive error is suspected, execution of the selftest section of the diagnostic and/or specific RAM device selftests is recommended. If the log is expected to be longer than the value given in the message, notify your support engineer.	
<hr/>		
07017	*WARNING - The value (!) of configuration item #! is outside the expected range of ! - !.	(REELWARN
	07017)	
CAUSE	SCSIREEL checks configuration values returned by the device against specified ranges for the device. If the value returned is less than the lower range value or greater than the higher range value, this warning is issued. SCSIREEL will attempt to process the value in any case. NOTE: the item number is to be found in maintenance documents for the device.	
ACTION	Check the specified range against device documentation. If the range is valid, a device error is indicated; otherwise, SCSIREEL may need to be updated to new specifications. In either case, notify your support engineer.	
<hr/>		

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07018	*WARNING - Density ! is not considered valid for the selected device.	(REELWARN
	07018)	
CAUSE	SCSIREEL checks density requests against product capabilities. If the value requested density is not implemented on the device, this message will be displayed. SCSIREEL will normally have forwarded the request to the device anyway. This message may also be displayed when decoding hardware status.	
ACTION	Verify device identification and capabilities. If these are correct, a device hardware problem may be assumed. If associated with hardware status display, SCSIREEL may need to be updated.	
<hr/>		
07019	*WARNING - An unexpected change in device identification was detected.	(REELWARN
	07019)	
CAUSE	The device returned a product identification string which is different than the previous one returned.	
ACTION	None. If SCSIREEL recognizes the new code, execution will continue on the basis of that new identity, otherwise, the user will be prompted for a substitute ID.	
<hr/>		
07020	*WARNING - SCSIREEL was not able to determine if the drive is equipped for DATA COMPRESSION. The default is NOT EQUIPPED.	(REELWARN
	07020)	
CAUSE	The buffer board of the drive could not be determined.	
ACTION	None. SCSIREEL will continue as though the data compression option is not present.	
<hr/>		
07021	*WARNING - SCSIREEL was not able to determine if the drive is equipped to handle 800bpi(WRZI) tapes. The default is NOT EQUIPPED.	(REELWARN
	07021)	
CAUSE	The read/write board of the drive could not be determined.	
ACTION	None. SCSIREEL will continue as though this option is not present.	
<hr/>		
07022	*WARNING - The device is not recognized by SCSIREEL. Default values for device options have been assigned as follows:	(REELWARN
	07022)	
CAUSE	The ID code returned by selftest 200 does not match one of the codes documented when this version of SCSIREEL was submitted.	
ACTION	If this is unexpected, consult your support engineer, otherwise you may assume a device problem.	
<hr/>		

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07024	*WARNING - Full identity of the physical device could not be obtained. Default values have been supplied as follows:
	(REELWARN 07024)
CAUSE	The describe command (or some portion of the describe command simulation for earlier devices) failed. Rather than abort at this point, SCSIREEL has chosen to continue with certain default information. Those default values are included in the identification information following this message.
ACTION	Diagnosis will continue as far as possible based on any other information available. If this is not desired, you may interrupt via the interrupt combination for the current operating system (e.g. CNTL-Y for MPE-XL, CNTL-B for HPUX).

07025	*WARNING - The log contained an unrecognized buffer controller ID code (!)
	Log decoding will proceed assuming an ID code of !. (REELWARN 07025)
CAUSE	The first byte of the log did not contain a value recognized as valid by SCSIREEL. This could be the result of a change in the device for which SCSIREEL has not yet been updated.
ACTION	Diagnosis will continue as far as possible based on the latest version of the hardware known to SCSIREEL. If this is an expected code for the device, contact your support engineer for correction of the diagnostic.

07026	*WARNING - The allocated i/o buffer is too small to handle the requested data transfer.
	(REELWARN 07026)
CAUSE	This should only occur when the system was not able to grant an i/o buffer as large as requested by SCSIREEL.
ACTION	Since this involves system allocation of memory resources, no specific action can be recommended here other than to rerun the diagnostic. If necessary, consult your support engineer.

07027	*WARNING - The data sent to the device has been truncated.
	(REELWARN 07027)
CAUSE	This warning will always be preceded by REELWARN 07027. In this case, SCSIREEL has determined that it is reasonable to attempt to continue.
ACTION	The user should be wary of results of the operation.

07028	*WARNING - Extra and/or invalid command parameters were encountered. These items will be ignored.
	(REELWARN 07028)
CAUSE	The user has either incorrectly specified parameters in a command or supplied more parameters than expected. If an incorrect parameter was specified, all others, even correct ones will be ignored.
ACTION	This is non fatal. Extra parameters will be ignored and you will be prompted for any needed data.

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07029	*WARNING - SCSIREEL was unable to return data buffer resources to the system.
	(REELWARN
	07029)
CAUSE	SCSIREEL did not succeed in releasing its hold on system memory resources.
ACTION	None - Advisory only. This is of no major consequence if you are exiting SCSIREEL, but should be reported to your support engineer. If you are not exiting, SCSIREEL will attempt to use that buffer if needed rather than requesting new resources.
<hr/>	
07030	*WARNING - This command clears the drive's internal hard error log. If this is not desired, type "cancel" at any prompt.
	(REELWARN
	07030)
CAUSE	The user has requested an operation which clears (initializes) the selected tape drive's internal error logs so that data may data may be accumulated from scratch.
ACTION	None - Advisory only. If the user has not already examined the error logs via SCSIREEL's section 7 or 'display logs' command, typing 'cancel' at the next subsequent prompt will abort the clear and its associated task.
<hr/>	
07031	*WARNING - Selftest ! does not return valid results to SCSIREEL. The result of this test must be read at the front panel of the device.
	(REELWARN
	07031)
CAUSE	Certain selftest (especially interactive ones) always return a successful status when called remotely. SCSIREEL believes the specified test is one of those.
ACTION	The results of this selftest must be read at the front panel of the device.
<hr/>	
07032	*WARNING - Selftest ! requires manual interaction at the device.
	(REELWARN
	07032)
CAUSE	The specified selftest is interactive and requires physical manipulation of the tape drive. Furthermore, the reset button on the device front panel must be pressed before the device will return control to SCSIREEL.
ACTION	Cause the required mechanical manipulation to be performed to the device. When done, press the reset button on the front panel of the device to cause it to return control to SCSIREEL. If nothing is done, SCSIREEL will time out after a reasonable period of time (usually about 5 minutes);
<hr/>	
07033	*WARNING - An end of file was passed on a record skip request.
	(REELWARN
	07033)
CAUSE	A skip of the specified number of records resulted in the skip crossing over into the next file.
ACTION	Advisory only.
<hr/>	

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07034	*WARNING - Data verification has been disabled for the rest of this tape. (REELWARN 07034)
CAUSE	Data verification is disabled for a tape whenever write or read operation creates a complex recovery situation or when the user specified limit of record mismatches for the tape has been reached.
ACTION	Correct causes of fatal/ignorable hard errors or specify a higher mismatched records limit, as appropriate.
<hr/>	
07035	*WARNING - A FATAL hard error occurred while attempting to write record !. (REELWARN 07035)
CAUSE	The requested tape write operation failed in such a way that continuing to write to tape is senseless.
ACTION	Advisory only.
<hr/>	
07036	*WARNING - An IGNORABLE hard error occurred while attempting to write record ! of file !. (REELWARN 07036)
CAUSE	The requested tape write operation failed but the failure is no considered to serious enough to stop writing. Record verification for this tape, however, will be turned off.
ACTION	Advisory only.
<hr/>	
07037	*WARNING - A FATAL hard error occurred while attempting to read record !. (REELWARN 07037)
CAUSE	The requested tape read operation failed in such a way that continuing to read the tape is senseless.
ACTION	Advisory only.
<hr/>	
07038	*WARNING - An IGNORABLE hard error occurred while attempting to read record !. (REELWARN 07038)
CAUSE	The requested tape read operation failed but the failure is no considered to serious enough to stop reading. Record verification for this tape, however, will be turned off.
ACTION	Advisory only.
<hr/>	

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07039	*WARNING - Invalid command parameter encountered.	(REELWARN
	07039)	
CAUSE	User has supplied a parameter along with a valid command. Either the command does not take parameters, the parameter was invalid in the specified context, or the parameter was not recognized.	
ACTION	Follow correct syntax for specified command. If you do not supply any parameter, you will be prompted for the needed information.	

07040	*WARNING - Selftest with parameters not yet supported.	(REELWARN
	07040)	
CAUSE		
ACTION		

07041	*WARNING - Current access to device does not allow selftest ! to be executed.	(REELWARN
	07041)	
CAUSE	The user was not granted a high enough diagnostic security clearance upon entering SCSIREEL. This can be due either to the user's capabilities or the access mode to the device which was granted. Program initialization messages should have clarified this.	
ACTION	If after insuring that the device is not being used by another process and after attempting to rerun SCSIREEL does not solve the problem, consult your system administrator for sufficient capabilities or consult your support engineer to determine how to get needed access to the device.	



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1/4-Inch Cartridge Tape Drives and Autochanger Diagnostic

Introduction

The CARTDIAG diagnostic program will test 1/4-inch cartridge tape drives and autochangers which use the CS/80 protocol. This diagnostic, which is only available on operating systems which support the online diagnostics subsystem, will detect failures down to a field replaceable unit (FRU).

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10017.

Auto-Diagnostics

If CARTDIAG is run as an auto-diagnostic by the system, the default set of sections and steps will be run, as listed in the "Default Sections" section, below.

Minimum Configuration

This product will be usable on any HP Precision Architecture RISC system supporting the online diagnostics subsystem.

In order to execute the CARTDIAG diagnostic program, a 1/4-inch cartridge tape drive and intermediate hardware necessary to communicate with the tape drive must exist on the host system.

In order to run this diagnostic, the online diagnostics subsystem must be supported.

Operating Instructions

The following subsections list the CARTDIAG default tests, tell how to invoke the diagnostic using the RUN command, and describe test execution.

Default Tests

The default sections for CARTDIAG are:

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 5	Selftest
Section 6	Request and Decode Status
Section 7	Error Logs
Section 8	Common System Operations
Section 9	Status Tests
Section 10	Verification Trouble Tree
Section 11	Hardware Trouble Tree

The default steps are all steps within these sections. These defaults are dependent on the test mode that has been granted by the system. Therefore, a smaller set of the defaults may be run due to the limitations of the test mode that was obtained.

RUN Command

The CARTDIAG diagnostic can be accessed by the user via the Diagnostic User Interface. It is initiated using the run `cartdiag` command. All parameters associated with the DUI's RUN command will be accepted by this diagnostic. Please refer to the DUI chapter for details concerning this command and its parameters. All parameters available in the RUN command are acceptable as parameters when running this diagnostic. Note that if the ERRONLY parameter is set "on", only error messages will be output by this diagnostic. Error messages can be distinguished from other messages by three "*"s preceding the text of the message (i.e., "*** MESSAGE" is an error message whereas 'Message' is not). Also note that error messages are in all capital letters and other messages use some lower case. This diagnostic can also be run as an auto-diagnostic by the diagnostic system. As noted in the previous section, certain modes are required in order to do certain tests. The mode needed to execute each command will be noted in the description of that command.

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Test Execution

When CARTDIAG is executed, the following header and welcome message will be displayed:

```
*****
*****                                     *****
*****          CARTRIDGE TAPE DIAGNOSTIC          *****
*****                                     *****
*****          (C) Copyright Hewlett Packard Co. 1987          *****
*****          All Rights Reserved                    *****
*****          Version n.nn.nn                          *****
*****                                     *****
*****
```

Welcome, Today is MON, OCT 5, 1987 7:39 AM

At this point, the diagnostic calls IO_Path_Test, which is a diagnostic procedure that tests the I/O path to the device. If the status returned from this procedure call is "fail", the following message will be output:

```
*** WARNING -- THE I/O PATH TO THE TAPE DRIVE MAY NOT BE FUNCTIONING
    PROPERLY (CARTERR 100)
```

The diagnostic then issues an identify to the specified device to determine whether or not it is a cartridge tape drive. If the device does not respond to the identify command, the following message will be output:

```
*** DEVICE FAILED TO RESPOND TO IDENTIFY COMMAND (CARTERR 101)
```

The diagnostic will terminate immediately after outputting this message.

If a response was obtained, then the returned status is examined to determine if the device is a cartridge tape drive. If not, the following messages will be displayed:

```
*** THE SPECIFIED DEVICE IS NOT A CARTRIDGE TAPE DRIVE --
    RETURNED ID CODE WAS XXXX (CARTERR 102)
```

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

If the response is Y then the diagnostic will continue, and if the response is N, the diagnostic will terminate. The [N] indicates that N will be the default response if the user simply hits <CR> in response to the prompt.

At this point, the sections and steps specified by the user will be executed and the results output. If the user did not specify sections and steps to be run, the default section and steps will be executed. If at any time, the number of errors generated reaches the limit specified by the user in the ERRCOUNT parameter of the run command, the following message will be output:

```
*** THE MAXIMUM NUMBER OF ERROR HAS BEEN REACHED (CARTERR 110)
```

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]?

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If the response is Y, then the test will be resumed (if possible), and if the response is N, this diagnostic will terminate. The [Y] indicates that Y will be the default response if the user simply hits <CR> in response to the prompt. If the sections and steps specified by the user were executed the number of times specified in the LOOP parameter of the run command without the number of errors exceeding the ERRCOUNT value, the diagnostic will terminate normally and the following message output:

CARTRIDGE TAPE Diagnostic Exiting . . .

Upon termination of this diagnostic, control will return to the online diagnostics subsystem.

Detailed Test Descriptions

This section is devoted to explaining each section of CARTDIAG, as well as each step within a section. For each section/step, this explanation will consist of a description of the section/step, including the actions performed therein, the expected output from that section/step, and any error messages that may be generated that are worth noting. Please note in regard to the error messages, that not all possible error messages that may be generated are listed. The only error messages that are listed are those that are considered to be of special significance. For a complete list of error messages that may be generated while running CARTDIAG, please refer to the "Error Messages" section, below.

Section 2—CLEAR

This section performs a CLEAR operation on the tape drive. This command basically resets the tape drive to its power-on state. The command that will be sent to clear the tape drive will be a CS/80 'SELECTED DEVICE CLEAR'. The following actions are taken as a result of executing this section:

- Flush any unwritten data to tape.
- Abort any command that is in progress.
- Reset all complementary parameters to their power-on values.

Note that no data will be lost due to a CLEAR and no unnecessary tape movement will occur.

OUTPUT:

```
Section 2 -- CLEAR
```

```
End of Section 2 -- Clear
```

Section 3—IDENTIFY

This section issues an IDENTIFY command to the selected tape drive to determine whether it is responding to commands and whether it is a CS/80 tape drive.

OUTPUT:

Section 3 -- IDENTIFY

The selected device has been identified as an HPXXXX tape drive.

End of Section 3 -- Identify

Section 4—LOOPBACK

This section will perform a write loopback of 256 bytes of data to the device using the pattern—255,0,1, . . . ,254. This operation will be followed by a read loopback of 256 bytes which will be compared with to the expected pattern to verify correct transmission.

This section has two steps:

- Step 6 - Write data loopback.
- Step 7 - Read data loopback.

OUTPUT:

```

Section 4 -- LOOPBACK

      Step 6 - Write Loopback Completed

      Step 7 - Read Loopback Completed

End of Section 4 -- Loopback
    
```

ERROR MESSAGES:

```

*** ERROR IN TRANSMISSION DETECTED DURING READ
LOOPBACK TEST: (CARTERR 115)
    
```

Byte #	Octal Value Transmitted	Octal Value Received	Bit Positions In Error
12	56	54	0000010
33	127	63	01100100
.			
.			
241	74	72	00000110

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

Section 5—SELFTEST

This section initiates the internal power-on selftest on the tape drive and reports the status of the test to the user. The test will be initiated by issuing an INITIATE DIAGNOSTIC command specifying diagnostic 0 as the test to be performed, which is the power-on selftest used by the device.

OUTPUT:

Section 5 -- SELFTEST

End of Section 5 -- Selftest

POSSIBLE ERROR MESSAGES:

*** DEVICE ENCOUNTERED AN ERROR WHILE EXECUTING THE
CS/80 INITIATE DIAGNOSTIC COMMAND (CARTERR 109)

STATUS = { status }

NOTE -- This status printout will include the failing field
replaceable unit(s) as specified by the device.

Section 6—REQUEST and DECODE STATUS

This section will request status from the tape drive and subsequently output the status to the user.

OUTPUT:

Section 6 -- STATUS

Status =

Unit = nnnn Volume = nnnn

No units with pending status
or
Unit nnnn has status pending

{One or more of the following status messages may be printed}

>>>>>>> REJECT ERRORS <<<<<<<<<<

Received a command without odd parity
Received an unrecognized opcode
Received an illegal volume or unit address
Received an address which exceeds device bounds
Received an illegal parameter
Received a parameter of the wrong length
Received a message out of sequence
Received a message of the wrong length

>>>>>>> FAULT ERRORS <<<<<<<<<<

Unit hardware fault
Hardware failed diagnostic --
 Failed part numbers are : nnnn, nnnn
 Test error numbers = nnnn, nnnn
Operator release required before command can be executed
maintenance release required before command can be executed
Power failed or drive just powered on
Auto Release has been completed -- Retransmit last command

>>>>>>> ACCESS ERRORS <<<<<<<<<<

Media has not been initialized or is unusable
Spare Block cannot be executed -- No spare media available
Drive is not ready for access
The selected volume is write protected
A block accessed during a read has not been written
Unrecoverable data has been detected
End of file encountered
End of volume encountered

>>>>>>> INFORMATION ERRORS <<<<<<<<<<

Device is requesting operator release
Device is requesting diagnostic release

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A defective block has been automatically spared
Early warning of EOY (End Of Volume)
Recoverable data

End of section 6 -- Status

Section 7—ERROR LOGS

This section obtains data from the run-time error log and drive fault log (fault log only exists on HP9145), then decodes the error messages, and displays them to the user. The run-time error log contains an accumulation of the run-time data errors which have been logged by the tape drive automatically during normal operation. The drive fault log contains an accumulation of faults that have occurred on the drive which have been logged by the tape drive automatically. Both logs contain all errors that have occurred since the last time the logs were cleared. This section is divided into two steps, one step for each log.

OUTPUT:

Section 7 -- ERROR LOGS

Step 10 - Run Time Data Error Log :

```

Number of uncorrectable read errors      = nnnn
Number of key errors                     = nnnn
Number of blocks spared on write         = nnnn
Number of correctable errors with retries = nnnn
Number of correctable errors without retries = nnnn
Type of certification is NOT CERTIFIED
      or
Type of certification is 3M CERTIFIED
      or
Type of certification is HP FACTORY CERTIFIED
      or
Type of certification is 7914 DRIVES CERTIFIED
      or
Type of certification is HP35401A/HP9144A/T CERTIFIED
      or
Type of certification is HP9145A CERTIFIED
    
```

Step 11 - Drive Fault Log :

For HP9145:

There are nnnn entries in this log

```

Fault Code   Fault Type   Time (milliseconds)
=====
DERR nnnn    nnnn          nnnnnnnnnnnnnnnnnn
.
. Repeat for each entry in the log
.
DERR nnnn    nnnn          nnnnnnnnnnnnnnnnnn
    
```

Note: Decoding of Fault Code and Fault Type will be provided when information becomes available.

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For HP9144 and HP35401

Fault Log does not exist on this drive.

End of section 7 -- Error Logs

Section 8—COMMON SYSTEM OPERATIONS

This section will execute all CS/80 commands applicable to tape drives with the exception of Initialize Media and Spare Block. The intent of this section is to verify that these commands are functioning properly. A tape has to be mounted in order for this section to operate. The tests will be as thorough as possible while still allowing them to be automated. There are several steps to choose from in this section as described below.

- Step 15 - Sends a CS/80 WRITE FILE MARK command to the tape drive to write a file mark at the current position of the tape. To the host, the file mark will appear as a complete 1 KByte logical block which contains no data. Destructive mode will be required to run this step.
- Step 16 - Reads data on the tape twice and compares them. If there is any mis-matches, the user will be informed that the CS/80 LOCATE AND READ command is not working properly.
- Step 17 - Writes random data blocks to the tape, reads them back and compares them. If there are any mis-matches, the user will be informed that the CS/80 LOCATE AND WRITE command is not working properly. Destructive mode will be required to run this step.
- Step 18 - Sends a CS/80 SET UNIT command to the tape drive to set unit 0 or unit 15, requests a hardware status from the device, and verifies that the unit set is either 0 or 15. If not, the user will be informed that the CS/80 SET UNIT command is not working properly. Destructive mode will be required to run this step.
- Step 19 - Sends a CS/80 SET ADDRESS command to the tape drive to set the current address to some random value, requests a hardware status from the device, and verifies that the current address is the same as the address that was set. If not, the user will be informed that the CS/80 SET ADDRESS command is not working properly. Only single vector addressing is supported.
- Step 20 - Sends a CS/80 SET BLOCK DISPLACEMENT command to the tape drive. This will result in a new target address by adding the parameter to the current address. It will then request a hardware status from the tape drive, and verify that the current address is the address that was set. If not, the user will be informed that the CS/80 SET BLOCK DISPLACEMENT command is not working properly. Destructive mode will be required to run this step.
- Step 21 - Sends a CS/80 LOCATE AND READ command to the tape drive to read 256 bytes of data at the current address. This is to ensure that the CS/80 SET LENGTH complementary command is working properly. If the drive does not return exactly 256 bytes of data, the user will be informed that the CS/80 SET LENGTH command is not working properly.
- Step 22 - Sends a CS/80 SET VOLUME command to the tape drive to specify the desired storage volume. The only valid parameter for this command is 0. Any attempt to set the volume other than 0 will result in a module addressing error. Requests a hardware status from the device, and verifies that the volume is set to 0. If not, the user will be informed that the CS/80 SET VOLUME command is not working properly.

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- Step 23 - Sends a CS/80 SET STATUS MASK command to mask out the error conditions reported by the REQUEST STATUS message. Each bit position in the eight parameter bytes corresponds to an error bit position in the REQUEST STATUS message. All error conditions except fault errors may be masked by setting the appropriate bit position to 'one'. An address bounds error bit will then be forced to occur by sending a CS/80 SET ADDRESS command to the tape drive to set an address that is greater than the maximum allowed. If an error is generated as a result, the user will be informed that the CS/80 SET STATUS MASK command is not working properly.
- Step 25 - Sends a CS/80 SET RETRY TIME command to set the retry time value to some random number. A read will then be performed at the current address. If an error is generated by this read, the user will be informed that the CS/80 SET RETRY TIME command is not working properly.
- Step 26 - Sends a CS/80 SET RELEASE command to the tape drive. If any error is generated, the user will be informed that the CS/80 RELEASE command is not working properly.
- Step 27 - Sends a CS/80 SET OPTION command to the tape drive to set tape specific options. If any error is generated, the user will be informed that the CS/80 SET OPTION command is not working properly. The option opcode is *M000IASC*, where

M = 0 : Cartridge unload mode (Sequential)
M = 1 : Media unload Mode (Sequential Mode)

I = 0 : Disable immediate report/command queueing
I = 1 : Enable immediate report/command queueing

A = 0 : Auto sparing disabled
A = 1 : Auto sparing enabled

S = 0 : Auto spare invokes Jump Sparing
S = 1 : Auto spare invokes Skip Sparing

C = 0 : Disable character count capability
C = 1 : Enable character count capability

Note: M option is only valid for HP35401A.

- Step 28 - Sends a CS/80 COLD LOAD READ command to the tape drive, reads data on the tape twice, and compares them. If there is any mis-matches, the user will be informed that the CS/80 COLD LOAD READ command is not working properly. This step has same sequence as LOCATE AND READ.

OUTPUT:

Section 8 -- Common System Operations

End of Section 8 -- Common System Operations

Section 9—STATUS TESTS

This section will force several errors to occur on the tape drive and then verify that the correct error bit was set in the hardware status returned from the drive. As many status bits as possible are checked by this section, although for many of the bits, it is not possible to force the errors that correspond to them. Thus, 7 status bits can be checked and one step will be provided per bit.

- Step 40 - Sends an invalid command opcode to the tape drive and then verifies that the Invalid Opcode bit was set in the hardware status that was returned from the device. If this bit was not set, the user will be informed that the status is not being set properly.
- Step 41 - Sends a CS/80 SET UNIT command to the tape drive, setting the unit to an illegal number and then verifies that the Module Addressing error bit was set in the hardware status that was returned from the device. If this bit is not set, the user will be informed that the status is not being set properly.
- Step 42 - Sends a CS/80 SET ADDRESS command to the tape drive, setting the address to a value greater than the maximum allowed, and then verifies that the Address Bounds error bit was set in the hardware status that was returned from the device. If this bit was not set, the user will be informed that the status is not being set properly.
- Step 43 - Sends a CS/80 SET STATUS MASK command to the tape drive, setting the status mask to all unmaskable bits, and then verifies that the Parameter Bounds error bit was set in the hardware status that was returned from the device. If this bit is not set, the user will be informed that the status is not being set properly.
- Step 44 - Sends a CS/80 SET LENGTH command to the tape drive, giving it only one byte for the length value instead of the 4 bytes that the drive expects, and verifies that the Illegal Parameter error bit was set in the hardware status that was returned from the device. If this bit is not set, the user will be informed that the status is not being set properly.
- Step 45 - Sends a CS/80 LOCATE AND WRITE command while requesting that it return an execution message instead of providing it with an execution message as it expects, and verifies that the Message Sequence error bit is set in the hardware status that is returned from the device. If this bit is not set, the user will be informed that the status is not being set properly.
- Step 46 - Sends a CS/80 LOCATE AND WRITE command to the tape drive, giving it fewer bytes in the execution message than were specified in the length that was set in the write command, and then verifies that the Message Length error bit was set in the hardware status that was returned from the device. If this bit is not set, the user will be informed that the status is not being set properly.

OUTPUT:

Section 9 -- Status Tests

End of Section 9 -- Status Tests

Section 10—Verification Trouble Tree

This section will perform a series of non-destructive tests to an HP9144, HP9145, or HP35401 to detect and isolate the MSFRU (Most Suspect FRU). The algorithm is yet to be defined.



Section 11—Hardware Trouble Tree

This section will perform a series of tests, some of which are destructive, to an HP9144, HP9145, or HP35401 to detect and isolate the MSFRU (Most Suspect FRU). 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 -- Hardware Trouble Tree

Scenario 1:

Device loopback test failed.

Suspected failing FRU(s) are (in order of probability):
Device Controller
HPIB channel

Scenario 2:

Device loopback test passed.
HDC-DDC interface test failed.

Suspected failing FRU(s) are (in order of probability):
Device Controller

Scenario 3:

Device loopback test passed.
HDC-DDC interface test passed.
DDC board test passed.
Microcontroller test passed.
Read/Write loopback test passed.
HDC-DDC Read/Write loopback test passed.
HDC-DDC-Servo interface test failed.

Suspected failing FRU(s) are (in order of probability):
Servo Mechanism Electronics

End of Section 11 -- Hardware Trouble Tree

Section 12—Media Trouble Tree (Non-Destructive)

This section will perform a series of non-destructive tests to the media of an HP9144, HP9145, or HP35401 to verify the integrity of the media. 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 12 -- Media Trouble Tree (Non-Destructive)

Scenario 1:

Read Use Log passed.
Read Spares Table failed.

Suspected failure(s) are (in order of probability):
For 600 ft tape, the media has more than 110 spared blocks.
For 150 ft tape, the media has more than 27 spared blocks.
MEDIA SHOULD BE REPLACED.

Scenario 2:

Read use log passed.
Read spares table passed.
Read run log failed.

Suspected failure(s) are (in order of probability):
The media has more than 1 uncorrectable errors.
MEDIA SHOULD BE REPLACED.

End of Section 12 -- Media Trouble Tree (Non-Destructive)

Section 13—Media Trouble Tree (Destructive)

This section will perform a series of destructive tests to the media of an HP9144, HP9145, or HP35401 to verify the integrity of the media. 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 13 -- Media Trouble Tree (Destructive)

Scenario 1:

Read Use Log passed.
Read Spares Table passed.
Read run log passed.
Clear run log passed.
Write ERT log passed.
Read ERT log failed.

Suspected failure(s) are (in order of probability):

For 600 ft tape, the media has more than 80 permanent errors
or 400 transient errors.

For 150 ft tape, the media has more than 20 permanent errors
or 100 transient errors.

MEDIA SHOULD BE REPLACED.

Scenario 2:

Read use log passed.
Read spares table passed.
Read run log failed.

Suspected failure(s) are (in order of probability):

The media has more than 1 uncorrectable errors.

MEDIA SHOULD BE REPLACED.

End of Section 13 -- Media Trouble Tree (Destructive)

Section 17—EXTERNAL EXERCISER

The CS/80 EXTERNAL EXERCISER is an interactive program which provides the user with access to the set of internal diagnostics and utilities within a CS/80 tape drive. The purpose of the exerciser is to aid service-trained personnel in troubleshooting CS/80 tape drives to a replaceable assembly level.

The EXTERNAL EXERCISER is an interactive program that provides the user with access to the set of internal diagnostics and utilities within a CS/80 tape drive.

ERROR-RATE TESTING

Error-rate tests are used to determine media integrity within a CS/80 device. These tests can find correctable and uncorrectable read errors. They also provide information on each error, such as the address where the error occurred, the type of error, and the number of times it has occurred. This information can be displayed to the user and/or logged in the error rate test log. This log file resides in the drive's RAM and can be accessed through the Read_Error_Rate_Test_Log utility.

All error rate tests allow the user to input a loop count when requesting the test. Each time an error is detected during the test, the test will stop, report the error, and then resume testing until the loop count has been satisfied. Note that the loop count is not a count of the number of errors, but rather the number of passes the device will execute during the error-rate test. The following information will be reported for each error that occurs:

- An error information byte.
- The loop count when the error occurred.
- The current physical address.
- The current logical address.
- The byte number at which the error begins.
- A bit map of the bits that were in error.

When requesting the error-rate test, the user may specify whether the errors are to be logged as opposed to displaying them on the user's terminal.

There are two general types of error rate tests that can be performed. The first type, called a read only error rate test, is a non-destructive test which reads data from the tape drive and attempts to detect any read errors that occur. There are two tests available in this category:

1. Read Only Error-Rate Test—Sequentially reads the current data on the tape drive in a specified area of the media.
2. Random Read Only Error-Rate Test—Reads 256 random blocks of random length data. This allows read errors to be detected on a large portion of the media in a minimum amount of time.

The second type of error-rate test, called a write-then-read error-rate test, is a destructive test which writes data onto the media and subsequently reads it back, attempting to detect sensitive bit patterns, read errors, and media defects. When requesting an error-rate test in this category, the user is allowed to specify a pattern to be used in the test. A user input pattern can be defined and edited via the Set Pattern command. If the user chooses not to enter a pattern, he/she will be given a choice to use internal patterns or random data

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generated by the tape drive. There are several types of write-then-read error rate tests available to the user:

1. **Pattern Write-Then-Read Error-Rate Test**—Sequentially writes a specified data pattern over a specified area of the media and then reads the data back.
2. **Random Write-Then-Read Error-Rate Test**—Write-then-read 256 randomly generated data patterns of random length at random locations on the media. This test locates errors that occur over a large area of the media in a minimum amount of time.
3. **Certification Write-Then-Read Error-Rate Test**—Executes a Write-then-read Error-Rate Test with bad blocks spared after test is done.

ERROR LOGGING

During run-time, the error correction circuitry of the drive is enabled. If an error is detected that cannot be corrected by this circuitry, it will be logged to an area of random access memory (RAM) on the drive. If this area becomes full during run-time, which is defined to be any time in which a test, diagnostic, or utility is not being performed, the device requests a release so that it can log the error information in the run-time data error log on the maintenance tracks. All error logging is done automatically by the drive.

When error-rate tests are run, the error correction circuitry is disabled, allowing correctable and uncorrectable errors to be logged.

The tape use log keeps a record of tape use on the tape. This log is never cleared and cannot be updated if the tape is write protected. Thus, not all the sessions will be reflected in this log. Device use log gives an indication of the amount of usage of the device has sustained. Both use logs are specific to HP35401A and HP9145A.

The transient error log records all read/write errors HP9145A encounters and overcomes by retries.

The fault log is used to store all drive and controller faults which have occurred since the last time the logs were cleared.

SPARING

All CS/80 tape drives provide the means to replace defective blocks with good ones. This operation is referred to as "sparing". Sparing includes updating the sparing table near BOT; thus, tape motion is involved. There are two types of sparing: skip sparing and jump sparing. Skip sparing deletes bad blocks by replacing the address of the next unused spare with that of the defective block. This action causes the bad block to be skipped in the conversion of logical to physical addresses and returns the spare to the pool of user blocks. It alters the address mapping of blocks after the target address which results in the effective loss of data beyond this point. For this reason, skip sparing can only be used during certification and sequential write operations.

Jump sparing places the defective block address in the spares table and links it to the closest available spare block. Subsequent references to the bad block will result in a seek to its spare. Although this method is slower in recovering spared blocks, all user data beyond the spared block is preserved.

EXERCISER COMMAND DESCRIPTIONS

When the external exerciser is invoked, the following prompt will be displayed to the user:

CARTDIAG>

When the prompt appears, the exerciser is waiting for a command from the user. The available commands are listed in this section in alphabetical order accompanied by descriptions. Each command description is in the following format:

COMMAND NAME

SHORT DEFINITION

Explanation of what the command does and when it should be used.

INPUT FORMAT:

CARTDIAG> [COMMAND NAME]

Note that the prompt for this exerciser is CARTDIAG>. The appearance of this prompt indicates that the exerciser is waiting for the user to input a command.

OUTPUT FORMAT:

Information printed as a result of this command being executed

ERROR MESSAGES:

Any error messages worth noting that may be generated as a result of this command. Note that this does not imply that all possible error messages that may be generated are listed here, but rather, only those that are especially worth mentioning in relation to the command.

There are several conventions used throughout this section in the command formats. They are as follows:

- nxxx - refers to a decimal number of any magnitude that is output by the diagnostic.
- vvvv - refers to a decimal number of variable magnitude that must be input by the user.
- H - refers to a hexadecimal digit (0-F).
- O - refers to an octal digit (0-8).
- B - refers to a binary digit (0-1).

Any text enclosed in parenthesis indicates that the user is expected to input that text in response to a query from the diagnostic. Text enclosed in square brackets indicates the default response that will be assumed if the user simply hits <CR> in response to the query. For example, the user may be asked if the program should continue by the following question:

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

The text enclosed in the parenthesis (i.e., Y / N) indicates that the user is to type either a Y or an N in response to the question. Each option is separated by a /. The default response in this case would be N, as indicated by the [N] prior to the question mark. If there is no default response listed (enclosed in square brackets), the user will not be allowed to "default" the input by only entering a <CR>.

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Comments in the input and output sequences are enclosed in curly brackets and are not output by the program. For example, following the question in the previous example, the input sequence would probably look something like the following:

```
{if response was N this command will terminate}
```

Error messages will be preceded by three asterisks (***) and will be in all upper case letters. Other messages will not be all upper case and will not be preceded by the astericks.

If the user enters a command in response to a prompt and that command is not recognized as an exerciser command, the following message will be displayed:

```
*** YOUR RESPONSE WAS INVALID
```

```
CARTDIAG>
```

This message simply means that the command entered is not part of the command set for the external exerciser.

When the user enters a command that is recognized by the external exerciser, that command will then be processed as according to the corresponding command description given in one of the following sections of this document. If an error is encountered as a result of issuing a CS/80 command to the device, the hardware status that is returned by the device will be displayed to the user. The status display will consist of some device identification information followed by several categorized error messages. The categories are reject errors, fault errors, access errors, and information errors. Reject errors indicate illegal interaction with the device such as an opcode error. These errors result when commands are sent to the device but not recognized by it. Fault errors indicate hardware failures. Access errors indicate media absence, formatting problems, or operator intervention. Information errors indicate potential problems or performance irregularities in the device. The format of the output status message follows:

```
Status =
```

```
Unit = nnnn      Volume = nnnn
```

```
No units with pending status
```

```
or
```

```
Unit nnnn has status pending
```

```
{One or more of the following status messages may be printed}
```

```
>>>>>>>> REJECT ERRORS <<<<<<<<<
```

```
Received a command without odd parity
```

```
Received an unrecognized opcode
```

```
Received an illegal volume or unit address
```

```
Received an address which exceeds device bounds
```

```
Received an illegal parameter
```

```
Received a parameter of the wrong length
```

```
Received a message out of sequence
```

```
Received a message of the wrong length
```

```
>>>>>>>> FAULT ERRORS <<<<<<<<<
```

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```
Error occurred during copy data transaction --
  Units experiencing errors are :
    nnnn, nnnn, nnnn, nnnn
Hardware failed diagnostic --
  Failed part numbers are : nnnn, nnnn
  Test error numbers = nnnn, nnnn
Operator release required before command can be executed
Maintenance release required before command can be executed
Power failed or drive just powered on
Auto Release has been completed -- Retransmit last command
```

```
>>>>>>> ACCESS ERRORS <<<<<<<<<
Media has not been initialized or is unusable
Spare Block cannot be executed -- No spare media available
Drive is not ready for access
The selected volume is write protected
A block accessed during a read has not been written
Unrecoverable data has been detected
End of file encountered
End of volume encountered
```

```
>>>>>>> INFORMATION ERRORS <<<<<<<<<
Device is requesting operator release
Device is requesting diagnostic release
A defective block has been automatically spared
Early warning of EOV (End Of Volume)
Recoverable data
```

Note that only the portions of the above status display that correspond to errors indicated by the hardware status will be displayed. This means, for example, that if no Access Errors were indicated by the status, none of the messages listed under that heading would be output.

In order to exit the exerciser, the EXIT command should be entered (see EXIT command description).

This exerciser only covers the CS/80 utilities that are considered to be the most useful to the field. This diagnostic does not include Extended Describe, Release, Release Denied, Return Amplifier Gain, Return DDC Status, Return Servo Status, Return Trip Point, Set Front Panel Lights, Blind Load Cartridge, Control Infra_Red LEDs, Enable/Disable Auto Load, Enable/Disable Decompression, Enable/Disable Request Status Buffer Flushing, Enable/Disable XOR Correction, Enable/Disable Fault Recovery, Force R/W Gap, Send DDC Command, Send Servo Command, Set Amplifier Gain, Set DABS Extend, Set EWEQV Extend, Set Retry Mode, Set R/W Threshold, Set Trip Point, and Write Memory.

FOR HP INTERNAL USE ONLY

CART INFO

This command allows the user to read the information about cartridges that are loaded and their write-protect status (gathered with last Preload) without performing a Preload. This command is specific to HP35401A.

INPUT FORMAT:

CARTDIAG> CART INFO

OUTPUT FORMAT:

The following cartridges are present:
nn nn ... nn

The following cartridges are write protected:
nn nn ... nn

FOR HP INTERNAL USE ONLY

CART STATUS

This command allows the user to read the status of loaded cartridges and is specific to HP35401A.

INPUT FORMAT:

CARTDIAG> CART STATUS

OUTPUT FORMAT:

The following cartridge have failed during a load operation:
nn nn ... nn

The following cartridges have exceeded their normal use limit:
nn nn ... nn

FOR HP INTERNAL USE ONLY

CLEAR LOGS

This command is used to clear the Run-Time Data Error Log, the Error-Rate Test Data Error Log, the Transient Test Log and the Drive Fault Log. The user will be given the option of clearing all of the logs or just the Error-Rate Test Data Error Log, which would allow the logging of multiple executions of error-rate tests.

INPUT FORMAT:

CARTDIAG> CLEAR LOGS

For HP9144A/T and HP35401A:

Clear logs:

- 0 - Clear both the Error Rate AND the Runtime Error Log
- 1 - Clear ONLY the Error Rate Log

For HP9145A:

Clear logs:

- 0 - Clear the Error Rate, Transient Test AND the Runtime Error Logs
- 1 - Clear ONLY the Error Rate and Transient Test Logs
- 2 - Clear ONLY the Fault Log

Which log?

OUTPUT FORMAT:

For HP9144A/T and HP35401A:

All logs cleared
or
ERT logs cleared

For HP9145A:

All logs cleared
or
ERT and Transient Test logs cleared
or
Fault Log cleared

FOR HP INTERNAL USE ONLY

COUNTERS

This command will obtain the vertical motor count and horizontal motor count of HP35401A.

INPUT FORMAT:

CARTDIAG> COUNTERS

OUTPUT FORMAT:

Vertical motor count = nnnn
Horizontal motor count = nnnn

FOR HP INTERNAL USE ONLY

DESCRIBE

This command will obtain a CS/80 describe message from the device and will display the contents to the user in text form. The information in the describe message includes device parameters that are used by system drivers.

INPUT FORMAT:

CARTRDIAG> DESCRIBE

OUTPUT FORMAT:

Describe Information

The following unit(s) are installed:

nn nn . . . nn

Maximum transfer rate = nnnn Kbytes per second

Device is a nnnn tape drive

Block size = nnnn bytes

Buffer size = nnnn blocks

Burst mode is not recommended

Block transfer time = nnnn microseconds

Average transfer rate = nnnn Kbytes per second

Optimal retry time = nnnn 10's of milliseconds

Maximum access time to data = nnnn 10's of milliseconds

Maximum interleave = nnnn

There are no fixed volumes

There is one removable volume -- vol. 0

Maximum block address = nnnn

Current interleave = 0

FOR HP INTERNAL USE ONLY

DEVICE USELOG

This command allows the user to access the device use logs which contain the amount of usage the device has sustained since the logs were last cleared. This command is specific to HP35401A and HP9145A.

INPUT FORMAT:

CARTDIAG> DEVICE USELOG

OUTPUT FORMAT:

For HP35401A:

Total Movement time	= nnnn milli-seconds
Total operations	= nnnn
Total unit faults	= nnnn
Total recovery calls	= nnnn
Total nested faults	= nnnn
Total cleaning cycles	= nnnn
Total power cycles	= nnnn
Overflow value	= BBBBB

where BBBBB are

01234

=====

00001	Movement time overflow
00010	Operations overflow
00100	Unit faults overflow
01000	Recovery calls overflow
10000	Nested faults overflow

For HP9145A:

Total Power Cycle	= nnnn
Total Power on time	= nnnn seconds
Number of times tape was loaded	= nnnn
Total Cartridge Cleaning cycle	= nnnn
Total Unit Faults	= nnnn
Last Diagnostic To Fail	= nnnn
Total Number of Diagnostic Failures	= nnnn
Overflow value	= BBB

where BBB are

012

===

001	Unit Faults overflow
010	Tape Loads overflow
100	Diagnostic Failures overflow

FOR HP INTERNAL USE ONLY

DIAG

This command will initiate internal diagnostic tests which reside in the tape drive. The tests which can be selected are device dependent and are fully described in the support documentation for each type of drive.

INPUT FORMAT:

CARTDIAG> DIAG

Input the diag # (nnnn <= diag <= nnnn)[0]?

Input the loop count to be used (1<=loop<=65535)[1]?

OUTPUT FORMAT:

Internal diagnostic nnnn has completed successfully

POSSIBLE ERROR MESSAGES:

*** DEVICE ENCOUNTERED AN ERROR WHILE EXECUTING THE
CS/80 INITIATE DIAGNOSTIC COMMAND
{status - including failing FRU if any}

FOR HP INTERNAL USE ONLY

ERT LOG

This command allows the user to access the Error-Rate Test Data Error Log which contains an accumulation of all read errors which were detected during error-rate tests. These errors accumulate until the CLEAR LOGS command is used to clear them.

INPUT FORMAT:

CARTDIAG> ERT LOG

OUTPUT FORMAT:

Error Rate Test Log Values
=====

Number of blocks accessed = nnnn
Permanent errors = nnnn
Transient errors = nnnn
Uncorrectable errors = nnnn
permanent key errors = nnnn
There are no log entries
or



Logical Address	Error
=====	=====
nnnn	BBBBBBBB
nnnn	BBBBBBBB

. Repeat for each entry in the log

nnnn	BBBBBBBB
------	----------

{if any entries were printed}
Do you wish to see error byte decoding information(Y/N)[N]?

{if yes}

The Error values are :

76543210
=====
00000001 Frame 1 has a CRC error
00000010 Frame 2 has a CRC error
00000100 Frame 3 has a CRC error
00001000 Frame 4 has a CRC error
00010000 Frame 5 has a CRC error
00100000 Frame 6 has a CRC error
01000000 Data was unrecoverable
10000000 Key error

FOR HP INTERNAL USE ONLY

EXIT

This command terminates execution of the **EXTERNAL EXERCISER**. It may be entered any time the **CARTDIAG>** prompt appears.

INPUT FORMAT:

CARTDIAG> EXIT

OUTPUT FORMAT:

End of Section 17 - External Exerciser

FOR HP INTERNAL USE ONLY

EXTENDED STATUS

This command returns status information concerning mechanism faults and diagnostics.
EXTENDED STATUS is specific to HP35401A.

INPUT FORMAT:

CARTDIAG> EXTENDED STATUS

OUTPUT FORMAT:

The value loaded into the counter is nnnn and is a vertical counter.
or
The value loaded into the counter is nnnn and is a horizontal counter.

The previous vertical counter value is nnnn.
The previous horizontal counter value is nnnn.
The Read_Movement_Sensor's value is nnnn.
The Status value returned by Make_Primitive_Movement is nnnn.
Faulty H/V counter value is nnnn.
The current sensor state is nnnn.
The ideal state of the sensor is nnnn.
The distance measured by the Vertical Travel diagnostic, the
Horizontal Travel diagnostic and the first part of the
Horizontal sensors diagnostic is nnnn.
The distance measured by the Horizontal Sensors diagnostic from
the state HB(Horizontal sensor B)=1, HC(Horizontal sensor
C)=0 to Horizontal Home is nnnn.
The distance measured by the Horizontal Sensors diagnostic from
Horizontal Home to the state HB=0, HC=1 is nnnn.
The Movement Primitive address which failed the primitive movement
in Fault_Recovery is BBBBBBBB.
The status of the most recent Fault_Recovery is nnnn.

FOR HP INTERNAL USE ONLY

FAULT LOG

This command allows the user to access the Drive Fault Log which contain an accumulation of all faults that have occurred on the drive since the last CLEAR LOGS command was executed or power on. This log is not maintained during power failure and is cleared every time the drive is switched on. The timer used to derive the time stamp will be reset after 25 days of continuous power. The drive uses the fault log as a circular list, once the log is full, it will begin overwriting the oldest entries automatically without host intervention. This command is specific to HP9145A.

INPUT FORMAT:

CARTDIAG> FAULT LOG

OUTPUT FORMAT:

There are nnnn entries in this log

Fault log values:

Fault Code	Fault Type	Time (milliseconds)
=====	=====	=====
DERR nnnn	nnnn	nnnnnnnnnnnnnnnnnn

. Repeat for each entry in the log

DERR nnnn	nnnn	nnnnnnnnnnnnnnnnnn
-----------	------	--------------------

Note: Decoding of Fault Code and Fault Type will be provided when information becomes available.

FOR HP INTERNAL USE ONLY

HELP

This command provides the user with access to information concerning the commands that are available in the external exerciser. The user may request a list of the available commands accompanied by a brief description of each, or individual command descriptions. For individual commands, the user can request a description and syntax or just the syntax.

INPUT FORMAT:

CARTDIAG> HELP [command name or <cr>]

OUTPUT FORMAT:

{If no command name was given (i.e. <cr>)}
The following commands are available:

CLEAR LOGS - Clears the various error logs on the device

.
.
.

WTR ERT - performs a write-then-read error rate test on
the device

{If a command was given}
Do you want a description or just syntax (D/S)[D]?

{If response was D}
COMMAND DESCRIPTION:
Description of the command
Syntax of the command

{If response was S}
COMMAND SYNTAX:
Syntax of the command

FOR HP INTERNAL USE ONLY

INIT MEDIA

This command allows the user to certify the tape. For HP9145A, this command will also allow a cartridge to be marked for uncompressed or compressed operation. The user will also be given the option to allocate spares. All data on the tape may be destroyed by this command. It is essential that extensive error-rate testing be performed and all questionable sectors spared after executing this command.

INPUT FORMAT:

CARTDIAG> INIT MEDIA

For HP9144A/T:

This command will take the action based on the option and the state of the tape

	option							
tape status	0	1	2	3	4	5	6	7
Certified	0	C	X	X	0	B	X	X
Not certified	C	C	X	X	B	B	X	X
No spares								
Not certified	C	C	X	X	0	B	X	X
Spares								

C = Certify the tape.

Allocate 32 spares for a short tape or 128 for a long tape.

O = Optimize the spares table.

Convert any jump spares on the tape to skip spares.

B = Build a new spare table.

Allocate initial spares on the tape but do not test for any bad blocks.

X = Clear spares.

Input the option --

For HP35401A:

the option code is 0000CWZ(binary) where

C = 0: Run certification if necessary.

C = 1: Do not force a certify test.

W = 0: Initial spares are every 512 block plus a track offset.

W = 1: Initial spares to no spares.

Z = 0: Rewrite sparing table with no jump spares.

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Z = 1: Reset sparing table to initial spares.

For HP9145A:

the option code is 0000MCWZ(binary) where

M = 0: Mark cartridge uncompressed.

M = 1: Mark cartridge compressed.

The W bit -- Spares allocation is ignored
by HP9145A.

C and Z bits together with the tape status produce
the actions in the following table:

	C		0		0		1		1	
tape status	Z		0		1		0		1	

No spares table			CT		CT		U		B	
Formatted, not certified										

16 Track Format Tape			B		CT		B		B	

32 Track Format Tape			0		CT		0		B	

where CT -- Certify the tape and mark according
to M bit.

0 -- Optimize the spare table and mark
using M bit.

B -- Build a new spare table and mark using
M bit.

U -- Return uninitialized media error status
to host.

Input the option --

This test will destroy current data on the tape
Do you wish continue (Y/N) [N]?
{responding N will terminate this command}

OUTPUT FORMAT:

format - retain all spares

Media is being initialized -- may take several minutes

Media has been successfully initialized

FOR HP INTERNAL USE ONLY

LAST RUNLOG

This command is specific to HP9145A and allows the user to access the Last Run-Time Data Error Log which contains an accumulation of all run-time data errors that have been logged by the drive during the operation following the previous tape load (not the current load). If this log has never been written or cannot be read or a 9144A tape is loaded, all 0's will be returned.

INPUT FORMAT:

CARTDIAG> LAST RUNLOG

OUTPUT FORMAT:

Number of uncorrectable read errors	=	nnnn
Number of blocks spared out	=	nnnn
Number of key errors	=	nnnn
Number of correctable errors with retries	=	nnnn
Number of correctable errors without retries	=	nnnn

FOR HP INTERNAL USE ONLY

LOAD

This command will perform a full load of the cartridge in the drive. If a cartridge is unloading when the utility is issued, a load will be performed after the unload completed. This command is specific to HP35401A and HP9145A.

INPUT FORMAT:

CARTDIAG> LOAD

For HP35401A:

Enter the cartridge number to be loaded (1-8) [1] --

FOR HP INTERNAL USE ONLY

LOCATE VERIFY

This command allows the users to instruct the device to perform an internal verification of a section of data to ensure that it can be read. Verification will terminate immediately on an unrecoverable data error but will not terminate on a file mark.

INPUT FORMAT:

CARTDIAG> LOCATE VERIFY

Enter block address (<cr> to use current address) --
Enter the length --

FOR HP INTERNAL USE ONLY

MOVE

This command moves the axis into the direction specified by the user. MOVE is specific to HP35401A.

INPUT FORMAT:

CARTDIAG> MOVE

Do you want to move to 00 -- Vertical home
01 -- horizontal home
02 -- Home position (H/V)
03 -- Vertical cartridge position
04 -- into Carrier
05 -- into HP9144A/T

Enter direction -->

FOR HP INTERNAL USE ONLY

OPEN DOOR

This command is used to release and re-engage the door lock, and therefore is used to open the door. **OPEN DOOR** is specific to HP35401A.

INPUT FORMAT:

CARTDIAG> OPEN DOOR

FOR HP INTERNAL USE ONLY

PANEL LIGHTS

This command is used to set the front panel lights and is specific to HP9145A.

INPUT FORMAT:

CARTDIAG> PANEL LIGHTS

Do you want to set Busy Light (Y/N)[Y]?

Do you want to set Write Protect Light (Y/N)[Y]?

Do you want to set Fault Light (Y/N)[Y]?

Do you want to set Loaded Light (Y/N)[Y]?

Do you want to set Clean Head Light (Y/N)[Y]?

FOR HP INTERNAL USE ONLY

PATTERN ERT

This command is used to initiate a pattern error-rate test. Four options are available to the user. The test will destroy data on the tape. Thus, the user must be running in destructive mode in order to execute this command. The four options are loop count, test type, test area, and data source. They are defined as follow:

Loop count : 0 - 255

Test type : 00 = Read only ERT.
01 = Write then Read ERT.
02 = Certification (Write then read with bad blocks spared after test done).

Test area : C = Use current address and current length.
S = Use specific track.
E = Entire tape.

Data source :

For HP9144A/T and HP35401A:

00 = Internal patterns.
For first loop, pattern #1 is used, for second loop, pattern #2 is used, etc. If more than eight loops of the test are requested, then the pattern numbers will be cycled through again from the beginning. The patterns, in order, are:

Pattern	Function
===== B6 6D DB	===== MFH DC offset
7F	Standing wave
77	Standing wave
55 49 3F	Frequency sweep
FF	Produces 2F in one phase
00	Produces 2F in other phase
55	Produces 1F in one phase
AA	Produces 1F in other phase

01 = User defined pattern.
This is the 64 byte pattern that is sent to the unit via the Receive user pattern utility. This pattern will be used on all loops.

02 = Random pattern.

For HP9145A:

00 = Use internal pattern 6D B6 DB.
01 = User defined pattern.
Patterns received via the Receive User Pattern Utility. Use internal pattern if Receive User

FOR HP INTERNAL USE ONLY

pattern is not sent immediately prior to this command.

- 02 = Use random data.
- 03 = Use FF.
- 04 = Use 55.
- 05 = Use F5.
- 06 = Use FFFF5.

Note: The test area is ignored if Certification is selected because this option will test the entire tape.

INPUT FORMAT:

CARTDIAG> PATTERN ERT

Do you wish to clear the ERT log (Y/N) [N]?

Which type would you like: 00 -- Read only ERT
01 -- Write then Read ERT
02 -- Certification ERT

type --

{if type <> 02}

Available test area:

For HP9144A/T or HP35401A:
C - Current address and length
S - Use specific track
E - Entire tape

What test area would you like:

{if S is chosen}

Enter track number --

For HP9145A:
C - Current address and length
S - Use specific track X and X+1
E - Entire tape

What test area would you like:

{if S is chosen}

Do you want to use 1st or 2nd set of 16 tracks(1/2)[1]?

Enter track number --

What loop count would you like (0<= count <= 255)[1]?

{if Pattern test was selected}

FOR HP INTERNAL USE ONLY

For HP9144A/T or HP35401A:

The sources for the data pattern to be used are:

- I - Internal pattern
- R - Random pattern
- U - User input pattern

Which pattern source would you like (I/R/U)[I]?

For HP9145A:

The sources for the data pattern to be used are:

- 00 - Internal pattern
- 01 - User defined pattern
- 02 - Random pattern
- 03 - Use FF
- 04 - Use 55
- 05 - Use F5
- 06 - Use FFFF5

This test will destroy data on the tape

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

{Responding N will terminate this command}

Do you wish to read the ERT log (Y/N)[N]?

OUTPUT FORMAT:

{if user wants to read the ERT log}

No errors were detected in the ERT

{if errors were detected}

Error Rate Test Log Values

=====

Number of blocks accessed = nnnn

Permanent errors = nnnn

Transient errors = nnnn

Uncorrectable errors = nnnn

Permanent key errors = nnnn

There are no log entries

or

Logical Address	Error
=====	=====
nnnn	BBBBBBBB
nnnn	BBBBBBBB

. Repeat for each entry in the log

.

FOR HP INTERNAL USE ONLY

nnnn BBBBBBBB

{if any entries were printed}
Do you wish to see error byte decoding information(Y/N)[N]?

{if yes}

The Error values are :

76543210

00000001 Frame 1 has a CRC error
00000010 Frame 2 has a CRC error
00000100 Frame 3 has a CRC error
00001000 Frame 4 has a CRC error
00010000 Frame 5 has a CRC error
00100000 Frame 6 has a CRC error
01000000 Data was unrecoverable
10000000 Key error



FOR HP INTERNAL USE ONLY

POWERFAIL STATUS

This command returns information due to power failure since the current cartridge was inserted or the last POWERFAIL STATUS was issued. This command is specific to HP9145A.

INPUT FORMAT:

CARTDIAG> POWERFAIL STATUS

OUTPUT FORMAT:

Power fail has occurred.

or

Power fail has occurred but no tape was loaded.

or

Power fail occurred and a tape was loading or loaded and the tape was successfully loaded during powerfail.

or

Power fail occurred and a tape was loaded but the power fail load FAILED.

AND

No data was lost during last power down/fail.

or

Host data in the buffer was not written to tape due to the last power down/fail. The logical host block address of the first block not written to tape due to the power failure is nnnnnnnn

or

Spares table was not able to be updated on tape after the last power down/fail.

FOR HP INTERNAL USE ONLY

PRESET DRIVE

This command will update all logs on the tape if they require an update. This includes the spares table, run time logs, and use log. This utility enables the user to force the logs to be flushed to tape.

INPUT FORMAT:

CARTDIAG> PRESET DRIVE

Note: If a 9144A 16 track tape or a compressed tape is being used in HP9145A, then there will be an error message.

FOR HP INTERNAL USE ONLY

READ

This command allows the user to access any data block from the tape on the selected device. The user will be prompted for the block address to be read at. This command requires Level 0 security.

INPUT FORMAT:

CARTDIAG> READ

Enter block address --

OUTPUT FORMAT:

The data in hex follows:

	0	1	2	3	4	5	6	7	8	9	
0:	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH
10:	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH
.											
.											
250:	HH	HH	HH	HH	HH	HH				

{NOTE -- the dots in the preceding table represent non-alpha-numeric ASCII characters. Alpha-numeric characters will be printed.}

FOR HP INTERNAL USE ONLY

READ MEMORY

This command allows the user to access any data block from the global data memory area on the selected device. For HP9144A/T and HP35401A, 1024 bytes of data will be returned starting at the address user specified. For HP9145A, user will be prompted for number of bytes of data. This command requires Level 0 security.

INPUT FORMAT:

CARTDIAG> READ MEMORY

Enter block address --

For HP9145:

Enter number of block to be read --

OUTPUT FORMAT:

The data in hex follows:

	0	1	2	3	4	5	6	7	8	9	
0:	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH
10:	HH	HH	HH	HH	HH	HH	HH	HH	HH	HH
.											
.											
250:	HH	HH	HH	HH	HH	HH				

{NOTE -- the dots in the preceding table represent non-alpha-numeric ASCII characters. Alpha-numeric characters will be printed.}

FOR HP INTERNAL USE ONLY

READ NOVDRAM

This command allows the user to access all the 32 bytes data in the Non-volatile RAM and is specific to HP35401A.

INPUT FORMAT:

CARTDIAG> READ NOVDRAM

OUTPUT FORMAT:

The drive is in Sequential mode.

or

The drive is in Selective mode.

There are currently nnnn installed cartridges.

The drive is currently IDLE.

or

The drive is currently LOADING.

or

The drive is currently UNLOADING.

or

The drive is currently has a drive FAULT.

Cartridge nnnn is currently Loading/Unloading.

Cartridge nnnn is selected for the next load.

The following cartridges are present in the drive:

nnnn nnnn ... nnnn

The following cartridges are write protected:

nnnn nnnn ... nnnn

The carrier is initialized.

or

The carrier is not initialized.

The following cartridges have faults:

nnnn nnnn ... nnnn

The following cartridges have exceeded the media life limit:

nnnn nnnn ... nnnn

The nested faults field is overflowed.

The recovery calls field is overflowed.

The unit faults field is overflowed.

The operations field is overflowed.

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The movement time field is overflowed.

The mechanism movement time is nnnn milli seconds.

Total operations = nnnn.

Total unit faults = nnnn.

Total recovery calls = nnnn.

Total nested faults = nnnn.

Total cleaning cycles = nnnn.

Total power cycles = nnnn.

FOR HP INTERNAL USE ONLY

RELOAD

This command will initiate the load sequence if the cartridge is inserted. RELOAD is specific to HP9144A/T.

INPUT FORMAT:

CARTRDIAG> RELOAD

FOR HP INTERNAL USE ONLY

REV

This command allows the user to read the revision numbers of the ROM's that contain the firmware installed in the device.

INPUT FORMAT:

CARTDIAG> REV

OUTPUT FORMAT:

For HP9144A/T:

```
Firmware Revision Values:
                        Revision Number
                        =====
Unit Code Rom   nnnn - R
Executive Rom   nnnn - R
```

For HP35401A:

```
Firmware Revision Values:
                        Revision Number
                        =====
Executibe Rom     nnnn - R
HP35401A Unit Code Rom  nnnn - R
HP9144A/T Unit Code Rom  nnnn - R
```

For HP9145A:

```
Firmware Revision Values:
                        Revision Number
                        =====
Controller Code   nnnn - R
DDC Code          nnnn - R
Servo Code        nnnn - R
```

FOR HP INTERNAL USE ONLY

RUN LOG

This command allows the user to access the Run-Time Data Error Log which contains an accumulation of all run-time data errors detected by the drive since the last CLEAR LOGS command. HP9145A will not roll over any of the error counts during operation. If the number of correctable without retries becomes "65535", for instance, then it will remain at "65535" and not roll to "0" on the next error until the log is cleared.

INPUT FORMAT:

CARTDIAG> RUN LOG

OUTPUT FORMAT:

For HP9144A/T and HP35401:

Run-Time Error Log Values
=====

Number of uncorrectable read errors = nnnn
Number of key errors = nnnn
Type of certification = nnnn

For HP9145A:

Run-Time Error Log Values
=====

Number of uncorrectable read errors = nnnn
Number of key errors = nnnn
Type of certification = nnnn
Number of blocks spared on write = nnnn
Number of correctable errors with retries = nnnn
Number of correctable errors without retries = nnnn

Values for type of certification:

- 0 -- Not certified
- 1 -- 3M certified
- 2 -- HP factory certified
- 4 -- 7914 drives certified
- 8 -- HP35401A/HP9144A/T certified
- 16 -- HP9145A certified

There are no log entries
or

Logical Address	Error
=====	=====
nnnn	BBBBBBBB
nnnn	BBBBBBBB
.	.

. Repeat for each entry in the log

FOR HP INTERNAL USE ONLY

nnnn BBBBBBBB

{if any entries were printed}

Do you wish to see error byte decoding information(Y/N)[N]?

{if yes}

The Error values are :

76543210

00000001 Frame 1 has a CRC error
00000010 Frame 2 has a CRC error
00000100 Frame 3 has a CRC error
00001000 Frame 4 has a CRC error
00010000 Frame 5 has a CRC error
00100000 Frame 6 has a CRC error
01000000 Data was unrecoverable
10000000 Key error

FOR HP INTERNAL USE ONLY

SENSE

This command allows the user to read the values of the state of the sensors/switches and is specific to HP35401A and HP9145A.

INPUT FORMAT:

CARTDIAG> SENSE

OUTPUT FORMAT:

For HP35401A:

The Quarry ID = 110100 (Binary)
The Mode is Field mode
or
The Mode is Factory mode
or
The Eject button has been pressed
or
Horizontal movement sensor is on HP9144A/T side
or
Horizontal movement sensor is on Magazine side
or
Vertical home sensor
or
Cartridge under arm detector
or
Cartridge write-protect indicator
or
Magazine is loaded and door is closed
or
Selective mode (0=Sequential mode)
or
Vertical movement sensor

For HP9145A:

Cartridge Present Switch is on
or
Write Protect Switch is on
or
Unload Button is on
or
Self Test Button is on
or
Display Self Test Results Button is on

FOR HP INTERNAL USE ONLY

SERVICE MODE

This command will allow the user to enable or disable service mode on the HP35401A or HP9145A. Service mode is required for some of the utilities to be performed.

INPUT FORMAT:

CARTDIAG> SERVICE MODE

Do you want to Enable or Disable service mode (E/D) [D]?



FOR HP INTERNAL USE ONLY

SET PATTERN

This command will allow the user to define and edit a pattern to be used in Pattern Error Rate Test. The pattern must be input in hex and is restricted to 64 digits in length. If less than 64 digits are input, the pattern that was input will be duplicated as many times as necessary to produce 64 digits. If no pattern has yet been defined, the pattern that is input will be stored for use in a Pattern ERT. If a pattern has been previously defined, via this command, that pattern will be displayed and the user can then edit that string. Valid edit characters are: R - for replace, I - for insert, and D for delete. R will replace the characters in the pattern with the characters following the R, starting at the pattern character under which the R is typed. I will insert the characters following the I into the pattern following the character in the pattern under which the I is typed. D will delete the pattern character under which the D is typed. Multiple D's may be typed to delete multiple pattern characters and other editing characters may follow a D (i.e., "DIab" will delete one character and insert the string "ab" at that point in the pattern). Following each edit string typed in, the resulting edited pattern will be re-displayed and the user will be given another opportunity to edit it. This process may be terminated by simply inputting a <cr> for the edit string.

INPUT FORMAT:

CARTDIAG> SET PATTERN

{if no previous pattern has been defined}
Input the pattern in hex:

{if pattern contains all valid hex characters this
command will terminate}

{if a previous pattern has been defined or the initial pattern
input contained invalid characters}

Input the changes (<cr> to stop):
{previous pattern is displayed here}

>

{if the input edit pattern is not valid then the pattern will
again be displayed and a new edit string will be requested}

{this process will be repeated until user inputs a <cr>
only for the edit string}

FOR HP INTERNAL USE ONLY

SPARE

This command will allow the user to spare the current target block. The user is also given a choice of method to use for sparing. This command is specific to HP9144A/T and HP35401A. The user must be running in Destructive mode in order to execute this command.

INPUT FORMAT:

CARTDIAG> SPARE

Enter the method of sparing:

0 -- skip spare

1 -- jump spare

Method you want to perform sparing --

OUTPUT FORMAT:

{If spare was performed}

{status -- including address of track affected by spare}

FOR HP INTERNAL USE ONLY

TABLES

This command provides access to the various information tables which reside in the drive. This includes the Manufacturer's block and Spares tables. The manufacturer's block table is written by 3M when the tape is formatted. It contains manufacturer's information about the tape and is written in the same direction on all tracks (moving towards EOT). The Spares table contains a list of all blocks which have been spared either by certification or auto-sparing.

INPUT FORMAT:

CARTDIAG> TABLES

The available drive tables are:
Manufacturer's Table
Spares Table

Which table do you want (M/S) [S]?

{other drives output the spare track table}

OUTPUT FORMAT:

Manufacturer's block Table:

Cartridge type = DC6xxHC
Number of user blocks = bbbb
Copyright notice =
Cartridge ID code = xxxxxxxnnnnnnnn for HP9144A/T and
HP35401A
= ZABBBCCDEEFFGGHH for HP9145A

where xx = 00 for the long tape
xx = 15 for the short tape
bbbb = 1024 for HP9144A/T and HP35401A
bbbb = 1024 or 4096 for HP9145A
xxxxxx = manufacturer's control code
nnnnnnnnnn = the date code
Z = cartridge mechanical configuration
0 - DC600HC or 1 - DC600XTDHC
A = location of formatter
1 - St. Paul or 2 - Camarillo
BBB = machine number
C = revision number
DD = year
EE = month
FF = day
GG = hour
HH = minute

Note: The cartridge ID code contains both numeric and alphanumeric characters and is unique for each cartridge.

FOR HP INTERNAL USE ONLY

Spares Table:

KEY #	TRACK #
-----	-----
nnnn	nnnn
.	
.	For each entry in the table
.	
nnnn	nnnn

FOR HP INTERNAL USE ONLY

TAPE INFO

This command allows the user to obtain information that is specific to tapes loaded in HP9145A.

INPUT FORMAT:

CARTDIAG> TAPE INFO

OUTPUT FORMAT:

A tape is loaded

or

There is no tape loaded

The tape is write protected

or

The tape is not write protected

Cartridge code is HC

or

Cartridge code is XTD

Cartridge format of the tape is HP9145A format (32 tracks)

or

Cartridge format of the tape is 9144A/LINUS format (16 tracks)

or

The tape is an uninitialized tape

The tape contains uncompressed data

or

The tape contains compressed data

The tape is Greeley MAGIC compression algorithm

The tape has a known EORD(End Of Record Data) with a host address of nnnn and actual EORD block address of nnnn

or

The tape has an unknown EORD(End Of Record Data)

The tape has nnnn DABS(Direct Access Blocks) Extent

FOR HP INTERNAL USE ONLY

TAPE USELOG

This command allows the user to access the tape use log which contain the record of tape usage. This log is never cleared and it is not possible to update this log if the tape is Write Protected.

INPUT FORMAT:

CARTDIAG> TAPE USELOG

OUTPUT FORMAT:

Number of times tape was loaded = nnnn

For HP9144A/T and HP35401A, the following information also return:

Number of blocks accessed = nnnn

FOR HP INTERNAL USE ONLY

TRANSIENT LOG

This command returns all the read/write errors the drive encountered and overcomes by retries. This command is specific to HP9145A.

INPUT FORMAT:

CARTDIAG> TRANSIENT LOG

OUTPUT FORMAT:

Transient Log Values
=====

Number of transient errors = nnnn
or

Logical Address	Error
=====	=====
nnnn	BBBBBB
nnnn	BBBBBB
.	
.	Repeat for each entry in the log
.	
nnnn	BBBBBB

{if any entries were printed}

Do you wish to see error byte decoding information(Y/N)[N]?

{if yes}

The Error values are :

543210
=====

000001	Frame 1 has an error
000010	Frame 2 has an error
000100	Frame 3 has an error
001000	Frame 4 has an error
010000	Frame 5 has an error
100000	Frame 6 has an error

FOR HP INTERNAL USE ONLY

UNLOAD

This command will perform a full unload of the cartridge. If a cartridge is loading when the utility is issued, the load will be aborted and the unload will be performed. For HP35401A, the user can specify the slot where the tape should be loaded. This command is specific to HP35401A and HP9145A.

INPUT FORMAT:

CARTDIAG> UNLOAD

For HP35401A:

Enter slot number for the tape to be loaded (1-8)[1] --

Error Messages

This section gives a partial list of the error messages that may be generated by CARTDIAG 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. Thus, a "!" indicates that a parameter of some sort will be placed in the location marked by the exclamation point. A "&" indicates that the line below will be concatenated onto the end of the line with the ampersand. Finally, a "%" means that the line below is a continuation of the message, but not to be concatenated as with the ampersand.

100	*** WARNING -- THE I/O PATH MAY NOT BE FUNCTIONING PROPERLY (CARTERR 100)%
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 CARTDIAG may be invalid.
101	*** DEVICE FAILED TO RESPOND TO ! COMMAND (CARTERR 101)%
CAUSE	No response to an i/o was received prior to the expiration of the allotted time.
ACTION	Verify that the selected tape drive is actually connected to the system. Run SYSMAP, if available, to confirm the presence of the device.
102	*** THE SPECIFIED DEVICE IS NOT A CARTRIDGE TAPE DRIVE & -- RETURNED ID CODE WAS ! (CARTERR 102)%
CAUSE	The selected device identified itself as something other than a CS/80 drive.
ACTION	Determine type of selected device and run the appropriate diagnostic on it.
103	*** CARTRIDGE TAPE DIAGNOSTIC TERMINATING (CARTERR 103)%
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.
104	*** A RESERVE AREA IS NOT AVAILABLE ON THIS DRIVE -- NO % OPERATION WAS PERFORMED. (CARTWARN 104)%
CAUSE	There is no available area on the tape drive that can be written to without corrupting user data. This can happen if no such area is provided by the system, or if the diagnostic is running in destructive mode, in which the location of the reserve area is unknown to the system since the drive is locked for diagnostics.
ACTION	For systems which do not support a reserve area (e.g. HP-UX), reserve area operations are not supported. Otherwise, execute the diagnostic selecting only section 8.

FOR HP INTERNAL USE ONLY

106	*** ! MODE REQUIRED TO EXECUTE THIS COMMAND (CARTERR 106)%
CAUSE	The diagnostic does not have access to the drive in the mode necessary to execute the selected command.
ACTION	The mode granted to a diagnostic for a selected device is system dependent.
<hr/>	
108	*** ! COMMAND IS NOT IMPLEMENTED * ON THIS DRIVE/SYSTEM (CARTERR 108)%
CAUSE	The selected operation is either not implemented on the selected drive or the system does not provide access to it.
ACTION	This operation is unavailable.
<hr/>	
109	*** DEVICE ENCOUNTERED AN ERROR WHILE EXECUTING THE% CS/80 ! COMMAND (CARTERR 109)%
CAUSE	The drive reported an error as a result of executing the selected operation.
ACTION	The hardware status that is displayed immediately following this message should indicate what sort of problem occurred, including a failing FRU if one is reported. If an FRU is reported, replace it and re-execute this diagnostic.
<hr/>	
110	*** THE MAXIMUM NUMBER OF ERRORS HAS BEEN REACHED (CARTERR 110)%
CAUSE	The user specified error limit has been reached.
ACTION	If more errors are desired, re-run the diagnostic assigning a larger value to the ERRCOUNT parameter of the run command.
<hr/>	
111	*** UNRECOGNIZED COMMAND -- % TYPE "HELP" FOR A LIST OF VALID COMMANDS (CARTERR 111)%
CAUSE	The specified command is not a valid command.
ACTION	Use the help facility to obtain a list of the commands that are valid and enter the desired command.
<hr/>	
112	*** UNRECOGNIZED REPLY WAS FOUND (CARTERR 112)%
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.
<hr/>	

FOR HP INTERNAL USE ONLY

113 * A NUMERICAL INPUT WAS EXPECTED BUT NOT RECEIVED (CARTERR 113)%**
CAUSE The reply that was entered in response to a prompt by the diagnostic is not a valid number.
ACTION Re-enter number using only numeric characters and valid special characters (e.g. +, -, , etc.).

114 * AN UNEXPECTED ERROR OCCURRED IN THE IO_CS80 DAR (CARTERR 114)%**
CAUSE A call to the CS/80 device access routine resulted in an unexpected status return.
ACTION The specific status generated by Io_Cs80 should have been displayed immediately prior to this error message. Report this set of error messages to support personnel.

115 * ERROR IN TRANSMISSION DETECTED DURING***
READ LOOPBACK TEST: (CARTERR 115)%

			%
	Octal Value	Octal Value	Bit Positions%
Byte #	Transmitted	Received	In Error%
*****	*****	*****	01234567%

CAUSE One or more bytes of data that were received from the tape drive as a result of a loopback operation did not contain the expected value(s).
ACTION Data is most likely being corrupted along the data path between the host and the drive. Check all cable connections along the path and re-execute the diagnostic. If errors persist, execute appropriate diagnostics against the modules that lay in the path between the host and the device.

116 ! ! ! !

118 * ERROR -- EXPECTED ! BYTES FROM THE DEVICE AND %**
RECEIVED ! BYTES (CARTERR 117)%
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, report the problem to support personnel.

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119	*** THIS COMMAND IS NOT SUPPORTED ON THIS DEVICE (CARTERR 119)%
CAUSE	The specified operation is not supported by the selected device.
ACTION	While other devices supported by the diagnostic may support the specified command, the selected device does not.
<hr/>	
120	*** FILE SYSTEM ERROR ENCOUNTERED WHILE RETRIEVING A MESSAGE (CARTERR 120)%
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.
<hr/>	
121	*** IDENTICAL READS FROM TAPE RETURNED NON-IDENTICAL DATA (CARTERR 121)%
CAUSE	A read operation was performed on the same sector twice and the data from both reads did not match exactly.
ACTION	This is most likely a hardware problem with the drive. If loopback executes correctly, the read/write board in the drive is the probable cause of the error.
<hr/>	
122	*** DATA READ FROM TAPE DID NOT MATCH DATA PREVIOUSLY WRITTEN (CARTERR 122)%
CAUSE	A block was written to the tape and immediately read back. The data read did not match exactly the data written.
ACTION	This is most likely a hardware problem with the drive. If loopback executes correctly, the read/write board in the drive is the probable cause of the error.
<hr/>	
123	*** UNIT WAS SET TO 15 BUT STATUS DOES NOT INDICATE THE CURRENT UNIT AS 15 (CARTERR 122)%
CAUSE	A set unit command was sent to the tape drive specifying unit 15 and hardware status was immediately requested. The unit field of the status was not 15.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	

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124	*** THE ADDRESS THAT WAS SET ON THE TAPE DRIVE IS NOT EQUIVALENT TO THE ADDRESS RETURNED IN STATUS (CARTERR 124)%
CAUSE	A set address command was sent to the tape drive immediately followed by a status request. The address reported in the hardware status did not match the address that was set.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
125	*** BLOCK DISPLACEMENT WAS SET TO 1 BUT THE ADDRESS RETURNED IN STATUS DOES NOT INDICATE THAT THE DISPLACEMENT IS BEING USED (CARTERR 125)%
CAUSE	A set block displacement command was sent to the tape drive immediately followed by a status request. The current block displacement did not match that which was set.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
127	*** THE ADDRESS BOUNDS BIT IN STATUS WAS MASKED, BUT THE DEVICE SET IT WHEN AN ADDRESS BOUNDS ERROR WAS FORCED (CARTERR 127)%
CAUSE	The set status mask command was used to mask address bounds errors and then a set address command was issued with an address that exceeded the maximum. The drive reported the error even though the status was masked.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
128	*** THE ADDRESS RETURNED IN STATUS INDICATES % THAT THE DEVICE ERRONEOUSLY CONVERTED THE ADDRESS % WHEN CHANGING ADDRESSING MODE (CARTERR 128)%
CAUSE	A set address command was issued to the drive followed by a set return address mode to the opposite of the current mode. Status was then requested and the current target address did not match the address that was set, implying that the address conversion performed by the drive was incorrect.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
129	*** AN ERROR WAS ENCOUNTERED WHEN READING AFTER RETRY TIME WAS SET TO A RANDOM VALUE (CARTERR 129)%
CAUSE	A set retry time was issued to the drive with a random time value followed by a read command. The drive reported an error.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	

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130	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO SEND A SET RELEASE% COMMAND TO THE DEVICE (CARTERR 130)%
CAUSE	A release command was sent to the drive and the drive returned an error.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
133	*** AN INVALID OPCODE WAS SENT TO THE DEVICE, BUT THE ILLEGAL% OPCODE BIT OF THE STATUS MESSAGE WAS NOT SET (CARTERR 133)%
CAUSE	A command was sent to the drive with an invalid op code and the drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
134	*** A SET UNIT COMMAND WAS ISSUED WITH A UNIT% NUMBER OF 1, BUT THE MODULE ADDRESSING BIT OF % THE STATUS MESSAGE WAS NOT SET (CARTERR 134)%
CAUSE	A set unit command was sent to the drive with a unit number of 1, which is an invalid unit number. The drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
135	*** A SET ADDRESS COMMAND WAS ISSUED TO AN ADDRESS GREATER THAN% THE MAXIMUM FOR THE DEVICE, BUT THE ADDRESS BOUNDS BIT OF THE% STATUS MESSAGE WAS NOT SET (CARTERR 135)%
CAUSE	A set address command was sent to the drive with an address greater than the maximum allowable. The drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	
136	*** THE STATUS MASK WAS SET TO MASK ALL UNMASKABLE % BITS, BUT THE PARAMETER BOUNDS BIT OF THE STATUS % MESSAGE WAS NOT SET (CARTERR 136)%
CAUSE	A set status mask command was sent to the drive specifying that all bits be masked that are not allowable (unmaskable). The drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.
<hr/>	

FOR HP INTERNAL USE ONLY

137	*** A SET LENGTH COMMAND WAS ISSUED WITH ONLY 1 PARAMETER BYTE% INSTEAD OF THE 4 EXPECTED BY THE DEVICE, BUT THE ILLEGAL% PARAMETER BIT OF THE STATUS MESSAGE WAS NOT SET (CARTERR 137)%
CAUSE	A set length command was sent to the drive with fewer bytes than are expected by the drive for that command. The drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.

138	*** A WRITE COMMAND WAS ISSUED TO THE DEVICE FOLLOWED % BY A REQUEST FOR AN EXECUTION MESSAGE INSTEAD OF % SENDING ONE, BUT THE MESSAGE SEQUENCE BIT OF THE % STATUS MESSAGE WAS NOT SET (CARTERR 138)%
CAUSE	The CS/80 protocol was violated by sending a write command and specifying the wrong type of execution message. The drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.

139	*** A WRITE COMMAND WAS ISSUED WITH THE LENGTH SET TO 10,% FOLLOWED BY AN EXECUTION MESSAGE OF ONLY 6 BYTES, BUT THE% MESSAGE LENGTH BIT OF THE STATUS% MESSAGE WAS NOT SET (CARTERR 139)%
CAUSE	The CS/80 protocol was violated by sending a write command which specified that more bytes be written than were actually provided in the execution message. The drive did not report the expected error.
ACTION	This is definitely a drive problem—probably firmware.

140	*** NO OPERATION WAS PERFORMED (CARTERR 140) %
CAUSE	Due to a previous error, which has already been reported, no operation was performed.
ACTION	Refer to action instructions for previously reported error.

200	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO SEND/RECEIVE% INFORMATION FROM THE USER (CARTERR 200)%
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.

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201	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO RETRIEVE A% MESSAGE FROM THE CATALOG (CARTERR 201)%
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to extract a message from its message catalog.
ACTION	Refer to action instructions for previously reported error.
<hr/>	
202	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO CONVERT A% NUMBER TO A STRING (CARTERR 202)%
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.
<hr/>	
203	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING A BIT EXTRACTION% OPERATION (CARTERR 203)%
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.
<hr/>	
204	*** THE SELECTED DEVICE COULD NOT BE OBTAINED% FOR TESTING (CARTERR 204)%
CAUSE	
ACTION	
<hr/>	
205	*** DUE TO PROBLEMS WITH RETURN ADDRESSING MODE, ADDRESSES% REPORTED WITH STATUS INFORMATION MAY BE INACCURATE (CARTERR 205)%
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to set the return address mode on the drive.
ACTION	Refer to action instructions for previously reported error. Also, if hardware status is displayed later in the diagnostic run, the address portion of the status could be displayed in both block and 3-vector formats since the diagnostic cannot determine the mode that the tape drive is currently in.

FOR HP INTERNAL USE ONLY

206	*** DUE TO PROBLEMS WITH SET BLOCK DISPLACEMENT, CARTDIAG% WILL TERMINATE TO AVOID POTENTIAL DESTRUCTION OF % USER DATA (CARTERR 206)%
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to successfully set the block displacement value on the drive. Since the diagnostic no longer knows what the displacement value is, it must terminate to avoid destroying data.
ACTION	Refer to action instructions for previously reported error.

207	*** DUE TO PROBLEMS WITH DESCRIBE, CARTDIAG CANNOT FUNCTION% PROPERLY AND WILL THEREFORE TERMINATE (CARTERR 207)%
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to successfully obtain describe data from the drive. Since the diagnostic needs this information to function correctly, it must terminate.
ACTION	Refer to action instructions for previously reported error.

208	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO COMMUNICATE% WITH THE DIAGNOSTIC SYSTEM (CARTERR 208)%
CAUSE	Due to a previous error, which has already been reported, the diagnostic was unable to successfully perform a function which requires communication with the diagnostic system.
ACTION	Refer to action instructions for previously reported error.

209	*** YOUR RESPONSE WAS INVALID (CARTERR 209)%
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.

210	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN DATA% FROM AN I/O BUFFER (CARTERR 210)%
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.

FOR HP INTERNAL USE ONLY

211	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO PLACE DATA% INTO AN I/O BUFFER (CARTERR 211)%
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.

212	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN AN% I/O BUFFER (CARTERR 212)%
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.

215	*** HIGHER SECURITY IS NEEDED TO PERFORM THIS OPERATION & (CARTERR 215) %
CAUSE	The user requested an operation which is restricted to users with higher security than the user possesses.
ACTION	Contact system administrator if higher security level is desired.

216	*** ! BYTES WERE EXPECTED TO HAVE BEEN SENT FROM THE TAPE DRIVE, % BUT ONLY ! WERE RECEIVED (CARTERR 216) %
CAUSE	Data returned from the device in response to a command consisted of a different number of bytes than were expected.
ACTION	This is probably a firmware problem in the drive.





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HPIB Digital Data Storage Tape Drive Diagnostic

Introduction

The HPIB Digital Data Storage Tape Drive (HPIBDDS) diagnostic tests the DDS (Digital Data Storage) drive with the HPIB interface. This diagnostic detects failures down to a field replaceable unit (FRU) and is only available on operating systems which support the online diagnostic subsystem.

Defects and Enhancements

Submit defect reports and enhancement requests concerning this diagnostic through the STARS database referencing product number 30600-10033.

Minimum Configuration

This product is available on any Precision Architecture RISC system which supports the online diagnostic subsystem.

Intermediate hardware for communication with the DDS drive must be available on the host system.

The online diagnostic system must be supported with DAR to access DDS. I/O driver with access to diagnostic functions for DDS through the host operating system.

Operating Instructions

Diagnostic subsystem security level 3 is required to initiate this diagnostic. However, some diagnostic tasks which are exclusive or destructive to tape data will require a higher clearance.

Default Tests

If the user does not specify sections and steps, the default sections and steps will be executed. These default sections and steps will be performed whether the drive is either on-line or off-line:

Section 10 : Non-destructive verification trouble tree
Section 11 : Destructive hardware trouble tree

FOR HP INTERNAL USE ONLY

RUN Command


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

sysdiag

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


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. 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 HPIBDDS pdev=4.6.1 <RUN Command Options>
      |           |
      |   none   |
      | required |
      | for      |
      | default  |
      | test    |
      | suite   |
      |
      | insert physical location of
      | device to be tested here;
      | alternatively, for MPE XL,
      | type the ldev number;
      | or for HP-UX, type the devfile name
```

Note  For converged diagnostic, you do not need to include the word **RUN** in the **RUN** command.

A description of HPIBDDS and all the sections are available through the DUI's Help facility.

Upon completion of all sections and steps or when a fatal error condition is encountered, control will be returned to the Diagnostic User Interface (DUI).

FOR HP INTERNAL USE ONLY

Test Execution

In executing HPIBDDS, the following welcome message will be displayed:

```
*****  
*****  
*****          HPIB DDS DIAGNOSTIC          *****  
*****  
*****          (C) Copyright Hewlett Packard Co. 1987          *****  
*****          All Rights Reserved.          *****  
*****          Version  n.nn.nn          *****  
*****  
*****
```

Welcome, Today is TUE, Jul 12, 1988 at 9:00 AM

{Output from sections and steps executed}

HPIBDDS EXITING ...

The diagnostic will request access to the device from the diagnostic subsystem unless the program is being called to decode status. If access is denied, error messages from the subsystem as well as this diagnostic will be displayed upon program termination. If access is successful, the diagnostic will automatically invoke a diagnostic subsystem routine to test the I/O path between the intermediate hardware and the drive. If the status returned from this routine is "unsuccessful", a warning message will be displayed and the diagnostic will continue. For "successful" status, the diagnostic will interrogate the device to identify itself. If the device fails to respond, the program will clear the device and re-interrogate the device to identify itself.

The HPIBDDS is CLEARing the drive and DESCRIBE will be performed again after clear.

If the device still fails to respond, the program will terminate.

*** DUE TO PROBLEMS WITH DESCRIBE, HPIBDDS CANNOT FUNCTION PROPERLY AND WILL THEREFORE TERMINATE (DDSERR 207)

If an unexpected identification code is received, an appropriate warning message will be displayed and the execution will continue to allow development devices to be diagnosed. In this case, the user will be asked whether to continue or not, for example:

*** HPIBDDS IS UNABLE TO DIAGNOSE THE SELECTED DEVICE(DDSERR 102)

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

If the device identifies itself as a valid candidate, the sections and steps specified by the user in the DUI run command will be executed. If the user did not specify sections and steps, the default sections and steps will be executed. These default sections and steps will be performed whether the drive is either on-line or off-line.

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If the diagnostic request fails during the execution of any program section or step, the appropriate error will be displayed. When the number of errors generated reaches the limit specified by the user in the ERRCOUNT parameter of the RUN command, an error will be displayed and the diagnostic will terminate.

If the ERRPAUSE parameter of the RUN command was assigned a value of "on", the diagnostic will pause after each error and will ask the user whether or not to continue the test.

Detailed Test Descriptions

The following test sections and steps are available to the user with HPiBDDS:

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 5	Selftest
Section 6	Display Device Status
Section 7	Display Device Log
Step 62	Fault Log
Step 63	Error Rate Log
Step 64	Tape Log
Section 10	Verification Trouble Tree
Section 11	Hardware Trouble Tree
Section 12	Media Trouble Tree (Non-Destructive)
Section 13	Media Trouble Tree (Destructive)
Section 50	Interactive External Exercisera

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Section 2—CLEAR

This section will place the device in the following state:

- Tape drive protocol will be restarted
- Internal command and report queues will be purged
- Data buffers will be cleared
- Current tape position will be retained
- Current tape status will be retained
- Current On/Off-Line status will be retained

However, the device response to these commands will not be tested. To test the response, use other sections such as Identify, Loopback and Device Status.

OUTPUT :

Section 2 -- CLEAR

End of Section 2 -- CLEAR

FOR HP INTERNAL USE ONLY

Section 3—IDENTIFY

This section requests the tape drive to identify itself in order to determine whether it is responding. If not, an error message will be displayed and the program aborts. Otherwise, the user will be informed of the device identity. The ID code and the device mnemonic (HP *nnnn*) will be displayed.

If the code does not match the device, a warning will be issued and the user will be prompted for one of the valid identification codes to use to diagnose the device. If none is supplied, the program will terminate.

OUTPUT :

Section 3 -- IDENTIFY

The selected device has been identified as an HPC15X1
Digital Audio Tape Drive.

End of Section 3 -- IDENTIFY

FOR HP INTERNAL USE ONLY

Section 4—LOOPBACK

This section will test the HP1B Communication Link between the host and selected tape drive.

The Loopback operation tests the HP1B (ABI) chip, HP1B transceivers, data buffer, handshake logic and buffer memory. This operation performs a write loopback of 256 bytes of data to the device using the pattern—255, 0, 1, . . . , 254, follows by a read loopback of 256 bytes. The results will be checked against the expected pattern.

OUTPUT:

Section 4 -- LOOPBACK

Tape Drive data channel checks out OK.

End of Section 4 -- LOOPBACK


{OR}

Section 4 -- LOOPBACK

The following transmission errors were detected during the loopback test:

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
====	=====	=====	=====
<i>nn</i>	<i>hh</i>	<i>hh</i>	<i>bbbbbbb</i>
12	56	54	0000010
33	7F	3D	0100010
.	.	.	.
.	.	.	.

End of Section 4 -- LOOPBACK

Note  Entries in the preceding table will be displayed for as many errors as were detected, unless the ERRCOUNT parameter of the RUN command has been exceeded.

FOR HP INTERNAL USE ONLY

Section 5—Selftest

This section will attempt to isolate and identify a problem by initiating the internal power-on selftest on the tape drive and reports the status of the test to the user. The test will be initiated by issuing an INITIATE DIAGNOSTIC command specifying diagnostic 0.

OUTPUT:

Section 5 -- SELFTEST

No faulty Field Replaceable Units (FRUs) were detected
by device diagnostic #*nnn*.

{or}

Device diagnostic #*nnn* detected the following failure:

Error Class - *error group according to device ERS*
[Detection - *while name of detecting action*]
[- *by name of detecting processor/program*]
[- (*nnn*) *name of detecting test*]
Explanation - (*hhh*) *error explanation as listed in device ERS*
Faulty FRUs - (*nn*) *FRU name as listed in device ERS*
[- (*nn*) *FRU name as listed in device ERS*]

{or}

Device diagnostic #*nnn* was unable to either run to completion
and/or isolate an FRU. Error returned:

Error Class - *error group according to device ERS*
Explanation - (*hhh*) *error explanation as listed in device ERS*

End of Section 5 -- SELFTEST

Note



This is a generalized example and selftest numbers will be displayed in decimal; error and FRU numbers in hex except for the section which the header/trailer will be repeated for execution.

FOR HP INTERNAL USE ONLY

Section 6--DISPLAY DEVICE STATUS

This section decodes the 6 bytes of hardware status from the tape drive and displays the status to the user. It will display both the raw and interpreted values of each status register which will reflect the status of the drive.

OUTPUT:

Section 6 -- DISPLAY DEVICE STATUS

=====

DEVICE STATUS

=====

RAW FORM:

Register	Hex Value	DIO Map	Decimal Value(s)
#1	hh	87654321	bbbbbbbb
#2	hh		bbbbbbbb
#3	hh		bbbbbbbb
#4	hh		nn, nn
#5	hh		nnn
#6	hh		nnn

INTERPRETED DRIVE STATUS:

Tape drive is [ON-line, OFF-line]
Immediate Response Mode is [ENABLED, DISABLED]
Device has been CLEARED since last command or power has
been just restored

INTERPRETED TAPE STATUS:

Tape is Write [ENABLED, PROTECTED]
Tape density is UNKNOWN
Tape position is [BOT, EOF, past EOT, UNKNOWN]
Tape RUNAWAY condition detected
Data TIMING error detected

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INTERPRETED I/O STATUS:

Last command was [REJECTED, ACCEPTED]
- Last command was retried nnn times
Reject Class : [DEVICE reject, PROTOCOL reject,
SELFTEST failure, #n]
Error location : [CONTROLLER, SERVO, FORMATTER]
Error #hhh - error explanations
HPIB Command Parity Error detected
Unrecovered Data PARITY error detected
Unrecovered Data/Format Error
RECOVERED error detected

End of Section 6 -- DISPLAY DEVICE STATUS



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Section 7—DISPLAY DEVICE LOG

This section obtains data from the fault log, error rate log, and tape log, and decodes and displays the error messages to the user.

Step 62 - Fault Log Contains selftest failures along with all problems encountered during normal operation.

Step 63 - Error Rate Log Used to monitor the condition of a tape during normal operation and may also be used to monitor tape errors while executing error rate tests.

Step 64 - Tape Log Contains tape-related information generated during the current tape load.

OUTPUT:

Section 7 -- DISPLAY DEVICE LOGS

Step 62 - Fault Log

=====

FAULT LOG

=====

01

Device diagnostic #nnn detected the following failure:

Error Class - *Runtime errors*
 OR
 Drive controller diagnostic errors
 OR
 Buffer controller diagnostic errors
 OR
 Interface controller diagnostic errors
 OR
 Multi-processor errors
 OR
 Operational status

Error Code - (hhh) *error explanation as listed in device ERS*
[Faulty FRUs - (nn) *FRU name as listed in device ERS*]
[- (nn) *FRU name as listed in device ERS*]

----- 02 -----

:

:

----- nn -----

End Step 62 - Fault Log

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Step 63 - Error Rate Log

```
=====
                        ERROR RATE LOG
=====
Number of groups written      = nnnn
Number of groups has RAW rewrites = nnnn
Number of write hard errors   = nnnn
Number of groups read        = nnnn
Number of groups retried     = nnnn
Number of read hard errors   = nnnn
```

End Step 63 - Error Rates

Step 64 - Tape Log

```
=====
                        TAPE LOG
=====
Total tape load              = nnnnn

Current groups written = nnnnnnnn
Current RAW retries     = nnnnn
Current groups read     = nnnnnnnn
Current ECC-3 retries   = nnnnn

Previous groups written = nnnnnnnn
Previous RAW retries    = nnnnn
Previous groups read    = nnnnnnnn
Previous ECC-3 retries  = nnnnn

Total groups written = nnnnnnnn
Total RAW retries    = nnnnn
Total groups read    = nnnnnnnn
Total ECC-3 retries  = nnnnn
```

End Step 64 - Tape Log

End of Section 7 -- DISPLAY DEVICE LOGS

FOR HP INTERNAL USE ONLY

Section 10—VERIFICATION TROUBLE TREE

This section will perform a series of non-destructive tests to a DDS drive to detect and isolate the FRU. This diagnostic trouble tree will determine that the device is up and responding and that the HP-IB channel appears to be free of problems.

OUTPUT:

Section 10 -- VERIFICATION TROUBLE TREE

{Scenario 1:}

REJECTED - Device identification
Explanation: (nnn) hardware status error if available.

SUSPECT: (in descending order of probability)
1. FRU : HP-IB cable
2. Device powerfail

{Scenario 2:}

FAILED - Device identification
HP-IB code = hhhh - WARNING: Device is not recognized
as a DDS tape drive.

REJECTED - HP-IB Loopback test
Explanation: (nnn) hardware status error if available.

SUSPECT: (in descending order of probability)
1. FRU : HP-IB cable
2. FRU nn: Hp - HP-IB Interface

{Scenario 3:}

FAILED - Device identification
HP-IB code = hhhh - WARNING: Device is not recognized
as a DDS tape drive.

FAILED - HP-IB Loopback test

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
nn	hh	hh	bbbbbbb
12	56	54	0000010
33	7F	3D	0100010
.	.	.	.

SUSPECT: (in descending order of probability)
1. FRU : HP-IB cable

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2. More than 1 device answering to the same address
3. FRU nn: Hp - HPIB Interface

{Scenario 4:}

FAILED - Device identification
HPIB code = hhhh - WARNING: Device is not recognized
as a DDS tape drive.
PASSED - HPIB Loopback test

SUSPECT: (in descending order of probability)
1. Invalid configuration
2. Wrong device at specified address
3. More than 1 device answering to the same address
4. FRU nn: Hp - HPIB Interface
5. FRU : HPIB cable

{Scenario 5:}

PASSED - Device identification
REJECTED - HPIB Loopback test
Explanation: (nnn) hardware status error if available.

SUSPECT: (in descending order of probability)
1. FRU : HPIB cable
2. FRU nn: Hp - HPIB Interface

{Scenario 6:}

PASSED - Device identification
FAILED - HPIB Loopback test

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
nn	hh	hh	bbbbbbb
12	56	54	0000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.

SUSPECT: (in descending order of probability)
1. FRU : HPIB cable
2. More than 1 device answering to the same address
3. FRU nn: Hp - HPIB Interface

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{Scenario 7:}

PASSED - Device identification
PASSED - HPIB Loopback test

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Run destructive trouble tree (section 11)
2. Run operator assisted trouble tree (section 12)

End of Section 10 -- VERIFICATION TROUBLE TREE

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Section 11—HARDWARE TROUBLE TREE

This section will check out the device as thoroughly as possible without on-site assistance (tape handling) and without taking excessively long to complete. This section is destructive since the tests may clear data buffers and otherwise reset the device or even declare it unuseable by processes other than diagnostics. This section will attempt to clear the device to a known state and cause a series of device internal selftests to be run.

OUTPUT:

Section 11 -- HARDWARE TROUBLE TREE

{Scenario 1:}

[PASSED - test description]

[PASSED - test description]

[FAILED - test description]

[REJECTED - test description]

Explanation: (nnn) hardware status error if available.]

SUSPECT: (in descending order of probability)

1. name of suspected failing component/FRU

2. name of suspected failing component/FRU

{Scenario 2:}

PASSED - Device clear

PASSED - Device identification

PASSED - HPIB Loopback test

PASSED - Selftest nnn

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Run operator assisted trouble tree (section 12)

End of Section 11 -- HARDWARE TROUBLE TREE

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Section 12--MEDIA TROUBLE TREE (Non-Destructive)

This section will perform a series of non-destructive tests to the media of the DDS tape drive to verify the integrity of the media. 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 12 -- MEDIA TROUBLE TREE (Non-Destructive)

{Scenario 1:}

{Scenario 2:}

End of Section 12 -- MEDIA TROUBLE TREE (Non-Destructive)

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Section 13—MEDIA TROUBLE TREE (Destructive)

This section will perform a series of destructive tests to the media of the DDS tape drive to verify the integrity of the media. 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 13 -- MEDIA TROUBLE TREE (Destructive)

{Scenario 1:}

{Scenario 2:}

End of Section 13 -- MEDIA TROUBLE TREE (Destructive)

FOR HP INTERNAL USE ONLY

Section 50—INTERACTIVE EXTERNAL EXERCISER

This section provides the user with interactive access to the drive's internal diagnostics and utilities.

The following commands are available:

CLEARDEV	Clear operation on the DDS tape drive
CLEARLOG	Clears the various error logs on the device
DESCRIBE	Obtains describe information from the device
EXIT	Terminates execution of the External Exerciser
HELP	Provides this list of commands as well as more detailed descriptions and syntax of each command
HWSTATUS	Obtains current hardware status from the device
IDENTIFY	Obtains identification information from the device
IRM	Enables/disables immediate response mode
LOADTAPE	Performs a full load of the tape in the drive
LOGS	Provides access to the device's error rate log, fault log, and tape log
LOOPBACK	Performs a write and read loopback of 256 bytes of data
MOTIONCHECK	Performs basic tape movement functions of the drive
REV	Displays the firmware revision numbers
REWIND	Causes the tape mounted on the drive to be rewound to BOT
RESET	Perform a HARD reset on the drive
SELFTEST	Provides access to device's internal diagnostics
SUSPEND	Suspends HPIBDDS and returns control to the DUI
TREES	Executes one of the HPIBDDS's diagnostic trouble tree
UNLOADTAPE	Performs a full unload of the tape
WORKOUT	Provides the user with different ways of reading and writing tape

FOR HP INTERNAL USE ONLY

When the external exerciser is executed, the user will enter command upon the following prompt:

HPIBDDS>

Some commands may not be available if the requested device could not be obtained with exclusive access. The Exit command will terminate the program. Syntax and usage help will be available via the HELP command.

If the user enters an unrecognized command the following error message with one or more of the applicable additional explanations will be displayed. For unrecognized command the user will be reprompted, e.g.

*** YOUR RESPONSE IS INVALID. (DDSERR 05008)

{explanation of error.}

HPIBDDS>

Some commands require additional information from the user. In many cases, this information can be supplied as parameters to the command. If an invalid parameter is supplied, the following error message will be displayed.

*** UNEXPECTED PARAMETER (!) ENCOUNTERED.

The user will then be prompted for remaining information. The data prompts will be displayed in mixed case and will end with the prompt symbol ">". They will also include a range or selection of choices enclosed in parentheses and, where appropriate, a default selection, enclosed by square brackets, supplied by the program upon entry of a carriage return (<CR>). For example:

Enter the value. (off|1..99) [OFF]>

The text enclosed in the parentheses indicates that the user is to type either "off" or an integer value between 1 and 99 inclusive. Each option is separated by a "|". The default response "off", as indicated by [OFF], would be used if the user simply entered a carriage return. For items like configuration values, the current value will normally be displayed as the default.

Keyword responses (e.g., command names) may be abbreviated but not below the minimum number of characters necessary to distinguish them from all other valid responses. Responses will not be case sensitive. In addition, some commands will have special 2 or 3 character abbreviations which will also be recognized. These abbreviations are listed next to the command name in help messages. Where possible, command names, abbreviations, and other characteristics will conform to similar commands in the proposed Support User Interface Standard.

The HELP keyword will be recognized at all prompts.

If an error is encountered as a result of issuing a command to the device, error messages and the hardware status will be displayed. Status display will conform to that of *Section 6 -- Display Device Status*. Note that some exerciser commands may issue several different device commands to the tape drive. Therefore, error messages may refer to command names other than those which are part of the exerciser.

Each command description below is in the following format:

Command Name

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USAGE:

Explanation of what the command does and when it should be used.

SYNTAX:

Listing of command syntax (including any special abbreviation) and any parameter descriptions.

DATA PROMPTS:

Prompts to be displayed for needed information not available from the command parameter list.

OUTPUT FORMAT:

Information printed as a result of this command being executed.

ERROR MESSAGES:

Any error messages worth noting that may be generated as a result of this command. Note that this does not imply that all possible error messages that may be generated are listed here, but rather, only those that are especially worth mentioning in relation to the command.

There are several conventions used throughout the command output descriptions. They are as follows:

in - a decimal digit
(a 4 digit number would be represented as *nnnn*).
c - an ASCII character.
h - a hexadecimal digit (0-F).
o - an octal digit (0-7).
b - a binary digit (0-1).
text - a description of what will appear at that spot.

Comments in the input and output sequences are enclosed in curly brackets "{}". These comments are only part of this document and are not output by the program. For example, a command description may contain the following:

Do you wish to continue? (Y|N)[N]>

{if response is "N" this command will terminate}

However, the actual output of the program is:

Do you wish to continue? (Y|N)[N]>

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CLEARDEV

USAGE:

This command performs a CLEAR operation on the DDS tape drive. It basically resets the drive to a given known state. This command causes the drive to be placed in a known condition as follows:

- Tape drive protocol will be restarted
- Internal command and report queues will be purged
- Data buffers will be cleared
- Current tape position will be retained
- Current tape status will be retained
- Current On/Off-Line status will be retained

SYNTAX:

CLEARDEV

DATA PROMPTS: None

OUTPUT FORMAT:

Device has been cleared.

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CLEARLOG

USAGE:

This command is used to initialize (clear) various logs internal to the device. The user is given a choice of log to be cleared or to clear all logs. This command can destroy valuable information and should be used with caution.

SYNTAX:

CLEARLOG

where:

- | | |
|------------|---|
| ALL | - All of the following clears will be done. |
| FAULT | - Selftest failures and all problems encountered during normal operation. |
| ERROR RATE | - Tape condition during normal operation. |

DATA PROMPTS:

Which log is to be initialized?

- 0 -- ALL
- 1 -- FAULT
- 2 -- ERROR RATE

Your selection [<cr>=none]>

OUTPUT FORMAT:

The specified log has been initialized.

FOR HP INTERNAL USE ONLY

DESCRIBE

USAGE:

This command will obtain a message describing the device and display the contents to the user in text form.

SYNTAX:

DESCRIBE

DATA PROMPTS: None

OUTPUT FORMAT:

The product is an HPC15X1 Digital Audio Tape Drive.
RAM size is 512 KBytes.
The interface ID is HPIB.

EXIT

USAGE:

This command terminates execution of the External Exerciser. It may be entered any time at the HPIBDDS> prompt.

SYNTAX:

EXIT

DATA PROMPTS: None

OUTPUT FORMAT:

End of Section 50 -- INTERACTIVE EXTERNAL EXERCISER

FOR HP INTERNAL USE ONLY

HELP

USAGE:

This command provides the user information about the commands that are available in the external exerciser. The user may request a list of all available commands accompanied by a brief description of each, or individual command descriptions. Individual command help contains a brief explanation of usage and describes command syntax.

SYNTAX:

HELP

OUTPUT FORMAT:

CLEARDEV	- Resets device to known state.
CLEARLOG	- Resets user specified device internal log.
CONFIGS	- Allows internal reconfiguration of drive.
DESCRIBE	- Obtains describe information from the device.
EXIT	- Terminates Interactive External Exerciser.
HELP	- Displays descriptions of exerciser commands.
HWSTATUS	- Obtains and displays device hardware status.
IDENTIFY	- Displays device identification information, including product code, firmware revs, etc.
IRM	- Enables/disables Immediate Response Mode.
LOGS	- Displays various device internal logs.
LOADTAPE	- Loads a tape (on auto-loading drives) and places drive on-line.
LOOPBACK	- Tests HPIB link to device.
MOTIONCHECK	- Exercises drive's ability to skip files & records.
REV	- Displays the firmware revision number.
REWIND	- Rewinds the loaded tape to BOT.
SELFTTEST	- Executes of user specified sequence of device selftests.
SUSPEND	- Suspends execution of HPIBDDS so that other DUI commands can be executed.
TREES	- Executes user specified HPIBDDS diagnostic trouble tree.
UNLOADTAPE	- Rewinds and unloads a tape (auto-loading drives).
WORKOUT	- Checks drive's basic ability to write & read data.

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HWSTATUS

USAGE:

This command will obtain the current hardware status from the device and display it in readable text form.

SYNTAX:

HWSTATUS
HS

DATA PROMPTS: None

OUTPUT FORMAT:

DEVICE STATUS

RAW FORM:

Register	Hex Value	DIO Map	Decimal Value(s)
#1	hh	87654321	bbbbbbbb
#2	hh		bbbbbbbb
#3	hh		bbbbbbbb
#4	hh		nn, nn
#5	hh		nnn
#6	hh		nnn

INTERPRETED DRIVE STATUS:

Tape drive is [ON-line, OFF-line]
Immediate Response Mode is [ENABLED, DISABLED]
Device has been CLEARED since last command or power has
been just restored

INTERPRETED TAPE STATUS:

Tape is Write [ENABLED, PROTECTED]
Tape density is UNKNOWN
Tape position is [BOT, EOF, past EOT, UNKNOWN, UNRECOGNIZED]
Tape RUNAWAY condition detected
Data TIMING error detected

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INTERPRETED I/O STATUS:

Last command was [REJECTED, ACCEPTED, ACCEPTED but FAILED]

- Last command was retried *nnn* times

Reject Class : [DEVICE reject, PROTOCOL reject,
 SELFTEST failure, #n]

Error location : [CONTROLLER, SERVO, FORMATTER, UNRECOGNIZED]

HPIB Command Parity Error detected

Unrecovered Data PARITY error detected

Unrecovered Data/Format Error

RECOVERED error detected

FOR HP INTERNAL USE ONLY

IDENTIFY

USAGE:

This command requests device identification information from the drive. The HP-IB code and the product number returned by the device will be displayed.

SYNTAX:

IDENTIFY

DATA PROMPTS: None

OUTPUT FORMAT:

The selected device has been identified as an HPC15X1
Digital Audio Tape Drive.



FOR HP INTERNAL USE ONLY

IRM

USAGE:

This command is used to enable or disable immediate response mode on the drive. Drives will require this command to turn on streaming.

SYNTAX:

IRM

DATA PROMPTS:

Immediate Response Mode? (Enable/Disable)[E]>

OUTPUT FORMAT:

Immediate Response Mode is now !. {! = enabled|disabled}

FOR HP INTERNAL USE ONLY

LOADTAPE

USAGE:

This command causes automatic loading to be initiated. The drive will also be placed on-line if it is not. The tape needs to be in the drive when the command is issued.

SYNTAX:

LOADTAPE

DATA PROMPTS: None

OUTPUT FORMAT:

Load completed successfully.

FOR HP INTERNAL USE ONLY

LOGS

USAGE:

This command displays the contents of a portion of the device logs. The user must specify which portion or form to be displayed. The displays will be identical to those obtained by running section 7 of HPIBDDS.

SYNTAX:

LOGS

where

- | | |
|-------------------|---|
| ALL | - All of the following logs will be displayed. |
| FAULT | - Selftest failures and all problems encountered during normal operation. |
| ERROR RATE | - Tape condition during normal operation. |
| TAPE | - Tape information during current tape load. |

DATA PROMPTS:

Which log is to be displayed?

- 0 -- ALL
- 1 -- FAULT
- 2 -- ERROR RATE
- 3 -- TAPE

Your selection [ALL]>

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OUTPUT FORMAT:

```
{For Fault Log:}
=====
                          FAULT LOG
=====
----- 01 -----
Device diagnostic #nnn detected the following failure:

Error Class -      Runtime errors
                   OR
                   Drive controller diagnostic errors
                   OR
                   Buffer controller diagnostic errors
                   OR
                   Interface controller diagnostic errors
                   OR
                   Multi-processor errors
                   OR
                   Operational status
Error Code  - (hhh) error explanation as listed in device ERS
[Faulty FRUs - ( nn) FRU name as listed in device ERS      ]
[            - ( nn) FRU name as listed in device ERS      ]

----- 02 -----
:
:
----- nn -----
```

```
{For Error Rate Log:}
=====
                          ERROR RATE LOG
=====
Number of groups written           = nnnn
Number of groups has RAW rewrites = nnnn
Number of write hard errors        = nnnn
Number of groups read              = nnnn
Number of groups retried           = nnnn
Number of read hard errors         = nnnn
```

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{For Tape Log:}

```
=====
                        TAPE LOG
=====
Total tape load      = nnnnn

Current groups written = nnnnnnnn
Current RAW retries  = nnnnn
Current groups read   = nnnnnnnn
Current ECC-3 retries = nnnnn

Previous groups written = nnnnnnnn
Previous RAW retries   = nnnnn
Previous groups read    = nnnnnnnn
Previous ECC-3 retries = nnnnn

Total groups written = nnnnnnnn
Total RAW retries    = nnnnn
Total groups read    = nnnnnnnn
Total ECC-3 retries  = nnnnn
```

FOR HP INTERNAL USE ONLY

LOOPBACK

USAGE:

This command tests the HPIB Communication Link between the host and the tape drive. This operation performs a write loopback of 256 bytes of data to the device using the pattern—255, 0, 1, . . . , 254, followed by a read loopback of 256 bytes. The results will be checked against the expected pattern.

SYNTAX:

LOOPBACK

DATA PROMPTS: None

OUTPUT FORMAT:

Tape Drive data channel checks out OK.

{OR}

The following transmission errors were detected during the channel loopback test:

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
====	=====	=====	=====
<i>nn</i>	<i>hh</i>	<i>hh</i>	<i>bbbbbbb</i>
{EXAMPLE:}			
12	56	54	00000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.
.	.	.	.

FOR HP INTERNAL USE ONLY

MOTIONCHECK

USAGE:

This command checks out basic tape movement functions of the drive. The tape will be erased and rewound. A set of 5 files (20 records each) will be written to tape and the tape rewound. The following sequence will then be executed:

```
+ = forward space
- = backward space

+ 2 files
  read record (to verify position)
- 1 file
  read record (to verify position)
+ 1 record
  read record (to verify position)
- 1 record
  read record (to verify position)
+ 3 files
- 4 files
+ 2 files
- 1 files
  read record (to verify position)
+11 records
- 3 records
+11 records
-19 records
+ 2 records
  read record (to verify position)
- 4 records
  verify past EOF
+20 records
  verify past EOF
+ 4 files
  verify tape runaway
  rewind
- 1 record
  verify past BOT
- 1 file
  verify past BOT
```

FOR HP INTERNAL USE ONLY

SYNTAX:

MOTIONCHECK

DATA PROMPTS:

This command takes approximately 15 minutes to complete...
Do you wish to continue (Y/N) [N]?

OUTPUT FORMAT:

This command takes approximately 15 minutes to complete...
Do you wish to continue (Y/N) [N]?

Motion check has completed successfully.

FOR HP INTERNAL USE ONLY

RESET

USAGE:

This command performs a hard reset on the drive. This behaves identically to a power cycle and forces the drive to a known state.

SYNTAX:

RESET

DATA PROMPTS: None

OUTPUT FORMAT:

Hard reset !. {! = successful|FAILED}

FOR HP INTERNAL USE ONLY

REV

USAGE:

This command displays the current firmware revision numbers in the drive.

SYNTAX:

REV

DATA PROMPTS: None

OUTPUT FORMAT:

Firmware Revision Values:

Version.Revision Number

Drive Controller	n.n
Buffer Controller	n.n
Interface Controller	n.n

FOR HP INTERNAL USE ONLY

REWIND

USAGE:

This command causes the tape mounted on the drive to be rewound to BOT. The user will be asked for the option of leaving the tape off-line before the operation.

SYNTAX:

REWIND

DATA PROMPTS:

Do you want to just rewind or rewind offline?(REWIND|OFFLINE) [REWIND>

where:

OFFLINE - puts the drive off-line at the end of the rewind.
REWIND - rewind to BOT.

OUTPUT FORMAT:

REWIND of tape was successful.

FOR HP INTERNAL USE ONLY

SELFTEST

USAGE:

This command will initiate internal diagnostic tests. The tests which can be selected are device dependent and are fully described in the support documentation of the tape drive. The user will be prompted for all required information.

The selftest may be automatically repeated up to 1,000 times. The execution count used is implemented at the diagnostic level and NOT within the device. The selftest request will be issued until the specified execution count is reached or until the selftest fails. Once the selftest sequence has been started, the user may abort via the program interrupt (CNTL-Y on MPE XL, CNTL-C on HP-UX).

SYNTAX:

SELFTEST

DATA PROMPTS:

```
Selftest number.          (0..255) [0]>
Number of times to execute:
    0 - continuous
    1 - run once
    2 - run 10 times
    3 - run 100 times
    4 - run 1000 times
Your selection (0..4) [1]>
Do you want to break on first error?
    0 - break on first error
    1 - no break on error
Your selection (0..1) [0]>
{
{parameter prompts are conditional depending on the}
{selftest number}
}
Parm A (mnemonic).        (0..nn) [0]>
Parm B (mnemonic).        (0..nn) [0]>
```

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OUTPUT FORMAT:

No faulty Field Replaceable Units (FRUs) were detected
by device diagnostic #nnn.

{or}

Device diagnostic #nnn detected the following failure:

Error Class - error group according to device ERS
[Detection - while name of detecting action]
[- by name of detecting processor/program]
[- (nnn) name of detecting test]
Explanation - (hhh) error explanation as listed in device ERS
Faulty FRUs - (nn) FRU name as listed in device ERS
[- (nn) FRU name as listed in device ERS]

{or}

Device diagnostic #nnn was unable to either run to completion
and/or isolate an FRU. Error returned:

Error Class - error group according to device ERS
Explanation - (hhh) error explanation as listed in device ERS

ERROR MESSAGES:

Special warnings will be given the user upon selection of an invalid selftest code, depending on
the code selected. In most cases the user will be prompted for a valid selftest.

*** SELFTEST ! IS NOT IMPLEMENTED BY THE SELECTED DEVICE.

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SUSPEND

USAGE:

This command temporarily suspends execution of the diagnostic, allowing the user to issue other DUI commands. To return to HPIBDDS, the user enters **resume** at the DUI prompt.

SYNTAX:

SUSPEND

DATA PROMPTS: None

OUTPUT FORMAT:

DUI>

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TREES

USAGE:

This command causes one of HPIBDDS's diagnostic trouble trees to be executed.

SYNTAX:

TREES

DATA PROMPTS:

Which tree is to be executed?
0 -- ALL
1 -- VERIFICATION
2 -- HARDWARE
3 -- NON-DESTRUCTIVE MEDIA
4 -- DESTRUCTIVE MEDIA

Your selection [<cr> = none]>

where

ALL	- All of the following
VERIFICATION	- Non-destructive trouble tree.
HARDWARE	- Destructive trouble tree.
NON-DESTRUCTIVE MEDIA	- Non-destructive media trouble tree.
DESTRUCTIVE MEDIA	- Destructive media trouble tree.

FOR HP INTERNAL USE ONLY

UNLOADTAPE

USAGE:

This command causes the automatic unloading to be initiated. The request will be honored even if the tape has not been rewound. The tape will be unloaded and ejected.

SYNTAX:

UNLOADTAPE

DATA PROMPTS: None

OUTPUT FORMAT:

Unload completed successfully.

FOR HP INTERNAL USE ONLY

WORKOUT

USAGE:

This command provides the user with different ways of reading and writing tape. It is useful in isolating medium vs drive problems, verifying media, isolating certain classes of read/write problems, and simulating system use of the tape drive.

This command will cause records to be written to tape, the tape rewound, and those same records read back off the tape. The user will also be able to vary the density record lengths, record content, number of files per tape, and loop count.

The user will have an option to clear the drive's internal error log prior to writing to the tape. The user will be warned and given an opportunity to back out of the command to look at and/or record the log before reissuing this command. This will also serve as the mechanism for correcting invalid entries.

There will be a choice of byte patterns to be written to the tape. Each record will consist of repetitions of the pattern up to the record size limit specified.

Data Verification This command will compare each record read to what this program originally sent, displaying any discrepancies.

SYNTAX:

WORKOUT

DATA PROMPTS:

WORKOUT

```
*****
*                WARNING                *
*  This command may destroy user data  *
*****
```

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

Reset in progress...

Reset completed successfully

Clear the drive logs (Y/N)[N]?

```
Types of WTR ERTs
P = selected area pattern WTR ERT
R = random area WTR ERT
Enter the test type [P]?
```

Is the media a Short(0.5 GBytes) or a Long(1.3 Gbytes) media? (S/L)[S]>
Do you want to write to the end of the media? (Y/N)[N]>

Do you want:
R = random transfer length

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U = user input transfer length

Which option would you like (R/U)[U]?

Input transfer length (1 <= bytes <= nnnn)[1]?

Input number of records to write to media(1 <= records <= !)[1]?

The sources of the data pattern to be used are:

I - Internal pattern

R - Random pattern

U - User input pattern

Which pattern source would you like(I/R/U)[I]?

{if user chooses U}

Input the pattern in hex:

Input loop count (1 <= count <= 254)[1]?

Writing to media is in progress...

Reading from media and comparing data are in progress...

OUTPUT FORMAT:

No errors were detected in the media test

or

*** ERROR IN TRANSMISSION DETECTED DURING READ/WRITE MEDIA TEST:

BYTES #	Hex		Bit	Time Error Occurred
	Value	Value	Positions	
=====	TRNS	RECD	01234567	=====
50	FF	60	11000011	Fri, Mar 17, 1989 3:30 PM
.
.
.

WORKOUT COMPLETED.

Error and Warning Messages

The following are general error/warning messages which may be encountered during the execution of HPIBDDS. Note, however, that system dependent error messages may be displayed by the subsystem along with any error message generated by this diagnostic. All error message without the (DDSERR #) trailer are generated by the subsystem.

Errors which have explanatory notes (preceded by "--") will normally display only one of the notes listed here. The exclamation point (!) is a symbol used to indicate the point at which context dependent information is to be placed.

100	*** WARNING -- THE I/O PATH MAY NOT BE FUNCTIONING PROPERLY (DDSERR 100)
101	*** DEVICE FAILED TO RESPOND TO ! COMMAND (DDSERR 101)
102	*** HPIBDDS IS UNABLE TO DIAGNOSE THE SELECTED DEVICE (DDSERR 102)
103	*** HPIBDDS DIAGNOSTIC TERMINATING (DDSERR 103)
104	*** A RESERVE AREA IS NOT AVAILABLE ON THIS DRIVE -- NO OPERATION WAS PERFORMED. (DDSWARN 104)
105	*** THIS OPERATION IS NOT IMPLEMENTED ON THE SELECTED DRIVE (DDSERR 105)
106	*** ! MODE REQUIRED TO EXECUTE THIS COMMAND (DDSERR 106)
107	*** ! MODE REQUIRED TO EXECUTE THIS STEP (DDSERR 107)
108	*** THIS COMMAND IS NOT IMPLEMENTED ON THE SELECTED DRIVE (DDSERR 108)
109	*** DEVICE ENCOUNTERED AN ERROR WHILE EXECUTING THE ! COMMAND (DDSERR 109)

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- 110 *** THE MAXIMUM NUMBER OF ERRORS HAS BEEN REACHED (DDSERR 110)
-
- 111 *** UNRECOGNIZED COMMAND --
TYPE "HELP" FOR A LIST OF VALID COMMANDS (DDSERR 111)
-
- 112 *** UNRECOGNIZED REPLY WAS FOUND (DDSERR 112)
-
- 113 *** A NUMERICAL INPUT WAS EXPECTED BUT NOT RECEIVED (DDSERR 113)
-
- 114 *** AN UNEXPECTED ERROR OCCURED IN THE IO_TAPE DAR (DDSERR 114)
-
- 115 *** ERROR IN TRANSMISSION DETECTED DURING
READ LOOPBACK TEST: (DDSERR 115)

	Byte #	Octal Value Transmitted	Octal Value Received	Bit Positions In Error 01234567
	-----	-----	-----	-----
116		!	!	!
117		*** ERROR IN STEP ! - ! (DDSERR 117)		
118		*** ERROR -- EXPECTED ! BYTES FROM THE DEVICE AND RECEIVED ! BYTES (DDSERR 118)		
119		*** THIS COMMAND IS NOT SUPPORTED ON THIS DEVICE (DDSERR 119)		
120		*** FILE SYSTEM ERROR ENCOUNTERED WHILE RETRIEVING A MESSAGE (DDSERR 120)		
121		*** IDENTICAL READS FROM TAPE RETURNED NON-IDENTICAL DATA (DDSERR 121)		

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122	*** DATA READ FROM TAPE DID NOT MATCH DATA PREVIOUSLY WRITTEN (DDSERR 122)
124	*** THE ADDRESS THAT WAS SET ON THE DRIVE IS NOT EQUIVALENT TO THE ADDRESS RETURNED IN STATUS (DDSERR 124)
129	*** AN ERROR WAS ENCOUNTERED WHEN READING AFTER RETRY TIME WAS SET TO A RANDOM VALUE (DDSERR 129)
140	*** NO OPERATION WAS PERFORMED (DDSERR 140)
141	*** DESTRUCTIVE MODE REQUIRED TO EXECUTE THIS COMMAND (DDSWARN 141)
142	*** EXCLUSIVE MODE REQUIRED TO EXECUTE THIS COMMAND (DDSWARN 142)
143	*** AN ERROR WAS ENCOUNTERED WHEN INITIALIZING SECTIONS AND STEPS (DDSERR)
200	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO SEND/RECEIVE INFORMATION FROM THE USER (DDSERR 200)
201	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO RETRIEVE A MESSAGE FROM THE CATALOG (DDSERR 201)
202	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO CONVERT A NUMBER TO A STRING (DDSERR 202)
203	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING A BIT EXTRACTION OPERATION (DDSERR 203)
204	*** THE SELECTED DEVICE COULD NOT BE OBTAINED FOR TESTING (DDSERR 204)
207	*** DUE TO PROBLEMS WITH DESCRIBE, HPIBDDS CANNOT FUNCTION PROPERLY AND WILL THEREFORE TERMINATE (DDSERR 207)

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208	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO COMMUNICATE WITH THE DIAGNOSTIC SYSTEM (DDSERR 208)
209	*** YOUR RESPONSE WAS INVALID (DDSERR 209)
210	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN DATA FROM AN I/O BUFFER (DDSERR 210)
211	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO PLACE DATA INTO AN I/O BUFFER (DDSERR 211)
212	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN AN I/O BUFFER (DDSERR 212)
213	*** SECTION NUMBER ! IS NOT A VALID SECTION (DDSERR 213)
214	*** STEP NUMBER ! IS NOT A VALID STEP NUMBER OR THE CORRESPONDING SECTION WAS NOT SELECTED (DDSERR 214)
215	*** HIGHER SECURITY IS NEEDED TO EXECUTE THIS SECTION (DDSERR 215)
216	*** ! BYTES WERE EXPECTED TO HAVE BEEN SENT FROM THE TAPE, BUT ONLY ! WERE RECEIVED (DDSERR 216)



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SCSI Digital Data Storage Tape Drive Diagnostic

The SCSIDDS diagnostic tests the DDS (Digital Data Storage) drive with the SCSI interface. This diagnostic detects failures down to a field replaceable unit (FRU) and is only available on operating systems which support the SHERLOCK diagnostic system.

Defects and Enhancements

Submit defect reports and enhancement requests for this diagnostic through the STARS database referencing Product Number 30600-10036.

Minimum Configuration

This product is available on any HP Precision Architecture (HPPA) system which supports the online diagnostics subsystem.

Intermediate hardware for communication with the DDS drive must be available on the host system.

The online diagnostics subsystem must be supported with DAR (device access routine) to access DDS, and I/O driver with access to diagnostic functions for DDS through the host operation system.

Default Tests

The program will allow the user to select which testing functions are to be executed, but a default set running only the trouble trees can also be invoked by not making any section or step specification. For security reasons, only non-destructive trouble trees will be run as defaults. If the user did not specify sections and steps, the following default sections and steps will be executed:

Section 10 : Non-exclusive and Non-disruptive hardware trouble tree
Section 12 : Non-destructive media trouble tree

These default sections and steps will be performed whether the drive is on-line or off-line.

User Environment

The online diagnostics subsystem has two access modes (non-exclusive/exclusive) and two test modes (non-destructive/destructive). Refer to the online Diagnostic User Interface (DUI) chapter of this manual for detailed definitions of these modes. The diagnostic system itself will determine the mode in which the test will be performed.

User Interface

The following subsections discuss SCSIDDS error and warning messages, prompts, and normal path flow.

Error Messages

Error messages will be displayed in the upper case preceded by three asterisks with a trailer containing the error number. The absence of a trailer or message other than (SCSIDDSERR *zzzz*) at the end indicates that the message originated from outside of this program. Such messages will generally provide detailed system dependent information related to the message issued by this diagnostic.

Example: *** THIS IS A SAMPLE ERROR. (SCSIDDSERR 32)

Warnings

Warning messages will be displayed in mixed case preceded by "** WARNING" with a trailer containing the warning number. Warnings may be accompanied by other system messages.

Example: * WARNING - This is a sample warning. (SCSIDDSWARN *zzzz*)

Prompts

Prompts for data will be displayed in mixed case indented with respect to the error and warning messages and ended with the prompt symbol ">". It will include a range or selection of choices enclosed in parentheses. If appropriate, a default selection, enclosed by square brackets, supplied by the program will be used upon entry of a carriage return.

Example: Do you wish to continue? (yes|no) [NO] >

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Normal Path Flow

The SCSIDDS diagnostic can be accessed by the user through the Diagnostic User Interface (DUI) by the run `scsidds` command. All parameters associated with the DUI's `RUN` command will be accepted by this diagnostic.

A description of SCSIDDS and all the sections are available through the DUI's Help facility.

When executing SCSIDDS, the following welcome message will be displayed:

```
*****
*****                               *****
*****          SCSI DDS DIAGNOSTIC          *****
*****                               *****
*****          (C) Copyright Hewlett Packard Co. 1987 *****
*****          All Rights Reserved.          *****
*****          Version n.nn.nn              *****
*****                               *****
*****
Welcome, Today is TUE, Aug 15, 1989 at 9:00 AM
```

{Output from sections and steps executed}

SCSIDDS EXITING ...

When all sections and steps selected by the user are completed, or when a fatal error condition occurs, control will be returned to DUI.

Unless SCSIDDS is being called just to decode status, this diagnostic will first request access to the DDS drive from the diagnostic subsystem.

If access to the drive is denied, error messages from both the diagnostic and the subsystem will be displayed, and the program will terminate. If access to the device is obtained, however, the diagnostic will invoke a diagnostic subsystem routine to test the I/O path between the intermediate hardware and the DDS drive.

If the status of the I/O path test is not successful, a warning message will be displayed, and the diagnostic will continue. If the status is successful, the diagnostic will ask the device to identify itself. If the device fails to respond, the program will clear the device and ask again for the device to identify itself.

The SCSIDDS is CLEARing the drive and IDENTIFY will be performed again after clear.

If the device still fails to respond, the program will terminate.

```
*** DUE TO PROBLEMS WITH IDENTIFY, SCSIDDS CANNOT FUNCTION
PROPERLY AND WILL THEREFORE TERMINATE (SCSIDDSERR 207)
```

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If an unexpected identification code is received, an appropriate warning message will be displayed and the execution will continue to allow development devices to be diagnosed. In this case, the user will be asked whether to continue or not, for example:

***** THE SELECTED DEVICE IS NOT DIAGNOSABLE BY SCSIDDS(SCSIDDSERR 102)**

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

If the device identifies itself as a valid candidate, the sections and steps specified by the user in the DUI run command will be executed. If the user did not specify sections and steps, the default sections and steps will be executed.

These default sections and steps will be performed whether the drive is on-line or off-line.

If the diagnostic request fails during the execution of any program section or step, the appropriate error message will be displayed. When the number of errors generated reaches the limit specified by the user in the ERRCOUNT parameter of the RUN command, an error will be displayed and the diagnostic will terminate.

If the ERRPAUSE parameter of the RUN command was assigned a value of "on", the diagnostic will pause after each error and will ask the user whether or not to continue the test.

Section Functional Descriptions

The following are the detailed descriptions of each section and step in SCSIDDS. Each section will be presented in the following format:

- An overview of the purpose of the section.
- How the section is divided into functional steps.
- An example of the output of the particular section.
- Examples of messages which will be displayed to the user during normal execution.

Output variables in the output examples are represented by one of the following codes (note the *italics font*):

n - decimal digit
(a 4 digit number would be represented by *nnnn*).

c - ascii character.

h - hexadecimal digit (0-F).

o - octal digit (0-7).

b - binary digit (0-1).

text - a description of the message.

An exclamation point (!) in the Error and Warning Messages section is normally a symbol representing the point at which certain sensitive words, phrases, or numbers should be inserted.

The value of some states and counters in the drive must be initialized. Otherwise, they will all contain Fs (hex) to indicate their unset state. This value will be displayed as "nv" (no value) by SCSIDDS. These are not error conditions unless other values are expected.

In compliance with the Online Diagnostic standard, the sections (and steps within sections) are executed in ascending numeric order. The order of each section and step function is determined by two factors: 1) customary online diagnostics subsystem order, so that it resembles other diagnostics to the extent practicable and 2) minimization of user intervention. An exception is in the selftest section (Section 5), because it was deemed desirable to allow the device to check itself before attempting less automatic and time consuming verification tests. The drive may be placed online at the beginning of the diagnostic, and is not required to reset online again until the next diagnostic.

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The following table specifies what sections and steps will be available for execution in this diagnostic program:

Section 10	Non-Exclusive and Non-Disruptive Hardware Trouble Tree
Section 11	Disruptive Hardware Trouble Tree
Section 12	Non-destructive Media Trouble Tree
Section 13	Destructive Media Trouble Tree
Section 50	External Exerciser

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Section 10—NON-EXCLUSIVE AND NON-DISRUPTIVE TROUBLE TREE

This section will perform a series of non-destructive tests to a DDS drive to detect and isolate the FRU. This diagnostic trouble tree will determine that the device is up and responding and that the SCSI channel appears to be free of problems.

OUTPUT:

Section 10 -- NON-EXCLUSIVE AND NON-DISRUPTIVE TROUBLE TREE

{Scenario 1:}

REJECTED - Device identification
Explanation: (nnn) hardware status error if available.

SUSPECT: (in descending order of probability)
1. FRU : SCSI cable
2. Device powerfail

{Scenario 2:}

FAILED - Device identification
SCSI code = hhhh - WARNING: Device is not recognized
as a DDS tape drive.

REJECTED - SCSI Loopback test
Explanation: (nnn) hardware status error if available.

SUSPECT: (in descending order of probability)
1. FRU : SCSI cable
2. FRU nn: HP - SCSI Interface

{Scenario 3:}

FAILED - Device identification
SCSI code = hhhh - WARNING: Device is not recognized
as a DDS tape drive.

FAILED - SCSI Loopback test

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits 01234567
nm	hh	hh	bbbbbbb
12	56	54	0000010
33	7F	3D	01000010
.	.	.	.
.	.	.	.

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SUSPECT: (in descending order of probability)
1. FRU : SCSI cable
2. More than 1 device answering to the same address
3. FRU nn: HP - SCSI Interface

{Scenario 4:}

FAILED - Device identification
SCSI code = hhhh - WARNING: Device is not recognized
as a DDS tape drive.
PASSED - SCSI Loopback test

SUSPECT: (in descending order of probability)
1. Invalid configuration
2. Wrong device at specified address
3. More than 1 device answering to the same address
4. FRU nn: HP - SCSI Interface
5. FRU : SCSI cable

{Scenario 5:}

PASSED - Device identification
REJECTED - SCSI Loopback test
Explanation: (nnn) hardware status error if available.
SUSPECT: (in descending order of probability)
1. FRU : SCSI cable
2. FRU nn: HP - SCSI Interface

{Scenario 6:}

PASSED - Device identification
FAILED - SCSI Loopback test

Byte #	Hex Value Transmitted	Hex Value Received	Erroneous bits
nn	hh	hh	bbbbbbb
12	56	54	0000010
33	7F	3D	0100010
.	.	.	.
.	.	.	.

SUSPECT: (in descending order of probability)
1. FRU : SCSI cable
2. More than 1 device answering to the same address
3. FRU nn: HP - SCSI Interface

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{Scenario 7:}

PASSED - Device identification
PASSED - SCSI Loopback test

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Run destructive trouble tree (section 11)
2. Run operator assisted trouble tree (section 12)

End of Section 10 -- NON-EXCLUSIVE AND NON-DISRUPTIVE TROUBLE TREE

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Section 11—HARDWARE TROUBLE TREE (Disruptive)

This section will check out the device as thoroughly as possible without on-site assistance (tape handling) and without taking excessively long to complete. This section is disruptive since the tests may clear data buffers and otherwise reset the device or even declare it unuseable by processes other than diagnostics. This section will attempt to clear the device to a known state and cause a series of device internal selftests to be run.

OUTPUT:

Section 11 -- HARDWARE TROUBLE TREE (Disruptive)

{Scenario 1:}

[PASSED - *test description*]

[PASSED - *test description*]

[FAILED - *test description*]

[REJECTED - *test description*]

Explanation: [(*nnn*) *hardware status error if available.*]

SUSPECT: (in descending order of probability)

1. *name of suspected failing component/FRU*

2. *name of suspected failing component/FRU*

{Scenario 2:}

PASSED - Device clear

PASSED - Device identification

PASSED - SCSI Loopback test

PASSED - Selftest *nnn*

NO PROBLEMS DETECTED.

Suggestions for further action:

1. Run operator assisted trouble tree (section 12)

End of Section 11 -- HARDWARE TROUBLE TREE (Disruptive)

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Section 12—MEDIA TROUBLE TREE (Non-Destructive)

This section will perform a series of non-destructive tests to the media of the DDS tape drive to verify the integrity of the media. 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 12 -- MEDIA TROUBLE TREE (Non-Destructive)

{Scenario 1:}

{Scenario 2:}

End of Section 12 -- MEDIA TROUBLE TREE (Non-Destructive)

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Section 13—MEDIA TROUBLE TREE (Destructive)

This section will perform a series of destructive tests to the media of the DDS tape drive to verify the integrity of the media. 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 13 -- MEDIA TROUBLE TREE (Destructive)

{Scenario 1:}

{Scenario 2:}

End of Section 13 -- MEDIA TROUBLE TREE (Destructive)

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Section 50—INTERACTIVE EXTERNAL EXERCISER

The SCSI DDS External Exerciser is an interactive section which allows the user to access to a set of internal diagnostics and utilities within the DDS tape drive. The purpose of the exerciser is to aid service-trained personnel in troubleshooting DDS tape drives to a replaceable assembly level.

The following commands will be implemented:

Displays: BLOCKLIMIT
 DESCRIBE
 IDENTIFY
 INQUIRY
 LOGS
 ALL
 FAULT LOG
 ERROR RATE LOG
 TAPE LOG
 MODESENSE
 REV
 SENSE

Diagnostics: LOOPBACK
 MOTIONCHECK
 SELFTTEST
 Power on sequence
 0 Reset Sequence
 2 Error Rate Test Sequence
 3 Error Rate Test Sequence with Data Compare
 9 Mult-Controller Sequence
 11 Dual-Ported RAM Sequence
 13 Drive Controller Reset Sequence
 14 Buffer Controller Reset Sequence
 15 Interface Reset Sequence
 32 Microprocessor Test
 33 ROM Checksum
 34 Destructive RAM Test
 35 Non-Destructive RAM Test
 36 Complete RAM Test
 38 Destructive Dual-Port RAM Test
 40 CXD1356 Test
 41 Sub-Area Microprocessor Test
 42 Mechanism Test
 48 Front Panel Check
 49 MD Connectivity Test
 50 Static Test
 51 Recognition Switch Test
 52 Voltage Test
 53 Thread/Unthread Test
 54 Reel Test
 55 Drum Test
 56 Capstan Test

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57 Power-On Mechanism Selftest
64 Randomizer Off
67 Read Data Exerciser
68 Write Data Exerciser
69 Reposition Exerciser
70 Start/Stop Exerciser
71 Search Exerciser
72 BOM/EOM Exerciser
80 Device Area Test
96 Buffer Register Test
97 Buffer Function Test
98 Buffer RAM Test
99 Initialize Error Rate Log
112 SPIFI Test
113 SPIFI Loopback Test
128 Onboard DPR Test
129 Offboard DPR Test
133 Interface Loopback Tests
134 Buffer Initiated Loopback Tests

TREES

VERIFICATION
HARDWARE
MEDIA (NON-DESTRUCTIVE)
MEDIA (DESTRUCTIVE)

WORKOUT

Tape commands: LOADTAPE
MEDIAREMOVAL
PREVENT
ALLOW
REWIND
UNLOADTAPE

Utilities: CLEARLOG
ALL
FAULT LOG
ERROR RATE LOG
TAPE LOG
RESET (SCSI Bus Device Reset)
TUR (Test Unit Ready)

Exerciser
control: EXIT
HELP
SUSPEND



FOR HP INTERNAL USE ONLY

Commands For Interactive External Exerciser

When the external exerciser is executed, the following prompt will be displayed to the user:

SCSIDDS>

Some commands may not be available if the requested device could not be obtained with exclusive access. The EXIT command will terminate the program. Syntax and usage help will be available via the HELP command.

If the user enters an unrecognized command the following error message with one or more of the applicable additional explanations will be displayed. For unrecognized command the user will be reprompted, e.g.:

```
*** UNRECOGNIZED COMMAND --  
TYPE "HELP" FOR A LIST OF VALID COMMANDS (DDSERR 111)
```

SCSIDDS>

If parameters are needed, the user will then be prompted for remaining information. The data prompts will be displayed in mixed case and will end with the prompt symbol >. They will also include a range or selection of choices enclosed in parentheses and, where appropriate, a default selection, enclosed by square brackets, supplied by the program upon entry of a carriage return (<CR>). For example:

```
Enter the configuration value. (off|1..50) [OFF]>
```

The text enclosed in the parentheses indicates that the user is to type either *off* or an integer value between 1 and 50, inclusive. Each option is separated by a |. The default response *off*, as indicated by [OFF], would be used if the user simply entered a carriage return. For items like configuration values, the current value will normally be displayed as the default.

Keyword responses (e.g., command names) may be abbreviated but not below the minimum number of characters necessary to distinguish them from all other valid responses. Responses will not be case sensitive. In addition, some commands will have special 2 or 3 character abbreviations which will also be recognized. These abbreviations are listed next to the command name in help messages. Where possible, command names, abbreviations, and other characteristics will conform to similar commands in the proposed Support User Interface Standard.

FOR HP INTERNAL USE ONLY

The **HELP** keyword will be recognized at all prompts.

If an error is encountered as a result of issuing a command to the device, error messages and the hardware status will be displayed. Note that some exerciser commands may issue several different device commands to the tape drive. Therefore, error messages may refer to command names other than those which are part of the exerciser.

Each command description below is in the following format:

Command Name

USAGE:

Explanation of what the command does and when it should be used.

SYNTAX:

Listing of command syntax (including any special abbreviation) and any parameter descriptions.

DATA PROMPTS:

Prompts to be displayed for needed information not available from the command parameter list.

OUTPUT FORMAT:

Information printed as a result of this command being executed.

ERROR MESSAGES:

Any error messages worth noting that may be generated as a result of this command. Note that this does not imply that all possible error messages that may be generated are listed here, but rather, only those that are especially worth mentioning in relation to the command.

There are several conventions used throughout the command output descriptions. They are as follows:

- n* - a decimal digit (a 4 digit number would be represented as *nnnn*).
- c* - an ascii character.
- h* - a hexadecimal digit (0-F).
- o* - an octal digit (0-7).
- b* - a binary digit (0-1).
- text* - a description of what will appear at that spot.

FOR HP INTERNAL USE ONLY

Comments in the input and output sequences are enclosed in curly brackets {}. These comments are only part of this document and are not output by the program. For example, a command description may contain the following:

Do you wish to continue? (Y|N)[N]>

{if response is "N" this command will terminate}

However, the actual output of the program is:

Do you wish to continue? (Y|N)[N]>

FOR HP INTERNAL USE ONLY

BLOCKLIMIT

USAGE:

This command tells the drive to return its limits for record length. The command does not reflect the currently selected record size, only the available limits. MODE SENSE returns the current record size.

SYNTAX:

BLOCKLIMIT

DATA PROMPTS:

None.

OUTPUT FORMAT:

Record Length Limits

Maximum Record Length = 16777215
Minimum Record Length = 1

FOR HP INTERNAL USE ONLY

CLEARLOG

USAGE:

This command is used to clear (initialize) the Fault Log and the Error Rate Log. The user will be prompted to choose the logs to be cleared, if not specified with the command. This command should be used with caution since logs that can help identify problems with the device will be cleared.

SYNTAX:

CLEARLOG [*log specifier*]
CLOG

log specifier:

- ALL - All of the following clears will be done.
- FAULT - Selftest failures and all problems encountered during normal operation.
- ERROR RATE - Tape condition during normal operation.

DATA PROMPTS:

Clear logs:

- 0 - Clear both the Error Rate AND the Fault Logs
- 1 - Clear ONLY the Fault Log
- 2 - Clear ONLY the Error Rate Log
- 3 - Cancel Clear

Which log?

OUTPUT FORMAT:

ERT and Fault logs cleared.
{or}
Fault Log cleared
{or}
ERT logs cleared.

FOR HP INTERNAL USE ONLY

DESCRIBE

USAGE:

This command is used to display the product id and product revision level.

SYNTAX:

DESCRIBE

DATA PROMPTS:

None.

OUTPUT FORMAT:

The product is an HP35450A Digital Data Storage Drive.
The Product Revision Level is hhhh.

FOR HP INTERNAL USE ONLY

EXIT

USAGE:

This command may be entered any time at the SCSIDDS> prompt to terminate the execution of the External Exerciser.

SYNTAX:

EXIT

DATA PROMPTS:

None.

OUTPUT FORMAT:

End of Section 50 -- INTERACTIVE EXTERNAL EXERCISER

FOR HP INTERNAL USE ONLY

HELP

USAGE:

This command provides the user a list of all commands available in the External Exerciser. If the user types help, followed by the command name, a brief description of usage and command syntax will be provided.

SYNTAX:

HELP [command name]

?

OUTPUT FORMAT:

BLOCKLIMIT -- Displays the Maximum and Minimum record lengths
CLEARLOG -- Clears the various error logs on the device
DESCRIBE -- Obtains describe information from the device
EXIT -- Terminates execution of the External Exerciser
HELP -- Provides this list of commands as well as more detailed descriptions and syntax of each command
IDENTIFY -- Obtains identification information from the device
INQUIRY -- Obtains 43 bytes of inquiry data from the device
LOADTAPE -- Performs a full load of the tape in the drive
LOGS -- Provides access to the device's error rate log, fault log, and tape log
LOOPBACK -- Performs a write and read loopback of 256 bytes of data
MEDIAREMOVAL-- Capability to prevent or allow the tape to eject.
MODESENSE -- Obtains mode sense data from the device
MOTIONCHECK -- Performs basic tape movement functions of the drive
RESET -- Performs a HARD reset on the drive
REWIND -- Causes the tape mounted on the drive to be rewound to BOT
REV -- Displays the firmware revision numbers
SELFTTEST -- Provides access to device's internal diagnostics
SENSE -- Obtains current sense data from the device
SUSPEND -- Suspends SCSIDDS and returns control to the DUI. Type RESUME to return into diagnostic
TREES -- Executes one of the SCSIDDS's diagnostic trouble tree
TUR -- Tests if the scsi tape drive is ready
UNLOADTAPE -- Performs a full unload of the tape
WORKOUT -- Provides the user with different ways of reading and writing tape

FOR HP INTERNAL USE ONLY

IDENTIFY

USAGE:

This command returns the product id.

SYNTAX:

IDENTIFY

DATA PROMPTS:

None.

OUTPUT FORMAT:

The selected device has been identified as an HP35450A
Digital Data Storage Drive

FOR HP INTERNAL USE ONLY

INQUIRY

USAGE:

This command requests device identification information from the drive.
The SCSI dds information display is defined below.

SYNTAX:

INQUIRY
INQ

DATA PROMPTS:

None.

OUTPUT FORMAT:

```
=====
                          INQUIRY DATA
=====
```

Peripheral Qualifier = n
The scsi dds is connected to logical unit number n.

Peripheral Device Type = n
Sequential access device
{or}
The target is not capable of supporting a physical device on this logical unit.
{or}
Unknown device type
{or}
fault... peripheral device type is not supported

Removable Medium Bit = n
The tape can be removed
{or}
The tape cannot be removed

Device Type Qualifier = n

ISO Version = n
The drive does not necessarily comply with the ISO version of SCSI
{or}
The drive does comply with the ISO version of SCSI

ECMA Version = n
The drive does not necessarily comply with the ECMA version of SCSI
{or}
The drive does comply with the ECMA version of SCSI

ANSI Approved Version = n
The drive complies with the ANSI version of SCSI-n

Asynchronous Event Notification Bit = n
The drive does not support asynchronous event notification.
{or}
The drive does support asynchronous event notification.

Terminate I/O Processing Bit = n
The drive does not support Terminate I/O Processing message.

FOR HP INTERNAL USE ONLY

{or}
The drive does support Terminate I/O Processing message.
Response Data Format = n
The Inquiry Data format complies with the ANSI version of SCSI-n
Relative Addressing Mode Bit = n
Relative Addressing Mode is not supported.
{or}
Relative Addressing Mode is supported.
32-bit Wide Data Transfer Bit = n
32-bit wide data transfers is not supported.
{or}
32-bit wide data transfers is supported.
16-bit Wide Data Transfer Bit = n
16-bit wide data transfers is not supported.
{or}
16-bit wide data transfers is supported.
Synchronous Data Transfer Bit = n
Synchronous data transfers is not supported.
{or}
Synchronous data transfers is supported.
Linked Commands Bit = n
The drive does not support linked commands.
{or}
The drive does support linked commands.
Tagged Command Queuing Bit = n
Tagged command queuing is not supported.
{or}
Tagged command queuing is supported.
Soft Reset Bit = n
The drive responds to the reset condition with a HARD reset.
{or}
The drive responds to the reset condition with a SOFT reset.
Vendor Identification = 8 byte string
Product Identification = 16 byte string
Product Revision Level = 4 byte string
Manufacturing Date Code = 4 byte string
Power-On Reset Time = n
The drive supports HPCS version n

FOR HP INTERNAL USE ONLY

LOADTAPE

USAGE:

This command will load and rewind the tape.
The tape needs to be in the drive when the command is issued.

SYNTAX:

LOADTAPE
LT

DATA PROMPTS:

None.

OUTPUT FORMAT:

Load completed successfully.

FOR HP INTERNAL USE ONLY

LOGS

USAGE:

This command allows the user to read log information from the drive. The user may choose to display either all or one of the Fault, Error Rate, or Tape Logs.

SYNTAX:

LOGS [*log specifier*]

log specifier

- ALL - All of the following logs will be displayed.
- FAULT - The drive maintains a history of the last 30 errors which have occurred within the drive, together with a 'timestamp' of when they occurred. The information is lost when the drive is power-cycled.
- ERROR RATE - Used to monitor the condition of a tape during normal operation and may also be used to monitor tape errors. The log contains information on current tape usage, the number of groups accessed, and the error counts. Entries are kept for both hard and soft errors. The data available from the log is valid until the next power-cycle, reset, CLEAR LOGS, Error Rate test, or TAPE LOAD, when it will be reset. The log is not saved to tape when the tape is unloaded.
- TAPE - This information is contained within RAM in the Drive Controller. When a cassette is loaded, the contents of the System area are copied into this log. The log is updated as the tape is used and is copied back into the System area when the cassette is unloaded (the System area only contains 'previous' and 'total' information - when the cassette is unloaded, the 'current' values become the System area 'previous' values). The term 'current' refers to information generated during the current load of the tape; 'previous' refers to information generated during the last tape load; 'total' refers to information generated during the life of the tape since it was first initialized including the current load.

FOR HP INTERNAL USE ONLY

DATA PROMPTS:

Which log is to be displayed?
0 -- ALL
1 -- FAULT
2 -- ERROR RATE
3 -- TAPE

Your selection [ALL]>

OUTPUT FORMAT:

{For Fault Log:}

RAW DATA :

Byte Count = 29

	0	1	2	3	4	5	6	7	8	9
Byte 0	01	00	1A	02	00	00	FF	FF	FF	03
Byte 10	46	01	00	20	00	00	06	00	FF	0C
Byte 20	0E	01	02	80	00	00	06	FF	FF	

=====

FAULT LOG

=====

Current Time - 16777215

Entry Number = 1
Error Class - Interface controller diagnostic errors
Error Code 70 -- SCSI controller register error.
Faulty FRU - (1) Drive Mechanism & Associated Electronics
Fault Time - 393471

Entry Number = 2
Error Class - Multi-processor errors
Error Code 14 -- On board dual-port RAM test error.
Most Probable
Faulty FRU - (1) Drive Mechanism & Associated Electronics
Second Most Probable
Faulty FRU - (2) Buffer Controller
Fault Time - 458751

FOR HP INTERNAL USE ONLY

{For Error Rate Log:}



RAW DATA :

Byte Count = 29

	0	1	2	3	4	5	6	7	8	9
Byte 0	02	00	1A	00	00	00	00	00	00	00
Byte 10	00	00	00	00	00	00	00	00	00	00
Byte 20	00	00	00	00	00	00	00	00	00	00

ERROR RATE LOG

Number of groups written	= 0
Number of groups has RAW rewrites	= 0
Number of total RAW counts	= 0
Number of write hard errors	= 0
Number of groups read	= 0
Number of groups corrected with a C3-ECC pass	= 0
Number of groups retried	= 0
Number of total retry counts	= 0
Number of read hard errors	= 0

FOR HP INTERNAL USE ONLY

{For Tape Log:}

RAW DATA :

Byte Count = 39

	0	1	2	3	4	5	6	7	8	9
Byte 0	03	00	24	00	00	00	00	00	00	00
Byte 10	00	00	00	00	00	00	00	00	00	00
Byte 20	00	00	00	00	00	00	00	00	00	00
Byte 30	00	00	00	00	00	00	00	00	13	

=====

TAPE LOG

=====

Total tape load	=	19
Current groups written	=	0
Current RAW retries	=	0
Current groups read	=	0
Current ECC-3 retries	=	0
Previous groups written	=	0
Previous RAW retries	=	0
Previous groups read	=	0
Previous ECC-3 retries	=	0
Total groups written	=	0
Total RAW retries	=	0
Total groups read	=	0
Total ECC-3 retries	=	0

FOR HP INTERNAL USE ONLY

LOOPBACK

USAGE:

This command tests the 512 Kbyte data buffer and the SCSI integrity of the drive. A read buffer will be performed after a write buffer and the results will be checked against the expected pattern. The tape will be rewound afterwards to allow normal operation of the drive.

SYNTAX:

WRB

DATA PROMPTS:

None.

OUTPUT FORMAT:

Loopback completed successfully.

{OR}

*** ERROR IN TRANSMISSION DETECTED DURING READ LOOPBACK TEST: (DDSERR n)

Byte #	Octal Value Transmitted	Octal Value Received	Bit Positions In Error
===== nn	===== ooo	===== ooo	===== bbbbbbb
{EXAMPLE:}			
12	126	124	0000010
33	177	75	0100010
.	.	.	.
.	.	.	.

FOR HP INTERNAL USE ONLY

MEDIAREMOVAL

USAGE:

This command will re-enable the Eject button after a PREVENT MEDIA REMOVAL. After issuing this command, the drive will eject the DDS tape after the completion of an UNLOAD.

SYNTAX:

MEDIAREMOVAL

where:

- PREVENT - Prevents the tape from being ejected following an UNLOADTAPE command.
- ALLOW - Allows the tape to be ejected following an UNLOADTAPE command.

DATA PROMPTS:

Prevent/Allow Medium Removal :

- 0 - Allow the tape to be ejected following an UNLOADTAPE command.
- 1 - Prevent the tape from being ejected following an UNLOADTAPE command.

OUTPUT FORMAT:

Allow medium removal enabled.
Media will be ejected following an UNLOAD command.
{or}
Prevent medium removal enabled.
Media will NOT be ejected following an UNLOAD command.

NOTE : The Prevention of Medium Removal condition terminates upon receipt of a BUS DEVICE RESET command or by a hard reset.

FOR HP INTERNAL USE ONLY

MODESENSE

USAGE:

This command tells the drive to report the current configuration values of the media to the host.

SYNTAX:

MODESENSE

DATA PROMPTS:

Which page to be displayed?
0 -- All Supported pages
1 -- Disconnect-Reconnect Page
2 -- Device Configuration Parameters
3 -- Medium Partition Parameters
4 -- Vendor-Unique Command Timers
5 -- No Pages

Your selection [0]>

OUTPUT FORMAT:

example output from all pages:

MODE SENSE DATA

RAW DATA :

Byte Count = 168

	0	1	2	3	4	5	6	7	8	9
Byte 0	A7	00	10	08	13	00	00	00	00	00
Byte 10	00	00	02	0E	00	00	00	00	00	00
Byte 20	00	00	01	EE	00	00	00	00	10	0E
Byte 30	08	00	00	00	00	32	60	00	18	00
Byte 40	00	00	00	00	11	08	01	00	10	03
Byte 50	00	00	00	00	20	70	00	9F	FF	FF
Byte 60	01	9F	FF	FF	03	9F	FF	FF	05	9F
Byte 70	FF	FF	08	9F	FF	FF	0A	9F	FF	FF
Byte 80	10	9F	FF	FF	11	9F	FF	FF	12	9F
Byte 90	FF	FF	13	9F	FF	FF	15	9F	FF	FF
Byte 100	16	9F	FF	FF	17	9F	FF	FF	18	A0
Byte 110	00	00	19	9F	FF	FF	1A	9F	FF	FF
Byte 120	1B	9F	FF	FF	1C	9F	FF	FF	1D	9F
Byte 130	FF	FF	1E	9F	FF	FF	2B	9F	FF	FF
Byte 140	34	9F	FF	FF	3B	9F	FF	FF	3C	9F
Byte 150	FF	FF	4C	9F	FF	FF	4D	9F	FF	FF
Byte 160	E0	9F	FF	FF	E1	9F	FF	FF		

FOR HP INTERNAL USE ONLY

INTERPRETED DATA :

Sense Data Length = 167 (number of bytes of MODE SENSE data)
Media Type = 0
 Only one media type is supported.
Write Protected Bit = 0
 The tape is write-enabled.
Buffered Mode = 1
 Buffered Mode. The drive reports GOOD status on WRITE commands
 as soon as the data record has been transferred to the buffer.
Speed = 0
 The dds only supports one speed. The default speed.
Block Descriptor Length = 8
Density Code = 19
 Hewlett-Packard/Sony DDS Format
Number of Records = 0
 All the remaining logical records on the tape will have the
 medium characteristics specified by the block descriptor, or until
 a subsequent MODE SELECT changes those parameters.
Record Length = 0 (length in bytes of each logical record)

PAGE CODE DATA:

Page Saveable Bit = 0
 There is no non-volatile RAM on the drive into which parameter
 data may be saved.
Page Code = 2 (Disconnect-Reconnect Page)
Additional Length = 14 (number of remaining bytes in this page)
Buffer Full Ration = 0 (not supported)
Buffer Empty Ration = 0 (not supported)
Bus Inactivity Limit = 0 (not supported)
Disconnect Time Limit = 0
 Minimum time in 100 microsecond increments that the drive will wait
 after releasing the SCSI bus before attempting reselection.
Connect Time Limit = 0 (not supported)
Maximum Burst Size = 494
 This is the maximum amount of data the drive will transfer during
 a data phase before disconnecting.
DTDC = 0 (not supported)

PAGE CODE DATA:

Page Saveable Bit = 0
 There is no non-volatile RAM on the drive into which parameter
 data may be saved.
Page Code = 16 (Device Configuration Page)
Additional Length = 14 (number of remaining bytes in this page)
Change Active Partition Bit = 0
Change Active Field = 0
Active Format Field
 Disable RAW = 0
 Read-After-Write is Enabled.

FOR HP INTERNAL USE ONLY

C3 ECC - Third Level Correction Code = 1
Third Level Error Correction (C3 ECC) is Enabled.
N-Group = 0
A group will repeatedly be written 0 times to tape.
Active Partition Field = 0
Write Buffer Full Ratio = 0 (not supported)
Read Buffer Empty Ratio = 0 (not supported)
Write Delay Time = 50
The drive will wait 50 milliseconds with a partially full buffer before forcing the data to tape.
DBR - Data Buffer Recovery bit = 0
The drive does not support data buffer recovery using the 'RECOVER BUFFERED DATA' command.
RIS - Record Identifiers Supported bit = 1
The tape has recorded information about the logical record ID relative to the partition.
RSmk - Report Setmark bit = 1
Save-Set Marks will be reported to the drive. (default)
AVC - Automatic Velocity Control bit = 0 (not supported)
SOFC - Stop on Consecutive Filemarks field = 0 (not supported)
RBO - Recover Buffer Order bit = 0 (not supported)
REW - Report Early-Warning End-of-Media bit = 0
The drive will not report the early-warning condition on reads but will report early-warning on writes at a distance of 500mm before PEOT or synthetic PEOT.
Gap Size = 0 (not DDS specific)
EOD Defined = 0
The drive will use its default EOD mark before any change of direction following a write-type operation.
EEG - Enable EOD Generation bit = 1
The drive generates an EOD mark prior to a change of direction following a write-type operation.
SEW - Synchronize at Early Warning bit = 1
Data written to the drive after Early-Warning End-Of-Media will be written to the tape as normal.
Buffer Size at Early Warning = 0 (not supported)
Select Data Compression Algorithm = 0
The drive does not use data compression before writing data to tape

PAGE CODE DATA:
Page Saveable Bit = 0
There is no non-volatile RAM on the drive into which parameter data may be saved.
Page Code = 17 (Medium Partitions Parameter Page)
Additional Length = 8 (number of remaining bytes in this page)
Maximum Additional Partitions supported by the drive = 1
Additional Partitions Defined = 0
FDP - Fixed Data Partitions bit = 0 (not supported)
SDP - Select Data Partitions bit = 0 (not supported)
IDP - Initiator Defined Partitions bit = 0
PSUM - Partition Size Unit of Measure field = 2

FOR HP INTERNAL USE ONLY

Partition size = 2 megabytes.
Medium Format Recognition = 3
The drive is capable of format and partition recognition.
Partition Size = 0
Partition 1 size = 0 megabytes.

PAGE CODE DATA:

Page Saveable Bit = 0
There is no non-volatile RAM on the drive into which parameter
data may be saved.
Page Code = 32 (Vendor-Unique Command Timers Page)
Additional Length = 112 (number of remaining bytes in this page)

Command Operation Code = 0 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 1 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 3 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 5 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 8 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 10 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 16 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 17 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 18 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 19 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 21 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 22 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 23 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

FOR HP INTERNAL USE ONLY

Command Operation Code = 24 (HP Common SCSI)
The command will execute in 0 milliseconds (max).

Command Operation Code = 25 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 26 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 27 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 28 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 29 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 30 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 43 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 52 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 59 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 60 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 76 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 77 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 224 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

Command Operation Code = 225 (HP Common SCSI)
The command will execute in 2097151 milliseconds (max).

FOR HP INTERNAL USE ONLY

MOTIONCHECK

USAGE:

This command checks out basic tape movement functions of the drive. The tape will be erased and rewound. A set of 5 files (20 records each) will be written to tape and the tape rewound. The following sequence will then be executed:

```
+ = forward space
- = backward space

+ 2 files
  read record (to verify position)
- 1 file
  read record (to verify position)
+ 1 record
  read record (to verify position)
- 1 record
  read record (to verify position)
+ 3 files
- 4 files
+ 2 files
- 1 files
  read record (to verify position)
+11 records
- 3 records
+11 records
-19 records
+ 2 records
  read record (to verify position)
- 4 records
  verify past EOF
+20 records
  verify past EOF
+ 4 files
  verify tape runaway
  rewind
- 1 record
  verify past BOT
- 1 file
  verify past BOT
```

FOR HP INTERNAL USE ONLY

SYNTAX:

MOTIONCHECK
MC

DATA PROMPTS:

This commad takes approximately *zz* minutes to complete...
Do you wish to continue (Y/N) [N]?

{*zz* will be filled in after the actual testing of the command}

OUTPUT FORMAT:

Motion check has completed successfully.

FOR HP INTERNAL USE ONLY

RESET

USAGE:

This command performs a reset operation on the DDS tape drive. When this is executed, the currently executing command will be aborted and the drive will be at a Bus Free state. Following that will be a hard reset leaving the drive in a power-cycled state. No data in the buffer will be saved.

SYNTAX:

RESET

DATA PROMPTS:

None.

OUTPUT FORMAT:

Reset completed successfully

FOR HP INTERNAL USE ONLY

REWIND

USAGE:

This command causes the tape mounted on the drive to be rewound to BOT. The user will be asked for the option of immediate bit being enabled or disabled. If enabled the drive first writes any remaining buffered data to tape followed by an EOD marker. It then returns status to the host before the actual operation has completed.

SYNTAX:

REWIND
RW

DATA PROMPTS:

Immediate Mode?
0 -- Immediate bit not set. Status will be returned after
has completed
1 -- Immediate bit set. The drive first writes any remaining
buffered data to tape followed by an EOD marker. It then
returns status to the host before the actual operation has
completed.

OUTPUT FORMAT:

REWIND of tape was successful.

FOR HP INTERNAL USE ONLY

REV

USAGE:

This command displays the current firmware revision numbers in the drive in a hex format.

SYNTAX:

REV

DATA PROMPTS:

None.

OUTPUT FORMAT:

```
=====
                          FIRMWARE REVISIONS (HEX)
=====

Controller id           = 01  ( DRIVE )
Firmware Version        = 0B
Firmware Revision       = 07
Firmware Revision Update = FF
-----

Controller id           = 02  ( BUFFER )
Firmware Version        = 0B
Firmware Revision       = 10
Firmware Revision Update = 00
-----

Controller id           = 03  ( INTERFACE )
Firmware Version        = 0B
Firmware Revision       = 0E
Firmware Revision Update = 53
-----
```



FOR HP INTERNAL USE ONLY

SELFTEST

USAGE:

From this command, the user may either choose to run the internal power-on test or run an internal diagnostic test. The tests which can be selected are device dependent and are fully described in the support documentation of the tape drive. The user will be prompted for all required information.

The selftest may be automatically repeated up to 1,000 times. The execution count used is implemented at the diagnostic level and NOT within the device. The selftest request will be issued until the specified execution count is reached or until the selftest fails. Once the selftest sequence has been started, the user may abort via the program interrupt (CNTL-Y on MPE XL, CNTL-C on HP-UX).

SYNTAX:

SELFTEST
ST

DATA PROMPTS:

Enter one of the following options:
0 - Run power on sequence
1 - Run specific internal selftest(0-134)
2 - Exit selftests
Your selection (0..2) [1] >

{if user selects 1 then the following prompts will appear}

The dds supports the following tests:
0 Reset Sequence
2 Error Rate Test Sequence
3 Error Rate Test Sequence with Data Compare
9 Mult-Controller Sequence
11 Dual-Ported RAM Sequence
13 Drive Controller Reset Sequence
14 Buffer Controller Reset Sequence
15 Interface Reset Sequence
32 Microprocessor Test
33 ROM Checksum
34 Destructive RAM Test
35 Non-Destructive RAM Test
36 Complete RAM Test
38 Destructive Dual-Port RAM Test
40 CXD1356 Test
41 Sub-Area Microprocessor Test
42 Mechanism Test
48 Front Panel Check
49 MD Connectivity Test
50 Static Test

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- 51 Recognition Switch Test
- 52 Voltage Test
- 53 Thread/Unthread Test
- 54 Reel Test
- 55 Drum Test
- 56 Capstan Test
- 57 Power-On Mechanism Selftest
- 64 Randomizer Off
- 67 Read Data Exerciser
- 68 Write Data Exerciser
- 69 Reposition Exerciser
- 70 Start/Stop Exerciser
- 71 Search Exerciser
- 72 BOM/EOM Exerciser
- 80 Device Area Test
- 96 Buffer Register Test
- 97 Buffer Function Test
- 98 Buffer RAM Test
- 99 Initialize Error Rate Log
- 112 SPIFI Test
- 113 SPIFI Loopback Test
- 128 Onboard DPR Test
- 129 Offboard DPR Test
- 133 Interface Loopback Tests
- 134 Buffer Initiated Loopback Tests

Selftest number. [0]>

{all tests will prompt for number of times to execute}

Number of times to execute:

- 0 - continuous
- 1 - run once
- 2 - run 10 times
- 3 - run 100 times
- 4 - run 1000 times

Your selection (0..4) [1]>

Do you want to break on first error?

- 0 - break on first error
- 1 - no break on error

Your selection (0..1) [0]>

{Parameter prompts are conditional depending on the selftest number}

Param A (0..255) [0]>

Param B (0..255) [0]>

Param C (0..255) [0]>

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OUTPUT FORMAT:

Running selftest #n ...

Selftest Results

Error Class - Runtime errors | Drive controller diagnostic
errors | Buffer controller diagnostic errors |
Interface controller diagnostic errors |
Multi-processor errors | Operational status |
Unknown error class.

Error Code n -- {description}

Faulty FRU - (1) Drive Mechanism & Associated Electronics
{or}

Faulty FRU - (2) Buffer Controller
{or}

Faulty FRU - (3) Interface Controller
{or}

No FRU

ERROR MESSAGES:

Special warnings will be given the user upon selection of an invalid selftest code, depending on the code selected. In most cases the user will be prompted for a valid selftest.

*** SELFTEST ! IS NOT IMPLEMENTED BY THE SELECTED DEVICE.

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SENSE

USAGE:

This command will obtain the current sense data from the device and display it in readable text form.

SYNTAX:

SEN

DATA PROMPTS:

None.

OUTPUT FORMAT:

=====
SENSE DATA
=====

RAW FORM:

byte#	Description	Hex Value	Bit Map 76543210	Decimal Value
0	Valid(7) Error Code(6-0)	70	01110000	112
1	Segment Number	00	00000000	0
2	Mark(7) EOM(6) ILI(5) Sense Key(3-0)	02	00000010	2
3	Information Byte(MSB)	00	00000000	0
4	Information Byte	00	00000000	0
5	Information Byte	00	00000000	0
6	Information Byte(LSB)	00	00000000	0
7	Additional Sense Length	0B	00001011	11
8	Command Specific Information (MSB)	00	00000000	0
9	Command Specific Information	00	00000000	0
10	Command Specific Information	00	00000000	0
11	Command Specific Information (LSB)	00	00000000	0
12	Additional Sense Code	3A	00111010	58
13	Additional Sense Code Qualifier	00	00000000	0
14	Field Replaceable Unit Code	00	00000000	0
15	SKSV(7) Sense Key Specific Byte(6-0)	00	00000000	0
16	Sense Key Specific Byte	00	00000000	0
17	Sense Key Specific Byte	00	00000000	0
18	Reserved	00	00000000	0

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INTERPRETED SENSE DATA:

Reported error is associated with the most recent command issued to device.

Medium is not present. Device is in a quiescent state with no media in the drive.

Error Code -- No error.

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SUSPEND

USAGE:

This command temporarily suspends execution of the diagnostic, allowing the user to issue other DUI commands. This feature is handy for retaining any default values accumulated by WORKOUT or other SCSIDDS functions. To return to SCSIDDS, the user may just enter "resume" at the DUI prompt.

SYNTAX:

SUSPEND

DATA PROMPTS:

None.

OUTPUT FORMAT:

DUI>

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TREES

USAGE:

This command causes one of SCSIDDS's diagnostic trouble trees to be executed.

SYNTAX:

TREES [*tree specifier*]

tree specifiers:

ALL	- All of the following
VERIFICATION	- Non-destructive trouble tree.
HARDWARE	- Destructive trouble tree.
NON-DESTRUCTIVE MEDIA	- Non-destructive media trouble tree.
DESTRUCTIVE MEDIA	- Destructive media trouble tree.

DATA PROMPTS:

Which tree is to be executed?

0 -- ALL
1 -- VERIFICATION
2 -- HARDWARE
3 -- NON-DESTRUCTIVE MEDIA
4 -- DESTRUCTIVE MEDIA

Your selection [<cr> = none]>

OUTPUT FORMAT:

{same as sections 10 to 13}

FOR HP INTERNAL USE ONLY

TUR

USAGE:

This command tests whether a tape is loaded and the drive is ready for use.

SYNTAX:

TUR

DATA PROMPTS:

None.

OUTPUT FORMAT:

DDS is ready with a tape loaded

{or drive will return a check condition and status will be decoded}

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UNLOADTAPE

USAGE:

This command causes the automatic unloading to be initiated. The request will be honored even if the tape has not been rewound. The tape will be unloaded and ejected. If the PMR is set, then the tape will remain in the drive.

SYNTAX:

UNLOADTAPE
ULT

DATA PROMPTS:

None.

OUTPUT FORMAT:

Tape was successfully unloaded.

FOR HP INTERNAL USE ONLY

WORKOUT

USAGE:

This command provides the user with different ways of reading and writing tape. It is useful in isolating medium vs drive problems, verifying media, isolating certain classes of read/write problems, and simulating system use of the tape drive.

This command will cause records to be written to tape, the tape rewound, and those same records read back off the tape. The user will have the option of whether or not to verify the records read match the ones written earlier. The user will also be able to vary the density record lengths, record content, number of files per tape, and loop count.

The user will have an option to clear the drive's internal error logs prior to writing to the tape. The user will be warned and given an opportunity to back out of the command to look at and/or record the log before reissuing this command. This will also serve as the mechanism for correcting invalid entries.

There will be a choice of byte patterns to be written to the tape. Each record will consist of repetitions of the pattern up to the record size limit specified.

Data Verification

This command will compare each record read to what this program originally sent, displaying any discrepancies.

SYNTAX:

WORKOUT
WO

DATA PROMPTS:

WORKOUT

```
*****  
*                WARNING                *  
*  This command may destroy user data  *  
*****
```

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

Reset in progress...

Reset completed successfully

Clear the Error events, W/R error counters logs (Y/N)[N]?



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Is the media a Short(0.5 GBytes) or a Long(1.3 Gbytes) media? (S/L)[S]>

Do you want to write to the end of the media? (Y/N)[N]>

Do you want:

- R = random transfer length
- U = user input transfer length

Which option would you like (R/U)[U]?

Input transfer length (1 <= bytes <= nnnn)[1]?

Input number of records to write to media(1 <= records <= n)[1]?

The sources of the data pattern to be used are:

- sequential [ff,00,01,02,..fe]
- alternating [00,ff,00,ff,..]
- butterfly [00,ff,01,fe,..]
- single [you will be prompted]

Which pattern source would you like [sequential]>

{if user chooses single}

Input the pattern in hex:

Input loop count (1 <= count <= 254)[1]?

Writing to media is in progress...

Reading from media and comparing data are in progress...

OUTPUT FORMAT:

No errors were detected in the media test

or

*** ERROR IN TRANSMISSION DETECTED DURING READ/WRITE MEDIA TEST:

REC #	BYTES #	Hex TRNS Value	Hex RECD Value	Bit	Time Error Occurred
				Positions In Error	
2	50	FF	60	11000011	Fri, Mar 17, 1989 3:30 PM
.
.
.

WORKOUT COMPLETED.

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Error and Warning Messages

The following are general error/warning messages which may be encountered during the execution of SCSIDDS. Note, however, that system dependent error messages may be displayed by the subsystem along with any error message generated by this diagnostic. All error message without the (DDSERR #) trailer are generated by the subsystem.

Errors which have explanatory notes (preceded by “—”) will normally display only one of the notes listed here. The exclamation point (!) is a symbol used to indicate the point at which context dependent information is to be placed.

100	*** WARNING -- THE I/O PATH MAY NOT BE FUNCTIONING PROPERLY (DDSERR 100)
CAUSE	The data path between the host and specified device is not functioning properly.
ACTION	If it is determined that a device has not been selected for testing, the diagnostic will be aborted. Otherwise, the warning message will be displayed and the diagnostic will continue.

101	*** DEVICE FAILED TO RESPOND TO ! COMMAND (DDSERR 101)
CAUSE	Device timed-out during execution of command.
ACTION	Be sure scsi cable is connected to drive correctly. Reset drive and try again.

102	*** SCSIDDS IS UNABLE TO DIAGNOSE THE SELECTED DEVICE (DDSERR 102)
CAUSE	The device was not identified as a HP35450A after responding from an inquiry command.
ACTION	If this occurs during the diagnostic initialization routine, the user is asked to continue. If this occurs during section 10 or 11, the trouble tree operations will not be performed.

108	*** THIS COMMAND IS NOT IMPLEMENTED ON THE SELECTED DRIVE (DDSERR 108)
CAUSE	The selected command is not implemented by the device.
ACTION	Try another command.

109	*** DEVICE ENCOUNTERED AN ERROR WHILE EXECUTING THE ! COMMAND (DDSERR 109)
CAUSE	The command did not execute successfully.
ACTION	Interpret results from sense data.

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110 ***** THE MAXIMUM NUMBER OF ERRORS HAS BEEN REACHED (DDSERR 110)**
CAUSE The maximum allowed number of errors has been reached.
ACTION The diagnostic is aborted.

111 ***** UNRECOGNIZED COMMAND --**
 TYPE "HELP" FOR A LIST OF VALID COMMANDS (DDSERR 111)
CAUSE Parser did not recognize the command.
ACTION Enter a valid command.

112 ***** UNRECOGNIZED REPLY WAS FOUND (DDSERR 112)**
CAUSE Parser did not recognize the reply.
ACTION Enter a valid reply.

113 ***** A NUMERICAL INPUT WAS EXPECTED BUT NOT RECEIVED (DDSERR 113)**
CAUSE Parser expected an integer.
ACTION Enter a valid integer.

114 ***** AN UNEXPECTED ERROR OCCURED IN THE IO_SCSISA DAR (DDSERR 114)**
CAUSE The diagnostic returned an unexpected status from the device access routine.
ACTION The user should never see this. Used for debugging diagnostic.

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115 ***** ERROR IN TRANSMISSION DETECTED DURING
READ LOOPBACK TEST: (DDSERR 115)**
CAUSE The buffer read does not match the buffer written to the device.
ACTION Try different media. If it fails again, contact your support engineer.

116

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

CAUSE Bytes expected do not match byte received during loopback test.
ACTION Try different media. If it fails again, contact your support engineer.

118 ***** ERROR -- EXPECTED ! BYTES FROM THE DEVICE AND
RECEIVED ! BYTES (DDSERR 118)**
CAUSE The number of bytes recieved from the drive do not match what was expected.
ACTION Try different media. If it fails again, contact your support engineer.

140 ***** POWER FAIL - NO OPERATION WAS PERFORMED (DDSERR 140)**
CAUSE Power fail caused operation to fail.
ACTION Try command again.

143 ***** AN ERROR WAS ENCOUNTERED WHEN INITIALIZING SECTIONS AND STEPS
(DDSERR)**
CAUSE An internal error was encountered.
ACTION Notify your support engineer..

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200	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO SEND/RECEIVE INFORMATION FROM THE USER (DDSERR 200)
CAUSE	An internal error was encountered.
ACTION	Notify your support engineer..
<hr/>	
201	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO RETRIEVE A MESSAGE FROM THE CATALOG (DDSERR 201)
CAUSE	A corresponding message is not included in the catalog.
ACTION	This will not effect the execution of the diagnostic. However, your support engineer should be notified.
<hr/>	
202	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING TO CONVERT A NUMBER TO A STRING (DDSERR 202)
CAUSE	This as internal error in the diagnostic.
ACTION	Notify support engineer so it may be resolved.
<hr/>	
203	*** AN ERROR WAS ENCOUNTERED IN ATTEMPTING A BIT EXTRACTION OPERATION (DDSERR 203)
CAUSE	This as internal error in the diagnostic.
ACTION	Notify support engineer so it may be resolved.
<hr/>	
207	*** DUE TO PROBLEMS WITH INQUIRY, SCSIDDS CANNOT FUNCTION PROPERLY AND WILL THEREFORE TERMINATE (DDSERR 207)
CAUSE	Inquiry command cannot identify device.
ACTION	Notify support engineer for help.
<hr/>	

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209	*** YOUR RESPONSE WAS INVALID (DDSERR 209)
CAUSE	Diagnostic did not expect your response.
ACTION	Try again with valid response.
<hr/>	
210	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN DATA FROM AN I/O BUFFER (DDSERR 210)
CAUSE	This is an internal error between the diagnostic and the device access routine.
ACTION	Notify your support engineer.
<hr/>	
211	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO PLACE DATA INTO AN I/O BUFFER (DDSERR 211)
CAUSE	This is an internal error between the diagnostic and the device access routine.
ACTION	Notify your support engineer.
<hr/>	
212	*** AN ERROR WAS ENCOUNTERED WHILE ATTEMPTING TO OBTAIN AN I/O BUFFER (DDSERR 212)
CAUSE	This is an internal diagnostic error.
ACTION	Notify your support engineer.
<hr/>	
217	*** WARNING -- EXPECTED ! BYTES OF FIRMWARE REVISION DATA, BUT RECEIVED ONLY ! BYTES. (DDSERR 217)
CAUSE	Drive did not return the proper number of bytes for firmware revision number.
ACTION	Internal error. Notify your support engineer.
<hr/>	

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218 ***** NO MORE FIRMWARE REVISION DATA**
CAUSE Drive returned no firmware revision data.
ACTION Internal error. Notify your support engineer.

219 ***** RECEIVED CONTROLLER ID = ! (!)**
 EXPECTED CONTROLLER ID = ! (!)
CAUSE Drive returned the incorrect controller id.
ACTION Internal error. Notify your support engineer.





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