HP 3000 Computer System

HP 7976A MAGNETIC TAPE UNIT DIAGNOSTIC LOADER

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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. Changes are marked with a vertical bar in the margin. If an update is incorporated when an edition is reprinted, these bars are removed but the dates remain.

All pages are original 2nd Edition.

PRINTING HISTORY

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The date of the title page of the manual changes only when a new edition is published. When an edition is reprinted, all the prior updates to the edition are incorporated.

First Edition. . . . . Jun 1981
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GENERAL INFORMATION

SECTION I

1.0 INTRODUCTION

The HP 7976A Magnetic Tape Unit Diagnostic Loader provides the capability of testing an HP 7976A Tape Unit ONLINE from the system console or a remote maintenance terminal. The user must have system manager (SM) or system supervisor (OP) capability to run this program. The diagnostic loader will run under MPE on any HP 3000 computer system that has an HP 7976A connected to it.

The diagnostic loader will load, execute, and report the results of 88 diagnostic routines, HP-IB loopback test, and selftest. Installation of the diagnostic loader will occur as part of the normal IT installation procedure.

The diagnostic loader will automatically locate the HP 7976A from the I/O configuration tables if only one is connected to the system. If there are two or more HP 7976A tape units connected to the system, the user will receive a message that lists all the HP 7976A's by logical device number and then asks which one the user wants to test.

1.1 HARDWARE REQUIREMENTS

An HP 3000 computer system with an HP 7976A Magnetic Tape Unit connected to it.

1.2 SOFTWARE REQUIREMENTS

The following files must be resident in the HP32340 group of the SUPPORT account:

PD470A	MONLIST	BASMON	BUFSUB	CNFG
CNVR	DMSSUB	DSTATR	EOTSUB	EROR2
EROR3	EXECUTE	ERRTAB	INTABL	INTRP
INTRSB	INIT	MONITR	OPCDE0	OPCDE1
OPCDE2	OPCDE3	OPCDE4	OPCDE5	OPCDE7
PRCMBF	PRNT	PHDR	REGFIX	RDREG
RDSUB	REGTBL	RGT	RUNCMD	SETSNS
SETSTA	WRTSUB	DIAPAT	FLIP	XEQ
XEQCE				

7976A Diagnostic Loader

PD470A is the loader program file.
MONLIST is the monitor file directory.
BASMON thru FLIP are monitor files.
XEQ and XEQCE are the execution files.

13 LIMITATIONS

None

OPERATING INSTRUCTIONS

SECTION II

2.0 INTRODUCTION

When the HP 7976A Diagnostic Loader is run it will locate the HP 7976A Magnetic Tape Unit, request a tape mount, and perform the opertions specified in the Execution (XEQ) file of the Diagnostic Loader.

2.1 OPERATION

The HP 7976A Diagnostic Loader (hereafter referred to as the Loader) may be run in either Auto or Manual mode. To run the Loader type the following:

```
:HELLO FIELD.SUPPORT,HP32340
:RUN PD470A
    or
:RUN PD470A,MANUAL
```

If the Loader is run in Auto mode, minimal user interaction is necessary. In Manual mode the Loader prompts the user for the desired operation:

```
Routine (RTssrree), Selftest, Loopback, Auto, Exit?
```

Where:

ss is the section designator in OCTAL
rr is the routine designator in OCTAL
ee is the routine extension field in OCTAL

Refer to HP 7976A Subsystem Diagnostic Manual (p/n 07976-90906) for test routine descriptions, error codes and messages.

2.11 Routines

Routines are executed in the 7976 under the supervision of a Monitor. The Monitor is comprised of a number of individual files, with their names listed in the file MONLIST. When the Loader needs to download the Monitor, it reads the names out of MONLIST. If MONLIST or a Monitor file cannot be found, the situation is reported:

```
Monitor directory "MONLIST" is unavailable.
                    or
Monitor file (filename) is unavailable.
```

The above are irrecoverable errors.

2.12 Selftest

The 7976 internal Selftest runs identically whether it is initiated by the Loader, the Selftest pushbutton, or at power-on. However, under the Loader the result is a code indicating passed, or describing the error that occurred. On error, the Loader reports the code and generates a message corresponding to it. For more information on error codes or messages, refer to the HP 7976 Operators Manual (p/n 07976-90901).

2.13 Loopback

The Loopback command performs the traditional 256 byte HP-IB loopback (Data bytes %377, 0, 1, 2, 3, ...,%376). If less than 256 bytes are returned, the user is informed:

```
Loopback failed.  Only xxx bytes returned out of 256.
```

otherwise, received bytes are checked. If any are in error, they are printed, along with what value they should have, and the exclusive OR of the expected and received bytes:

```
Loopback failed.
Byte   0 is %375, should be %377; exclusive or=%002
Byte   3 is %000, should be %002; exclusive or=%002
Byte   4 is %001, should be %003; exclusive or=%002
```

If more than 32 bytes are in error, the remaining ones are not printed, and the user will see the message:

```
Remaining bytes not checked.
```

2.2 EXECUTION (XEQ) FILES

The Execution file will specify which operation (routine, self-test,loopback) to execute, what to do next if it passes, and what to do if it fails. The XEQ file is an EDITOR file and may be modified by the user or the user can create one or more XEQ files using EDITOR. The following is an example of a line in an XEQ file:

```
23  RT111002   24   124   Tach symmetry test
```

Where:

23 is the EDITOR file line number.
RT111002 is the routine name.
24 is the EDITOR file line number to branch to if RT111002 passes.
124 is The EDITOR file line number to branch to if RT111002 fails.
Tach symmetry test is a short comment telling what type of test RT111002 is.

Whole lines in an XEQ file may be comments if the first character is a period (.) or the letter C. Using lines of comments will allow XEQ files to be easily documented and identified by the user. An XEQ file must be a standard 80 byte ASCII EDITOR file. The following is an example of a short XEQ file:

```
1    C              7976 XEQ file version X.00      5/5/81
2    C
3    C Loop back and selftest are done before any routines.
4    C Any failure will invoke manual mode.
5    C
6    Command      Pass      Fail      Comment
7    C------      ----      ----      -------
8    Loopback      9         18
9    Selftest      10        18
10   RT020100      11        18    Amp sensors pick and drop
11   RT020200      12        18    Amp sensors decode
12   RT020300      13        18    PE write ones
13   RT020400      14        18    PE write zeros
14   RT020500      15        18    PE write zeros-p track
15   RT020600      16        18    GCR write ones lwr
16   RT021001      17        18    PE read 20% phase error
17   RT021101      19        18    PE write 20% early error
18   Manual
19   Exit
```

Only the first character of an XEQ command is significant and it may be either upper or lower case. Before an XEQ file is used, it will be checked for syntax errors and that all referenced line numbers exist. This is done to prevent the case where the Loader must abort partway through a run because a problem is only then discovered. The offending line will be printed, the field in question will be identified with a pointer (^), and followed by an error message.

Two execution files are furnished as part of the diagnostic, XEQ and XEQCE. File XEQ is the standard execution file, which performs basic hardware tests of the tape drive, and should be used for normal user tests. File XEQ is selected automatically by the loader, so no special action is required.

File XEQCE is a more thorough but time consuming test of the HP 7976, intended for the use of HP service personnel. XEQCE includes all tests done by XEQ plus others. Some tests are "MARGIN" tests, which check fine adjustments of the tape drive. Special equipment is required to measure the state of the circuits and perform the adjustments. Failures indicated by XEQCE do not necessarily indicate a failure in the HP 7976, but provide information to HP service personnel as to what service the tape drive requires at the next preventive maintenance (PM) call.

To specify that the execution file XEQCE is to be used by the loader, enter the following:

```
:FILE XEQ=XEQCE
:RUN PD470A
```

To run a user created XEQ file, a file equation (with the users filename for it) must be used prior to the ":RUN PD470A" command such as:

```
:FILE XEQ=NEWXEQ
:RUN PD470A
```

To get a hardcopy listing of the Loader output, use the following file equation prior to the RUN command:

```
:FILE LIST;DEV=LP
```

2.3 AUTO AND MANUAL MODES

The loader may be run in either Auto or Manual mode and the mode may be changed. Auto is the default mode when the ":RUN PD470A" command is used and the XEQ file will control Loader operations. To run in Manual mode the "RUN PD470A,MANUAL" command should be used. To enter Manual mode when running in Auto, simply type a Control-Y. To enter Auto mode when running in Manual, type the word Auto or A when prompted by the following Loader message:

Routine (RTssrree), Selftest, Loopback, Auto, Exit?

Manual mode will also be entered if the XEQ command "Manual" is encountered in the XEQ file.

2.4 ERROR MESSAGES

Any of the following errors will prohibit further operation. The Loader will print "XEQ file has error(s), can't continue", and terminate. The error messages are:

Read of XEQ record xxx failed, can't continue. Error is:
(followed by a file system error message)

XEQ record xxx <>80 bytes---illegal format. Must be standard Editor file, kept numbered.

Illegal Editor line number in record xxx. Must be standard Editor file, kept numbered.

Illegal Routine name. Must be "RT" followed by six digit octal number.

Illegal or missing branch line number.

Command must be RTssrree (Routine), Loopback, Selftest, Manual, Comment, or Exit.
(unknown command)

Can't find this line.
(A Routine, Loopback, or Selftest's "branch" number referenced a line that does not exist).

Too many records in XEQ file - 305 maximum.

More than 16 errors in XEQ. I give up.

It is possible, and allowed, that not all Routines referenced in the XEQ file are actually on disc. The Loader will print:

Warning: RTssrree, ..., RTssrree are not on disc. Execution will stop when one is needed.

The Loader will continue until that point.