HP 91711B
Diagnostic and Verification Package

Reference Manual

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PRINTING HISTORY

The Printing History below identifies the Edition of this Manual and any Updates that are included. Periodically, Update packages are distributed which contain replacement pages to be merged into the manual, including an updated copy of this Printing History page. Also, the update may contain write-in instructions.

Each reprinting of this manual will incorporate all past Updates, however, no new information will be added. Thus, the reprinted copy will be identical in content to prior printings of the same edition with its user-inserted update information. New editions of this manual will contain new information, as well as all Updates.

To determine what software manual edition and update is compatible with your current software revision code, refer to the appropriate Software Numbering Catalog, Software Product Catalog, or Diagnostic Configurator Manual.

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Introduction

Product Description

The HP 91711B product is a set of diagnostic and verification programs for the HP 1000-M/E/F Series computer and peripheral devices (systems). This manual, one of a set of three included in the 91711B product, is the Reference Manual covering the use and application of on-line RTE-IVB and RTE-6/VM programs.

The stand-alone diagnostics for the HP CS80-Series (7908x, 7911x, 7912x, 7933x) and the ICD (Integrated Controller) or H-Series (7906H, 7920H, 7925H, 9895) Disc Drives run under the control of a pre-generated RTE-IVE Operating, System, included in this product. For information on the stand-alone diagnostics programs, refer to the other manuals included in this product.

* CS80 External Reference Manual (part no. 5955-3462).

* Integrated Controller Disc Utilities Reference Manual
  (part no. 5955-4355).

1) <u>On-line Verification Programs</u> These programs, which run under the operating system concurrently with other system activity, provide basic functional pass-fail testing of various processor sections and peripherals. These are not extensive and exhaustive tests, but successful completion of the verification program confirms a basic level of integrity. On-line programs may be run with either the HP RTE-IVB or RTE-6/VM operating system.

2) <u>On-line Diagnostic Programs</u> These programs may be run under the RTE-IVB or RTE-6/VM operating system (concurrently with other system activities) to provide in-depth testing of various CPU and peripheral activities attempting to isolate the failure to a particular module. Where applicable, the diagnostic will indicate the order of probability in which individual subassemblies should be replaced.

3) <u>Stand Alone Diagnostics</u> Stand-alone refers to the set of programs run under the RTE-IVE Operating System. These are the diagnostics for the CS80 and H Series disc drives (see above).

Media Configuration

The 91711B product is available on 2645/48 Display Terminal minicartridges and 800 or 1600 BPI magnetic tape (but not on the CS80 cartridge tape units). Table 1-1 contains the minicartridge file structure; Table 1-2 contains the magnetic tape file structure:

1) <u>Minicartridges</u> the diagnostic/verification library consists of several minicartridges. The first file on each minicartridge is an ASCII directory file indicating contents of the remaining files. The remaining files may be absolute, relocatable or ASCII files.

2) <u>Magnetic Tape</u> The first file on each tape is an ASCII directory file. The remaining files may be absolute, relocatable or ASCII format files. To facilitate loading of stand-alone diagnostics, the appropriate files immediately follow the directory file.

Products Tested

Products tested in the three modes of testing performed by the HP 91711B include:

*CPU   - memory, firmware, Scientific Instruction Set, Virtual Memory Area, Hardware Floating Floating Point, RTE-IVB or RTE-6/VM Vector Instruction Set

*Disc Drives   - MAC Series (7900, 7906, 7925); H Series (7906H, 7920H, 7925H, 9895A) and CS80 Series (7908x, 7911x, 7912x, 7933x)

*Tape Drives   - 800 or 1600 BPI

*264x Terminals   - any RS232 terminal supported by RTE-IVB or RTE-6/VM

*Datacapture   - all terminals currently supported by 92080A, DATACAP/1000

*Line Printers   - all printers supported by RTE-IVB or RTE-6/VM

*HP-IB Interface - verifies hardware performance only

*DS-1000/IV   - verifies communication link to a specified node

Table 1-1. 91711B Library Structure (minicartridges)

FILE NAME	DATE CODE	DESIGNATION	MINI-CARTRIDGE
DIR #1	2201	Minicartridge #1 Directory	
%TXPM0	2201	Main Processor Verification	
%RODFK	2201	- Subroutine	
#TXPM0	2201	- Loader Command File	
%TXPM1	2226	Memory Verification Father	
%NPART	2226	- Subroutine	
#TXPM1	2201	- Loader Command File	
%TXPM2	2201	Memory Verification Son #1	
#TXPM2	2201	- Loader Command File	
%TXPM3	2201	Memory Verification Son #2	
#TXPM3	2201	- Loader Command File	
%TXPF0	2201	Supported Firmware Verification	
%RPTBL	2201	- Table of Entry Points	
%MORFE	2201	- Subroutine	
%FFPVF	2201	- Subroutine	
%HFPVF	2201	- Subroutine	
%SISVF	2201	- Subroutine	Minicart #1
%VMAVF	2201	- Subroutine	91711-13319
%DISVF	2201	- Subroutine	
%VISVF	2201	- Subroutine	
#TXPF0	2201	- Loader Command File	
%TXMV0	2226	7900/06/20/25 Disc Verification	
#TXMV0	2201	- Loader Command File	
%TXDS0	2201	DS/1000 Verification	
#TXDS0	2201	- Loader Command File	
%TXIB0	2201	HP-IB Interface Verification	
#TXIB0	2201	- Loader Command File	
%TXMT0	2201	7970 Mag Tape Verification	
#TXMT0	2201	- Loader Command File	
%TXTD0	2201	3070 Data Terminal Verification	
#TXTD0	2201	- Loader Command File	
DIR #2	2201	Minicartridge #2 Directory	
%TXTD1	2201	3075A/76A/77A Verification	
%TXTD2	2201	- Segment 1	
%TXTD3	2201	- Segment 2	
%CFTML	2201	- Segment 3	Minicart #2
%IWRZZ	2201	- Segment 4	91711-13320
%IMPTM	2201	- Segment 5	
$XXTD1	2201	- Library	
#TXTD1	2201	-Loader Command File	

Table 1-1. 91711B Library Structure (minicartridges) Continued

FILE NAME	DATE CODE	DESIGNATION	MINICARTRIDGE
DIR #3	2201	Mini-cartridge #3 directory	
%TXTT0	2201	2645/48 Terminal Verification	
#TXTT0	2201	– Loader Command File	
%TXTT1	2201	2645/48 Multipoint Verification	
#TXTT1	2201	– Loader Command File	
%TXTR0	2201	RS-232 Terminal Verification	
#TXTR0	2201	– Loader Command File	
%TXPF1	2201	F-Series HFP Processor Diagnostic	Minicart #3
%RODSK	2201	– Subroutine	91711-13321
#TXPF1	2201	– Loader Command File	
%TXPF2	2201	F-Series SIS Diagnostic	
%RODTK	2201	– Subroutine	
#TXPF2	2201	– Loader Command File	
%TXPF3	2201	RTE IV EMA Diagnostic	
#TXPF3	2201	– Loader Command File	
%TXPF4	2201	F-Series VIS Diagnostic	
#TXPF4	2201	– Loader Command File	
%VMACK	2201	RTE-6/VM VMA Diagnostic	
#VMACK	2201	– Loader Command File	
DIR #4	2201	Minicartridge #4 directory	Minicart #5
!ICD01	2201	RTE-IVE Off-Line Host	91711-13323
DIR#5	2201	Mini-cartridge #5 Directory	
FORM	2201	H-Disc RTE-IVE Format Utility	Minicart #6
DIAG	2201	H-DISC RTE-IVE Diagnostic	91711-13324
DIR#6	2201	Minicartridge #6 Directory	
ERT	2201	H-Disc RTE-IVE Error Rate Test	Mini-cart #7
DISCZ	2201	H-Disc RTE-IVE Disc Analyzer	91711-13325
DIR#7	2201	Minicartridge #7 Directory	
%TXWL0	2201	Line Printer Verification	
#TXWL0	2201	–loader command file	Minicart #4
%TXMV1	2201	7900/06/20/25 Disc Verification	91711-13322
#TXMV1	2201	–loader command file	
%VIS06	2201	RTE-6/VM VIS Diagnostic	
#VIS06	2201	–loader command file	
DIR#8	2201	Minicartridge #8 Directory	Minicart #8
!CS801	2226	RTE-IVE CS80 Off-line Host	91711-13326
DIR#9	2201	Minicartridge #9 Directory	Minicart #9
EXR1	2226	CS80 Disc Exerciser	91711-13327
TAPE	2226	CS80 Cartridge Tape Exerciser	Minicart #10
OPER	2226	CS80 OP-Design	91711-13328

Table 1-2. 91711B Library Structure (800/1600 BPI Mag Tape)

FILE NAME	DATE CODE	DESIGNATION	FILE NO. DECIMAL	OCTAL
DIR.MT	2201	Mag Tape Directory	1	1
!ICD01	2201	RTE-IVE H Series Host	2-14	2-16
FORM	2201	H-Disc RTE-IVE Format Utility	15	17
DIAG	2201	H-Disc RTE-IVE Diagnostic	16	20
ERT	2201	H-Disc RTE-IVE Error Rate Test	17	21
DISCZ	2201	H-Disc RTE-IVE Disc Analyzer	18	22
!CS801	2226	RTE-IVE CS80 Off-line Host	19-32	23-40
EXR1	2226	CS80 Disc Exerciser	33	41
TAPE	2226	CS80 Cartridge Tape Exerciser	34	42
OPER	2226	CS80 OP-Design	35	43
%TXPM0	2201	Main Processor Verification	36	44
%RODFK	2201	- Subroutine	37	45
#TXPM0	2201	- Loader Command File	38	46
%TXPM1	2226	Memory Verification Father	39	47
%NPART	2226	- Subroutine	40	50
#TXPM1	2201	- Loader Command File	41	51
%TXPM2	2201	Memory Verification Son	42	52
#TXPM2	2201	- Loader Command File	43	53
%TXPM3	2201	Memory Verification Son	44	54
#TXPM3	2201	- Loader Command File	45	55
%TXPF0	2201	Supported Firmware Verification	46	56
%RPTBL	2201	- Table of Entry Points	47	57
%MORFE	2201	- Subroutine	48	60
%FFPVF	2201	- Subroutine	49	61
%HFPVF	2201	- Subroutine	50	62
%SISVF	2201	- Subroutine	51	63
%VMAVF	2201	- Subroutine	52	64
%DISVF	2201	- Subroutine	53	65
%VISVF	2201	- Subroutine	54	66
#TXPF0	2201	- Loader Command File	55	67
%TXMV0	2226	7900/06/20/25 Disc Verification	56	70
#TXMV0	2201	- Loader Command File	57	71
%TXDS0	2201	DS/1000-IV Verification	58	72
#TXDS0	2201	- Loader Command File	59	73
%TXIB0	2201	HP-IB Interface Verification	60	74
#TXIB0	2201	- Loader Command File	61	75
%TXMT0	2201	7970 Mag Tape Verification	62	76
#TXMT0	2201	- Loader Command File	63	77
%TXWL0	2201	Line Printer Verification	64	100
#TXWL0	2201	- Loader Command File	65	101
%TXTT0	2201	2645/48 Terminal Verification	66	102
#TXTT0	2201	- Loader Command File	67	103
%TXTT1	2201	2645/48 Multipoint Verification	68	104
#TXTT1	2201	- Loader Command File	69	105

Table 1-2. 91711B Library Structure (800/1600 BPI Mag Tape) Continued

FILE NAME	DATE CODE	DESIGNATION	FILE NO. DECIMAL	OCTAL
%TXTRO	2201	RS232 Terminal Verification	70	106
#TXTRO	2201	- Loader Command File	71	107
%TXTDO	2201	3070 Data Terminal Verification	72	110
#TXTDO	2201	- Loader Command File	73	111
%TXTD1	2201	3075A/76A/77A Verification	74	112
%TXTD2	2201	- Segment 1	75	113
%TXTD3	2201	- Segment 2	76	114
%CFTML	2201	- Segment 3	77	115
%IWRZZ	2201	- Segment 4	78	116
%IMPTM	2201	- Segment 5	79	117
$XXTD1	2201	- Library	80	120
#TXTD1	2201	- Loader Command File	81	121
%TXMV1	2201	7906H/20H/25H ICD Disc and 1303 Controller Disc Verification	82	122
#TXMV1	2201	- Loader Command File	83	123
%TXPF1	2201	F-Series HFP Processor Diagnostic	84	124
%RODSK	2201	- Subroutine	85	125
#TXPF1	2201	- Loader Command File	86	126
%TXPF2	2201	F-Series SIS Diagnostic	87	127
%RODTK	2201	- Subroutine	88	130
#TXPF2	2201	- Loader Command File	89	131
%TXPF3	2201	RTE IVB EMA Diagnostic	90	132
#TXPF3	2201	- Loader Command File	91	133
%TXPF4	2201	F-Series VIS Diagnostic	92	134
#TXPF4	2201	- Loader Command File	93	135
%VMACK	2201	RTE-6/VM VMA Diagnostic	94	136
#VMACK	2201	- Loader Command File	95	137
%VIS06	2201	RTE-6/VM VIS Diagnostic	96	140
#VIS06	2201	- Loader Command File	97	141

General Error Messages

In all test programs directed to I/O devices, the proper LU number assignments are tested along with the operational status of the device. The following notes, information, and error messages therefore apply, in general, to the I/O related tests.

Note 1: TXXXX - LU n: NOT ASSIGNED, NOT TESTED!

This is an information message issued when the test device LU specified in the program run command is found assigned to EQT 0. All diagnostic and verification programs assume that any logical unit number assigned to EQT 0 means that no testing of the device is desired.

Note 2: TXXXX - LU n IS NOT ASSIGNED TO A DEVICE. RERUN TEST SPECIFYING CORRECT LU.

This is an information message issued when the LU specified for the test device is assigned to a device driver different than the driver required by the test program. The operator or system manager must verify that the LU specified for the test is correct.

Note 3: TXXXX - LU n: EQT OR LU FOR DEVICE IS DOWN. UP EQT AND RERUN TEST.

This is an information message issued when the initial status check on the device shows the device to be down. The operator or system manager should verify that the device switches and control settings have been properly set and then issue one of the following commands to declare the device UP.

System command: *UP,<EQT number of device>

FMGR command: :SYUP,<EQT number of device>

The EQT can be found by using one of the following commands. The appropriate RTE-IVB or RTE-6/VM Programmers Reference Manual, HP Part No. 92068-90004 or 92084-90005 respectively should be consulted for more details of these commands.

System command: *LU,<LU number of device>

FMGR command: :SL,<LU number of device>

For each of these commands the operating system issues the following message:

SLU (lu) = LU (system lu) = E (eqt) S (subchannel) (device status)

If the LU's device is DOWN, a D is printed for (device status), otherwise the position is left blank.

Note 4: TXXXX - LU n SPECIFIED FOR DEVICE d IS NOT ASSIGNED TO
SUBCHANNEL. RERUN TEST SPECIFYING CORRECT LU.

> This message is issued if the LU assignment specifies an
> incorrect subchannel assignment for the type of test being
> performed. The operator or system manager must verify that the
> configuration of the LU is correct for the test which must be
> rerun.

Chapter 2
On-Line Diagnostic/Verification
Program Loading

General Operation

On-line diagnostic/verification program files may reside on a system
disc LU, mag tape, or 2645/48 mini-cartridge as binary relocatable
files. These programs and subroutines are loaded and linked together by
the RTE Relocating Loader prior to execution. The system manager may
wish to "SP" loaded programs and store them as type 6 memory image files
on LU 2 or 3. This will allow the programs to be run at a future time
without the need to reload the files.

Each on-line program has a corresponding loader command file. It is
recommended that the loader command file be used for program loading
since some of the programs are segmented, or require a particular
loading sequence, which is guaranteed by using the loader command file.

Disc Files

The 91711B product contains all main programs, subroutines, and
libraries in binary relocatable files. Each program has a corresponding
Loader Command File (same name as the program with a "#" as the first
character instead of "%") which will relocate all the necessary main and
subroutine sections required for diagnostic operation and search the
necessary system libraries. System libraries are not supplied with the
91711B product, so it is the system managers responsibility to ensure
that these libraries are available if required by the
diagnostic/verification program and not generated into the system.

The system manager should modify the loader command files to correspond
to the particular system generation. The loader command files contain
commands to search various system libraries. If these particular
libraries are generated into the system, the "SEARCH" commands of these
libraries should be removed from the loader command file.

For detailed operation of the RTE Loader, the appropriate section of the RTE-IVB or RTE-6/VM Programmer's Reference Manual, HP Part No. 92068-90004 or 92084-90005 respectively, should be consulted.

To load the program on-line:

  :RU,LOADER,<loader cmmnd file>,,<list output device>

Once the program is loaded, refer to the appropriate program for the RUN string parameters.

Mag Tape and Mini-Cartridge Files

If the files are not located on a disc LU, the individual files may be stored onto the disc individually from the mag tape or mini-cartridge by using the FMGR "ST" command as follows:

 1) Position the mag tape or mini-cartidge at the start of the required file.

 2) :ST,<LU #>,<disc file namr>,BR(binary relocatable) or AS(ASCII)

To load the program, run the RTE loader.

    :RU,LOADR,<loader cmmnd file>,,<list output lu>

The program UPDATE may be used to store all programs into the system disc area once all required files are available to the system.

Chapter 3
Processor On-Line
Verification Programs

Main Processor Verification (TXPM0)

The following processor instructions are tested in the following order
once each program pass. The program requires 6 pages to run and
completes in approximately two seconds per pass.

```
RSS      SOS      SOC      STO      CLO      CLE      SEZ      CCE      CME
CLA/B    SZA/B    SLA/B    CCA/B    CPA/B    STA/B    LDA/B    INA/B    CMA/B
OTA/B^   LIA/B^   MIA/B^   (^   =   to and from S-register)
STA B,I           STB A,I
LDA B,I           LDB A,I
CPA B,I           CPB A,I
JMP      JSB      JSB,I
AND      XOR      IOR      ISZ      ADA      ADB
ALS      ARS      RAL      RAR      ALR      ALF      (bits 8-6)
ALS      ARS      RAL      RAR      ALR      ALF      (bits 2-0)
ELA      ERA      (bits 8-6)
ELA      ERA      (bits 2-0)
```

Required Hardware

* HP 1000 M-Series, E-Series or F-Series Computer.

Required Software

* RTE-IVB or RTE-6/VM Operating System.
* A partition of at least 6 pages must be generated into the system.

File	File Description	Part Number
%TXPMO	Processor verification program	91711-16225
%RODFK	Processor verification subroutine	91711-16226
#TXPMO	Program TXPMO loader command file	91711-17001

*Required but not supplied with the 91711B package

Program Execution

    :RU,TXPMO,loglu,#passes

            loglu is the LU for logging information and error messages

            #passes is the number of times to cycle through the
                    processor during the test

No operator interaction is required. This program can be run in a
system environment with other programs scheduled and running.

Information Messages

    TXPMO - PROCESSOR TEST RUNNING
    TXPMO - PROCESSOR TEST FINISHED, n ERRORS
            (n = number of errors encountered)

Error Messages

    TXPMO - I/O INST. GROUP FAILURE
    TXPMO - ALTER/SKIP INST. GROUP FAILURE
    TXPMO - SHIFT/ROTATE INST. GROUP FAILURE
    TXPMO - MEMORY REF. INST. GROUP FAILURE
    TXPMO - EAU INST. GROUP FAILURE

If a failure occurs, perform the associated instruction group off-line diagnostic (Diagnostic Configurator compatible diagnostics, 24396A/F or 24998-14002 diagnostic libraries). If the instruction group off-line passes and the on-line verification program continues to fail, the problem may be related to simultaneous operations being performed in the CPU. Check for simultaneous DMA/CPU operations and run the DMA off-line diagnostic.

Processor Memory Verification (TXPM1, TXPM2, TXPM3)

This test verifies the presence of all memory modules assigned to partitions and runs a pattern test on all memory found to be present. In the event of a parity error, the standard parity error message from the operating system will be logged on the log device and any partitions containing reproducible parity errors will be removed from use by the operating system.

This verification test can be run in a system environment even when other programs are scheduled or executing. The father module, TXPM1, is responsible for determining which partitions are to be tested and then scheduling the appropriate son (TXPM2 or TXPM3) for execution in that partition. This process is repeated for partitions 1 through N, where N is the number of partitions defined at generation time (returned to TXPM1 by NPART).

TXPM2 will be scheduled for all partitions ranging in size from 2 to 28 pages. TXPM1 performs the following:

* unassign TXPM2
* adjust the size of TXPM2 to fit any partition
* assign TXPM2 to the partition under test
* size TXPM2 to the partition size
* schedule TXPM2

TXPM2 then checks memory from the end of its logical address space to the end of the partition using a complementing bit pattern (125252B, 052525B, 177777B, 000001B, 000000B). If a parity error occurs, the operating system will try to recreate the parity error and take appropriate action based upon the results (hard or soft parity error). In either case TXPM2 will be aborted, returning control to TXPM1 which will continue testing the next partition.

TXPM3 will be scheduled for all MOTHER partitions or partitions greater than 28 pages in size. TXPM1 performs the following:

* assign TXPM3 to the partition under test
* schedule TXPM3

TXPM3, then, dynamically allocates an EMA array based upon the size of the partition being tested. TXPM3 maps in 1K segments of the EMA array;and checks each segment using a complementing bit pattern (125252B, 052525B, 177777B, 000001B,000000B). If a parity error occurs, the operating system will try to recreate the parity error and take appropriate action based upon the results (hard or soft parity error). In either case, TXPM3 will be aborted, returning control to TXPM1 which will continue testing the next partition.

```
    PROGRAM        REQUIRED PARTITION SIZE

    TXPM1          4-pages
    TXPM2          2-pages
    TXPM3          4-pages (2-pages program, 1-page mseg, 1-page EMA)
```

Required Hardware

*   HP 1000 M-Series, E-Series, or F-Series computer
    with high performance or standard performance memory.

*   If the memory system is a fault control memory system, the fault
    control option should be disabled before TXPM1 is run, otherwise,
    the fault control system will automatically correct all single bit
    parity errors. Refer to the appropriate memory system manual for
    the procedure to disable the fault control option.

Required Software

*   RTE-IVB or RTE-6/VM Operating System.
*   A partition of at least 3 pages must be generated into the system.

File	File Description	Part Number
%TXPM1	Memory verification father	91711-16227
%NPART	TXPM1 subroutines	91711-16228
%TXPM2	Memory Test son (2-28 pages)	91711-16229
%TXPM3	Memory Test son (29-N pages or MOTHER)	91711-16230
#TXPM1	Loader Command File for TXPM1	91711-17002
#TXPM2	Loader Command File for TXPM2	91711-17003
#TXPM3	Loader Command File for TXPM3	91711-17004

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXPM1  [,loglu,#passes]
```

    loglu is the LU for logging information and error messages

    #passes is the number of times the program is to run

Execution time is approximately one second per 32K partition. Execution time may be excessively long if another program is currently executing in the partition to be tested and is not in a swappable state or has a higher priority than TXPM2 or TXPM3.

Test Information Messages

```
TXPM1 - MEMORY TEST RUNNING
TXPM2 - TESTING PARTITION  1. PAGES    64 -  .76
TXPM2 - TESTING PARTITION  2. PAGES    77 -   82
TXPM2 - TESTING PARTITION  3. PAGES    83 -   84
TXPM2 - TESTING PARTITION  4. PAGES    85 -   86
TXPM2 - TESTING PARTITION  5. PAGES    87 -   88
TXPM3 - TESTING PARTITION  6. PAGES    89 -  238
TXPM3 - TESTING PARTITION 13. PAGES   239 -  388
TXPM3 - TESTING PARTITION 20. PAGES   389 -  420
TXPM2 - TESTING PARTITION 21. PAGES   421 -  448
TXPM2 - TESTING PARTITION 22. PAGES   449 -  476
TXPM1 - 10 PARTITIONS TESTED     0 ERRORS. END OF PASS        1.
TXPM1 - MEMORY TEST COMPLETED
```

Untested Memory

TXPM1 will not test the following memory:

    * Undefined partitions
    * Downed partitions (by parity errors)
    * Subpartitions- these will be checked as part of a MOTHER

Test Error Messages

Should a parity error occur, the operating system takes over and obtains the logical address of the bad memory location. The physical address however, depends on which of the memory maps was enabled at the time of the parity error.

The operating system tries to recreate the parity error by reading the logical address with each of the memory maps enabled in turn. If the parity error cannot be recreated, it is termed a "soft error" and the following error messages are reported:

```
PE at mmmmm
DMS STAT = zzzzz
```

     mmmmm = logical address of the parity error.
     zzzzz = Dynamic Mapping System status register.

If the parity error can be recreated by the operating system it is termed a "hard error" and the following error messages are reported:

```
PE PG# nnnnn BAD
ABE aaaaa bbbbb e
XYO xxxxx yyyyy o
PE ppppp mmmmm
ppppp ABORTED
```

     nnnnn = physical page with parity error
     ABE = A,B, & E registers at time of parity error
     XYO = X,Y, & O registers at time of parity error
     ppppp = program name
     mmmmm = logical address of parity error

If TXPM2 is attempting to test non-existent memory (board removed or bad jumper settings) it will report:

```
 TXPM1 - ATTEMPT TO TEST NON EXISTENT MEMORY
```

If problems occur in assigning/unassigning program TXPM2 or TXPM3 to/from a partition or adjusting the size of TXPM2 or TXPM3 to fit a partition (except for the partitions that cannot be tested i.e. undefined, downed or shareable EMA partitions) then TXPM1 will report:

```
 TXPM1 - MEMORY TEST ABORTED
```

and stop.

Supported Firmware Identification (TXPF0)

The program performs a number of checks on the firmware which is installed in the computer. The program first executes the self-test which verifies the presence or absence of the following firmware modules:

```
    HFP - Hardware Floating Point Processor
    FFP - Fast FORTRAN Processor
    SIS - Scientific Instruction Set
    VIS - Vector Instruction Set
    DBI - Double Integer Instructions
    EMA - Extended Memory Area
    DIS - Distributed Systems (DS/1000 IV)
    VMA - Virtual Memory Area
```

If there are no failures during the firmware verification program, the program writes a table noting the presence or absence of each of the above firmware modules and the revision code of each firmware module present.

The following is a list of the current revisions which should be reported by the test if the latest firmware is installed.

```
    MODULE HFP WITH REV NUMBER 2       INSTALLED      (F-Series only)
    MODULE FFP WITH REV NUMBER 4       INSTALLED      (F-Series FFP)
  * MODULE FFP WITH REV NUMBER 1       INSTALLED      (E-Series FFP)
    MODULE SIS WITH REV NUMBER 4       INSTALLED      (F-Series only)
    MODULE VIS WITH REV NUMBER 3       INSTALLED      (F-Series only)
    MODULE DBI WITH REV NUMBER 4       INSTALLED      (F-Series only)
    MODULE EMA WITH REV NUMBER 1       INSTALLED      (E or F-Series)
    MODULE DIS WITH REV NUMBER 1913    INSTALLED      (E or F-Series)
    MODULE VMA WITH REV NUMBER 2       INSTALLED      (E or F-Series)
```

   * This rev is not unique for the E-Series computer. All released versions of E-Series FFP will return this rev code.

Table 3-1 is a cross reference between firmware revision numbers and ROM part numbers.

If any of the firmware sets fails one of the simple tests, an error message is issued and the program executes a STOP 11.

The program next checks for certain incompatible combinations of firmware (certain F-Series base set and FFP combinations, and SIS or VIS installed in an E-Series computer), and if any exist, the program issues an error message and executes a STOP 12.

The program next attempts to verify that all firmware entry points declared at system generation time match those contained in the installed firmware. Any errors or omissions are reported by the program which completes running by executing a STOP 77. For example, if a routine exists in firmware but was not RP'd in at system generation, this discrepancy will be reported by TXPFO.

Required Hardware

* HP 1000 E-Series or F-Series computer or computer system

Required Software

* HP RTE-IVB or RTE-6/VM Operating System
* A partition of at least 9 pages must be generated into the system.

File	File Description	Part Number
%TXPFO	Firmware verification program	91711-16231
%RPTBL	Table of entry points	91711-16232
%MORFE	Subroutine to determine M or E/F	91711-16233
%FFPVF	Subroutine to verify FFP	91711-16234
%HFPVF	Subroutine to verify HFP	91711-16235
%SISVF	Subroutine to verify SIS	91711-16236
%EMAVF	Subroutine to verify EMA	91711-16237
%DISVF	Subroutine to verify DS/1000	91711-16238
%VISVF	Subroutine to verify VIS	91711-16239
#TXPFO	TXPFO loader command file	91711-17005

*Required but not supplied with the 91711 package

NOTE

The program assumes that the routine .CFER is not present in E-Series FFP, since it is only contained in the current FFP revision. If this entry point is generated into a system containing the latest E-Series FFP firmware, TXPFO will give an error indicating that the entry point is declared but not installed, this should be ignored.

The following table summarizes the firmware entry points which are tested by TXPFO:

Entry Points Common to E and F-Series Computers

Extended Arithmetic Memory Reference

```
.DLD ,RP,104200B        .DST ,RP,104400B        .MPY ,RP,100200B
.DIV ,RP,100400B
```

Byte and Word Manipulation

```
.MVW ,RP,105777B        .CMW ,RP,105776B        .LBT ,RP,105763B
.SBT ,RP,105764B
```

Extended Memory Area

```
.EMAP,RP,105257B        .EMIO,RP,105240B        MMAP ,RP,105241B
```

Single Precision Floating Point

```
.FAD ,RP,105000B        .FSB ,RP,105020B        .FMP ,RP,105040B
.FDV .RP,105060B        IFIX ,RP,105100B        FLOAT,RP,105120B
```

Fast FORTRAN Processor Instructions

```
DBLE ,RP,105201B        SNGL ,RP,105202B        .DFER,RP,105205B
.XFER,RP,105220B        .XPAK,RP,105206B        .XCOM,RP,105215B
..DCM,RP,105216B        DDINT,RP,105217B        .GOTO,RP,105221B
..MAP,RP,105222B        .ENTR,RP,105223B        .ENTP,RP,105224B
.PWR2,RP,105225B        .FLUN,RP,105226B        .PACK,RP,105230B
$SETP,RP,105227B
```

E-Series Computer Entry Points Only

Fast FORTRAN Processor Instructions

```
.XADD,RP,105213B        .XSUB,RP,105214B        .XMPY,RP,105203B
.XDIV,RP,105204B        XADD ,RP,105207B        XSUB ,RP,105210B
XMPY ,RP,105211B        XDIV ,RP,105212B
```

F-Series Computer Entry Points Only

Single Precision Floating Point

.FIXD,RP,105104B   .FLTD,RP,105124B

Extended Precision Floating Point

.XADD,RP,105001B   .XSUB,RP,105021B   .XMPY,RP,105041B
.XDIV,RP,105061B   .XFXS,RP,105101B
.XFXD,RP,105105B   .XFTS,RP,105121B
.XFTD,RP,105125B

Double Precision Floating Point

.TADD,RP,105002B   .TSUB,RP,105022B   .TMPY,RP,105042B
.TDIV,RP,105062B   .TFXS,RP,105102B
.TFXD,RP,105106B   .TFTS,RP,105122B
.TFTD,RP,105126B

RTE-6/VM VMA ENTRY POINTS

.PMAP,RP,105240B $LOC,RP,105241B   .IMAP,RP,105250B
.IMAR,RP,105251B   .JMAP,RP,105252B   .JMAR,RP,105253B
.LPXR,RP,105254B   .LPX,RP,105255B   .LBPR,RP,105256B
.LBP,RP,105257B

Vector Instruction Set

.VECT,RP,101460B   VPIV ,RP,101461B   VABS ,RP,101462B
VSUM ,RP,101463B   VNRM ,RP,101464B   VDOT ,RP,101465B
VMAX ,RP,101466B   VMAB ,RP,101467B   VMIN ,RP,101470B
VMIB ,RP,101471B   VMOV ,RP,101472B   VSWP ,RP,101473B
.ERES,RP,101474B   .ESEG,RP,101475B   .VSET,RP,101476B
.DVCT,RP,105460B   DVPIV,RP,105461B   DVABS,RP,105462B
DVSUM,RP,105463B   DVNRM,RP,105464B   DVDOT,RP,105465B
DVMAX,RP,105466B   DVMAB,RP,105467B   DVMIN,RP,105470B
DVMIB,RP,105471B   DVMOV,RP,105472B   DVSWP,RP,105473B

Scientific Instruction Set

TAN ,RP,105320B   SQRT ,RP,105321B   ALOG ,RP,105322B
ATAN ,RP,105323B   COS ,RP,105324B   SIN ,RP,105325B
EXP ,RP,105326B   ALOGT,RP,105327B   TANH ,RP,105330B
DPOLY,RP,105331B   /CMRT,RP,105332B   /ATLG,RP,105333B
.FPWR,RP,105334B   .TPWR,RP,105335B

Double Integer Instructions

```
.DAD ,RP,105014B        .DSB ,RP,105034B        .DMP ,RP,105054B
.DDI ,RP,105074B        .DSBR,RP,105114B        .DDIR,RP,105134B
.DNG ,RP,105203B        .DIN ,RP,105210B        .DDE ,RP,105211B
.DIS ,RP,105212B        .DDS ,RP,105213B        .DCO ,RP,105204B
```

Fast FORTRAN Processor Instructions

```
.CFER,RP,105231B        ..FCM,RP,105232B        ..TCM,RP,105233B
.NGL ,RP,105214B        .BLE ,RP,105207B
```

Program Execution

```
:RU,TXPFO,loglu [,option]
```

loglu LU for logging information and error messages

option specify 'CH' to change system entry point table ($SYENT)

The program executes in approximately one second without operator intervention. TXPFO should be run stand-alone because in certain cases it will crash the system. As can be seen from the following discussion there is no UIT (Undefined Instruction Trap), so a system crash typically happens only when firmware is tested for that does not exist:

```
:RU,TXPFO,1
```

DO YOU WANT ALL TESTS PERFORMED? YE OR NO

If YE(S) is entered, then TXPFO will continue and test for the presence of all possible firmware without further questioning.

If NO is entered, TXPFO will ask what firmware you want tested (HPF, FFP, SIS, VIS, VMA, DS)? This offers you the option to selectively exclude one or more tests. This may be important because if a self-test instruction is executed and the instruction does not exist, then whatever instruction exists at that memory location will execute with unpredictable possibilities (since the existing memory instruction will not be defined). Typically the system will not crash but if it does, you should reboot and rerun TXPFO selectively excluding firmware that is not installed in your system.

If the character 'CH' is specified as the optional runstring parameter, then the system entry point table ($SYENT) and loader snapshot file will be modified to reference firmware installed in the computer but not RP'd at system generation. This is a permanent modification to your system, so should not be performed unless you are certain that this is what you want to do. If you elect to proceed with this change option, first back up the system, e.g. LSAVE LU02 and LU03. As the following example illustrates, TXPFO will, also, ask if you really want to proceed with the change option before actually incorporating it:

    :RU,TXPFO,1,CH

    DO YOU WANT ALL TESTS PERFORMED? <u>YE</u>

    ***WARNING: THE CHANGE OPTION HAS BEEN SPECIFIED

    OK TO PROCEED? (/E TO ABORT) <u>YES</u>

    (TXPFO will now execute)
        .
        .
        .

Following TXPFO, if you want to check that the modifications have been made:

    :OF,TXPFO

and reload TXPFO to get the new firmware entry points. Then, rerunning TXPFO should prove that the firmware entry points are referenced instead of their software equivalents, i.e. the message:

    "___   INSTALLED BUT NOT DECLARED"

should not be reported for the entry points that have been RP'd by TXPFO.

Note that this situation exists for any program loaded before or after running TXPFO with the change option, i.e. programs previously loaded will reference software equivalents and programs loaded after the change option will now reference the firmware routines.

Test Information Messages

```
TXPFO - MODULE xxx WITH REV NUMBER nnnn INSTALLED
TXPFO - MODULE xxx NOT INSTALLED
TXPFO - WARNING - ENTRY POINT zzz INSTALLED BUT NOT DECLARED
TXPFO - FIRMWARE VERIFICATION SUCCESSFUL
TXPFO : STOP 77     (Successful Program Completion)
```

Test Error Messages

```
TXPFO - PROGRAM CAN ONLY RUN IN AN E OR F MACHINE
TXPFO - VERIFICATION FAILURE IN FIRMWARE MODULE xxx
TXPFO - ERROR. MODULE xxx INCOMPATIBLE WITH MODULE yyy
TXPFO - ERROR - ENTRY POINT sss DECLARED AS ttt, SHOULD BE uuu
TXPFO - ERROR - ENTRY POINT sss DECLARED ttt BUT NOT INSTALLED
TXPFO : STOP 10    (Error halt, program run on an M machine)
TXPFO : STOP 11    (Error halt, firmware is faulty. Run the
                    appropriate on-line or off-line diagnostic)
TXPFO : STOP 12    (Error halt, firmware incompatible)
```

Table 3-1. Firmware Rev Number to ROM P/N Cross Reference

```
HFP REV 1  ---  F-Series Base Set P/N  12740-80011 to 12740-80016
                (requires FFP REV 1 for compatibility)

HFP REV 2  ---  F-Series Base Set P/N  12740-80019 to 12740-80024
                (requires FFP REV 4 for compatibility, 8K version
                is 02117-80001 thru 02117-80003).

HPF REV 3       F-Series Base Set P/N 02117-80016 to 02117-80018
```

```
FFP REV 1  ---  Not unique.  Can be any of the following ROM sets:

                13306-80013 to 13306-80018 and 5090-0589 to 5090-0591
                (current E-Series and original F-Series)
                                -or-
                13306-80001, 13306-80012, 13306-80003 to 13306-80006,
                and 5090-0569 to 5090-0571
                                -or-
                13306-80001, 13306-80012, 13306-80003 to 13306-80006,
                and 1816-0944 to 1816-0946
                                -or-
                13306-80001 to 13306-80006 and 1816-0944 to 1816-0946

FFP REV 4  ---  F-Series FFP P/N  5090-1615 to 5090-1623
                (current F-Series)
```

Table 3-1 Cont'd. Firmware Rev Number to ROM P/N Cross Reference

```
SIS REV 1  ---  F-Series SIS P/N  12823-80001 to 12823-80006

SIS REV 3  ---  F-Series SIS P/N  12823-80007 to 12823-80012

SIS REV 4  ---  F-Series SIS P/N  12823-80013 to 12823-80018
                8K version P/N    12823-80019 to 12823-80021
```

```
VIS REV 3  ---  F-Series   VIS P/N  12824-80001 to 12824-80006
VIS REV    ---  8K version VIS P/N  12829-80007 to 12829-80009
```

```
DBI REV 4  ---  F-Series Double Integer Instructions are contained
                in the F-Series FFP ROMs REV 4.  Therefore, this rev
                will appear if REV 4 FFP is installed.  If REV 1 FFP
                is installed in an F-Series, DBI are not available
                and will not be listed.
```

```
EMA REV 1  ---  RTE-IVB EMA P/N  92067-80001 to 92067-80003
```

```
DIS REV 1913  ---  DS/1000 P/N  91740-80049 to 91740-80051 and
                   loader ROM 91740-80048

DIS REV 1826  ---  DS/1000 P/N  91740-80033 to 91740-80035 and
                   loader ROM 91740-80048

DIS REV 1813  ---  DS/1000 P/N 91740-80018 to 91740-80020 and
                   loader ROM 91740-80017

DIS REV 2003  ---  DS/1000 P/N  91740-80064 to 91740-80066
```

NOTE: Released firmware rev numbers are not necessarily sequentially
       numbered.

Chapter 4
Peripheral On-Line
Verification Programs

7900/06/20/25 Disc Verification (TXMV0)

This test verifies the correct operation of the disc and file manager
for any chosen and legal disc LU that is available to the terminal
running the program. A type 1 file called TXM0X is created for test
data on the selected LU. This file is then opened, three records are
written to the file, the data is read and verified, and the file is
then closed and purged.

Required Hardware

* HP 1000 M-Series, E-Series, or F-Series Computer.
* HP 7900, 7906/20/25 Discs with 13037B Disc Controller.
* HP 7908/11/12 CS80 Disc Drive

Required Software

* RTE-IVB or RTE-6/VM Operating System with the correct
  driver for the corresponding disc type.
* A partition of at least 10 pages must be generated into
  the system.

File	File Description	Part Number
%TXMV0	Disc memory verification program	91711-16240
#TXMV0	Program TXMV0 loader command file	91711-17006

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXMVO,loglu,disclu
```

 loglu is the LU for logging information and error messages

 disclu is the legal disc LU for testing

The program executes in approximately 2 seconds per disc LU to be tested. No operator interaction is required. The program may be run in a system environment with other programs scheduled and running.

Test Information Message

```
TXMVO - LU# n: DISC TEST RUNNING
TXMVO - LU# n: DISC TEST FINISHED m ERRORS
TXMVO - LU# n: DISC TEST ABORTED!
```

Test Error Messages

```
TXMVO - LU# n: NOT ASSIGNED, NOT TESTED!
         (See general error note 1.)
TXMVO - LU# SPECIFIED FOR DISC IS ILLEGAL.
         RERUN TEST SPECIFYING CORRECT LU#.
TXMVO - LU# n IS NOT ASSIGNED TO A DISC.
         RERUN TEST SPECIFYING CORRECT LU#.
         (See general error note 2.)
TXMVO - LU# n: EQT OR LU FOR TEST DISC IS DOWN.
         UP EQT AND RERUN TEST.
         (See general error note 3.)
TXMVO - LU# n: CARTRIDGE NOT MOUNTED.
         MOUNT CARTRIDGE AND RERUN TEST.
         (Mount this LU if it is to be tested.)
TXMVO - LU# n: NO ROOM ON DISK FOR TEST FILE.
         (Use the PU and PK commands to create disc space
          for the test file.  See Batch Spool Monitor Manual.)
TXMVO - LU# n: CREATED FILE TXMOX IS WRONG TYPE. TYPE = y
         (Use the PU command to purge TXMOX.)
TXMVO - LU# n: ERROR CREATING FILE TXMOX. ERROR = x
         (See Batch Spool Monitor Manual for error number.)
TXMVO - LU# n: ERROR OPENING FILE TXMOX. ERROR = x
         (See Batch Spool Monitor Manual for error number.)
TXMVO - LU# n: ERROR READING FILE TXMOX. ERROR = x
         (See Batch Spool Monitor Manual for error number.)
```

```
TXMVO - LU# n: ERROR CLOSING FILE TXMOX. ERROR = x
          (See Batch Spool Monitor Manual for error number.)
TXMVO - LU# n: ERROR WRITING FILE TXMOX. ERROR = x
          (See Batch Spool Monitor Manual for error number.)
TXMVO - LU# n: READ-WRITE DATA DOES NOT VERIFY ON FILE TXMOX.
          (Repeat the test.  If error persists, run off-line
           disc diagnostic.)
TXMVO - LU# n: DISC HARDWARE ERROR
          (This may occur when testing an illegal LU. If LU
           is legal and error persists, run the off-line
           disc diagnostic.)
TXMVO - LU# n: DISC TEST ABORTED!
TXMVO - LU# n: DUPLICATE FILE TXMOX. ERROR = x
          (See Batch Spool Monitor Manual for error number.)
          (Rename or purge existing file before re-running the test.)
TXMVO - LU# n: ERROR PURGING FILE TXMOX. ERROR = x
          (See Batch Spool Monitor Manual for error number.)
```

The following error messages are issued as a result of a disc status failure and may serve to guide the System Manager in the correct analysis of the verification test results.

```
TXMVO - LU# n: PROTECT SWITCH SET
TXMVO - LU# n: DRIVE FORMAT SWITCH SET
TXMVO - LU# n: HARDWARE FAULT
TXMVO - LU# n: FLAGGED TRACK PROTECTED
TXMVO - LU# n: SEEK CHECK
TXMVO - LU# n: NOT READY
TXMVO - LU# n: DEVICE BUSY
TXMVO - LU# n: ERROR EXISTS
TXMVO - LU# n: ADDRESS ERROR
TXMVO - LU# n: DATA ERROR
TXMVO - LU# n: UNDEFINED STATUS BIT
TXMVO - LU# n: DISC HARDWARE ERROR
```

7970 Mag Tape Verification (TXMT0)

This test verifies correct operation of the essential read, write, and control functions of the 7970 Mag Tape Unit. Records of varying lengths will be written, read and verified on a scratch mag tape.

Required Hardware

* HP 1000 M-Series, E-Series, or F-Series Computer.
* HP 7970B or 7970E Mag Tape unit with corresponding interface card.

Required Software

*   RTE-IVB or RTE-6/VM Operating System.
*   Driver DVR23.
*   A partition of at least 9 pages must be generated
    into the system.

File	File Description	Part Number
%TXMT0	7970 mag tape verification	91711-16243
#TXMT0	Program TXMT0 loader command file	91711-17009

*Required but not supplied with the 91711B package

Program Execution

   :RU,TXMT0,ilu,tstlu,#passes

        ilu is the operator console LU

        tstlu is the LU of the Mag Tape unit to be tested

        #passes is the number of test passes (default is one)

The test will prompt the operator to mount a scratch tape with the write ring on it. The remainder of the test requires no operator interaction. The program may be run in a system environment with other programs scheduled and running.

Test Information Messages

```
TXMT0 - LU# n:  MAG TAPE RUNNING
TXMT0 - LU# n:  MAG TAPE TEST FINISHED m ERRRORS
TXMT0 - LU# n:  MAG TAPE TEST ABORTED!
TXMT0 - LU# n:  MOUNT MAG TAPE WITH WRITE RING ON TEST
                UNIT AND SET UNIT ON-LINE
                TYPE /C TO CONTINUE OR /A TO ABORT TEST.
```

Test Error Messages

```
TXMT0 - LU# n: NOT ASSIGNED, NOT TESTED!
         (See general error note 1.)
TXMT0 - LU# n SPECIFIED FOR MAG TAPE INTERFACE IS ILLEGAL.
         RERUN TEST SPECIFYING AN INTEGER >0
         AND <64 FOR LU#.
TXMT0 - LU# n IS NOT ASSIGNED TO MAG TAPE
         RERUN TEST SPECIFYING CORRECT LU#.
         (See general error note 2.)
TXMT0 - LU# n: EQT OR LU FOR TEST MAG TAPE IS DOWN.
         UP EQT AND RERUN TEST.
         (See general error note 3.)
TXMT0 - LU# n: TEST MAG TAPE UNIT OFF-LINE.
         SET UNIT ON-LINE AND RERUN TEST
TXMT0 - LU# n: READ/WRITE DATA DOES NOT VERIFY!
         (Rerun the test and if error persists, run the
          mag tape off-line diagnostic.)
TXMT0 - LU# n: NO WRITE RING ON SCRATCH TAPE!
         INSTALL WRITE RING AND UP EQT FOR
         MAG TAPE.  TEST WILL CONTINUE.
TXMT0 - LU# n: HARDWARE ERROR, STATUS = xxxxxx
         (See Mag-tape installation and reference manual.)
TXMT0 - LU# n: PARITY/TIMING ERROR!
         (Run the mag tape off-line diagnostic.)
TXMT0 - LU# n: MAG TAPE COULD NOT BE LOCKED!
         (The resource numbers are all taken. Rerun the test when
          the system is less busy.)
TXMT0 - LU# n: NO RESOURCE NUMBER AVAILABLE!
         (The resource numbers are all taken. Rerun the test when
          the system is less busy.)
TXMT0 - LU# n: MAG TAPE ALREADY LOCKED!
TXMT0 - LU# n: MAG TAPE TEST ABORTED!
TXMT0 - LU# n: EXPECTED ZERO TRANSMISSION LOG NOT ENCOUNTERED!
TXMT0 - LU# n: TRANSMISSION LOG = NNN
TXMT0 - LU# n: TEST STEP xxx
         (Step # and description follow)
         1.   Rewind
         2.   Test write ring status
         3.   Test start of tape (SOT) status
         4.   Write record, length equal 1024 words
         5.   Write record, length equal 512 words
         6.   Write record, length equal 256 words
         7.   Write end of file record
         8.   Write record, length equal 1024 words
         9.   Write record, length equal 512
         10.  Write record, length equal 256 words
```

11. Write end of file record
12. Rewind
13. Test status=SOT
14. Read record
15. Verify record
16. Read record
17. Verify record
18. Read record
19. Verify record
20. Read record
21. Verify end of file status
22. Read record
23. Verify record
24. Read record
25. Verify record
26. Read record
27. Verify record
28. Read record
29. Verify end of file status
30. Backward space record
31. Backward space record
32. Read record
33. Verify record
34. Read record
35. Verify end of file status
36. Rewind
37. Verify start of tape status
38. Forward space file
39. Verify end of file status
40. Read record
41. Verify record
42. Backward space file
43. Verify end of file status
44. Rewind
45. Read record
46. Backspace record
47. Read record
48. Verify record
49. Rewind
50. Verify start of tape status
51. Erase 32 inches of tape
52. Rewind
53. Read record
54. Verify zero length xmission log
55. **Terminate Test**

```
TXMTO - LU# N: TEST INDEX xxx
        (index # and description follow)
        1.   Rewind
        2.   Write record
        3.   Verify data buffer
        4.   No operation
        5.   Backward space record operation
        6.   Forward space record operation
        7.   Check status for write ring
        8.   Check status for end of file
        9.   Read record from tape
       10.   Check status for SOT (start of tape)
       11.   Forward space file
       12.   Backward space file
       13.   **Terminate Test**
       14.   Erase 32 inches of tape
       15.   Verify zero length xmission log
TXMTO - COMPLETED LOOP NUMBER xxx
```

Printer Verification (TXWL0)

This test will verify the correct operation of any line printer using DVA12 or DVB12. Additionally, the program will run in an interactive diagnostic mode which will allow the user to run a selected test repeatedly. The test menu includes special tests for the 2608A and the 2619.

Required Hardware

* HP 1000-Series Computer.
* HP 2608, 2617, 2619, or 2631 line printer.

Required Software

* RTE-IVB or RTE-6/VM Operating System.
* DVA12 for the 2608, or DVB12 for the 2619 or 2617.
* A partition of at least 12 pages must be generated into the system.

File	File Description	Part Number
%TXWLO	Line Printer Verification	91711-16263
#TXWLO	TXWLO Loader Command File	91711-17010

*Required but not supplied with the 91711B package

Program Execution

TXWLO is a single main routine which accepts the following input parameters.

        :RU,TXWLO,ilu,[op],tstlu,[prntc],[vfct]

    ilu   is the operator console logical unit.

    op   is the program mode selection:

                1)   1 for the verification mode.
                2)   2 for the diagnostic mode.

    tstlu   is the logical unit number of the line printer
                under test.

    prntc   is the line printer specification.

                1)   1 for the 2608A
                2)   2 for the 2619A
                3)   3 for the standard line printer
                     under DVA12.

    vfct   is the VFC tape code. (Applicable to the
                2619 only).

                1)   0 defaults to 0 and signifies that a 12
                     channel VFC tape is installed on the 2619
                     printer under test.
                2)   1 if an 8 channel VFC tape is installed on
                     printer under test.

NOTE: prntc and op can be omitted and the program will request them
       as a default.

The program mode specified by the OP parameter will allow the
operator to run in either verification or diagnostic mode. The
verification mode is used to verify the correct operation of a line
printer in a minimal amount of time. This mode allows the operator
to run all tests, that are currently available for the line printer,
in a single run. The verification mode requires no operator
interaction after initialization (see following section).

Test Information Messages

```
TXWLO - LU# n:   IS PRINTER A 2608A (Y OR N)?
                 (Operator must respond.)
TXWLO - LU# n:   DOT MATRIX TEST RUNNING
TXWLO - LU# n:   PING-PONG TEST RUNNING
TXWLO - LU# n:   SELF TEST -- PRINT VERSION RUNNING
TXWLO - LU# n:   DOUBLE SIZE PRINT TEST RUNNING
TXWLO - LU# n:   CHARACTER & LINE SPACE TEST RUNNING
TXWLO - LU# n:   CHARACTER & LINE SPACE TEST FINISHED
TXWLO - LU# n:   TYPE /C TO CONTINUE NEXT TEST OR
                 TYPE /A TO ABORT THIS TEST:
                 (Operator must respond.)
TXWLO - LU# n:   CONTROL FUNCTION TEST RUNNING
TXWLO - LU# n:   LINE PRINTER TESTS FINISHED
```

In the diagnostic mode the operator may repeatedly execute a selected
test. The operator may specify the number of times to repeat a
program. This mode is particularly useful in troubleshooting
hardware faults.

Upon initialization, the diagnostic program offers a menu selection
for the lineprinter from which any of the available tests can be
selected (see following section). Exit is provided by entering EX,
EN or /E. if the program is not aborted here it will prompt the
operator to enter a value for the number of times to run the test.
Any value betwen 1 and 99 will acceptable. After completion, any new
test may be selected and run. This will continue until EN, EX or /E
is entered at the test specification stage. The only way to abort
during the execution of the test is through the use of breakmode
commands.

Initially, the operator should be sure that the line printer is
on-line and that line printer paper is loaded into the printer. Any
operator interaction that may be necessary must be entered from the
operator console LU specified in the runstring. TXWLO can be run in
a system environment with other programs scheduled and running.

TXWL0 Line Printer Test

The following is a list of line printer tests currently available:

NO.	TEST
01	DOT MATRIX TEST
02	PING/PONG READ/WRITE TEST
03	PRINT VERSION OF SELF TEST
04	DOUBLE SIZE PRINT TEST
05	STATUS READBACK AND OUTPUT TEST
06	12 CHANNEL VFC TEST *
07	CHARACTER AND LINE SPACE TEST

NO.	TEST
01	RIPPLE PRITN TEST
02	DATA LINES (SENSITIVE BIT) TEST
03	HAMMER ALIGNMENT TEST
04	12 CHANNEL VFC TEST *
05	CHARTER AND LINE SPACE TEST

STANDARD PRINTER TEST

NO.	TEST
01	CHARACTER AND LINE SPACE TEST
02	8 CHANNEL VFC TEST *

For a complete description of the function of each VFC Channel
Number, refer to the appropiate Line Printer manual.

Information Messages

```
TXWL0 - LU N:  DOT MATRIX TEST RUNNING, PASS xx
TXWL0 - LU N:  PING-PONG READ/WRITE TEST RUNNING, PASS xx
TXWL0 - LU N:  SELF TEST--PRINT VERSION RUNNING, PASS xx
TXWL0 - LU N:  DOUBLE SIZE PRINT TEST RUNNING, PASS
TXWL0 - LU N:  STATUS READBACK TEST RUNNING, PASS xx
TXWL0 - LU N:  RIPPLE PRINT TEST RUNNING, PASS xx
TXWL0 - LU N:  SENSITIVE BIT TEST RUNNING, PASS xx
TXWL0 - LU N:  HAMMER ALIGNMENT TEST RUNNING, PASS xx
TXWL0 - LU N:  2608/2619 VFC TEST RUNNING, PASS xx
TXWL0 - LU N:  CHARACTER AND LINE SPACE TEST RUNNING, PASS xx
TXWL0 - LU N:  LINE PRINTER TEST FINISHED
TXWL0 - LU N:  LINE PRINTER TESTS EXITED!
TXWL0 - LU N:  LINE PRINTER TESTS ABORTED!
```

Error Messages

```
TXWLO - LU N: NOT ASSIGNED, NOT TESTED!
   (See general error note 1.)
TXWLO - LU N: SPECIFIED FOR LINE PRINTER IS ILLEGAL
   RERUN TEST SPECIFYING AN INTEGER >0
   AND <64 FOR LU#.
 TXWLO - LU N: IS NOT ASSIGNED TO A LINE PRINTER.
   RERUN TEST SPECIFYING CORRECT LU#.
   (See general error note 2.)
TXWLO - LU N:  EQT OR LU FOR TEST PRINTER IS DOWN.
   UP EQT AND RERUN TEST.
TXWLO - LU N:  ILLEGAL LINE PRINTER CODE SPECIFIED AT RUN TIME.
TXWLO - LU N:  ILLEGAL LIME PRITNER CODE.
TXWLO - LU N:  ILLEGAL PROGRAM MODE SPECIFIED AT RUN TIME.
TXWLO - LU N:  ILLEGAL PROGRAM MODE.
TXWLO - LU N:  IlLEGAL TEST NO.
TXWLO - LU N:  ILLEGAL REPEAT VALUE.
```

Interactive Messages

```
        LINE PRINTER CODES

        PRINTER        CODE
         2608          1
         2619          2
         STANDARD      3
         EXIT          /E,EN,EX
```

PLEASE ENTER PRINTER CODE?

This message will be printed out requesting an input for the type of printer under test.

PLEASE ENTER:

```
     1 FOR THE VERIFICATION PACKAGE
     2 FOR THE DIAGNOSTIC PACKAGE?
```

This message requests the mode designation input.

2645/48 Point to Point Terminal Verification (TXTT0)

Keyboard and display are tested by operator responses to program
prompt messages. Read, write and control operations will be tested
on a scratch mini-cartridge in each cartridge tape unit (CTU).

Required Hardware

* HP 1000 M-Series, E-Series, or F-Series Computer.
* HP 2645, or 2648 terminal (The program can be run on a 2621
  terminal if only the keyboard/display test is run).

Required Software

* RTE-IVB or RTE-6/VM Operating System.
* DVA05 or DVR05 as required by the terminal.
* A partition of at least 9 pages must be generated into
  the system.

File	File Description	Part Number
%TXTT0	2645/48 Terminal Verification	91711-16245
#TXTT0	TXTT0 Loader Command File	91711-17011

*Required but not supplied with the 91711B package

Program Execution

:RU,TXTT0,loglu,k,l or M,r

    loglu is the LU for logging information and error messages

      k is the keyboard/display LU (always required)

      l is the left cartridge tape unit LU (0 if N/A)

M specifies the menu mode

r is the right cartridge tape unit LU (not
    required if M is specified as previous parameter,
    0 if N/A).

The program requires operator interaction at the terminal to be tested. This test runs in one (of two) modes specified in the run command.

The automatic mode allows the operator to test the keyboard/display and the left or the right CTU by entering the appropriate LU#'s in the run command as specified above. Following the completion of all the specified tests, the main program will terminate.

The menu mode allows the operator to interactively select the tests he wishes to run. The operator will be prompted with a list of tests and their related test codes: keyboard/display(/K), left CTU(/L), right CTU(/R).

The main program returns to the menu after the selected test completes, and prompts the operator to select the next test, or to end the testing (/E).

Keyboard/Display Test

The user is prompted to type a character string. Care should be taken to type the string exactly as shown, including the imbedded blank, then press the return key. If an error occurs in this portion of the test, rerun the test checking for any operator input errors.

Cartridge Tape Unit Test (CTU)

The user must insert a 'scratch' mini-cartridge into the appropriate tape drive as prompted by the test. Care should be taken to move the RECORD tab to the record position and then to the protect position as prompted by the test. In the menu mode, the test requests the CTU LU#.

No other operator interaction is required for this portion of the test.

Test Information Messages

```
TXTTO - LU# n: TERMINAL TEST RUNNING
TXTTO - LU# n: TERMINAL TEST FINISHED
TXTTO - LU# n:
        TYPE THE FOLLOWING CHARACTERS, THEN PRESS
        THE RETURN KEY.  THE CHARACTERS SHOULD ECHO
        ON THE TEST DISPLAY AS THEY ARE TYPED.
        U*3LG8 =
TXTTO - LU# n:
        THERE SHOULD BE 5 LINES OF SPACE BETWEEN THIS LINE...
        ...AND THIS LINE
TXTTO - LU# n: KEYBOARD DISPLAY TEST COMPLETED
TXTTO - LU# n:
        INSERT 'SCRATCH' CARTRIDGE WITH RECORD TAB SET TO
        RECORD INTO LEFT CTU SLOT. TYPE /C TO CONTINUE WITH
        CTU TEST OR TYPE /A TO ABORT THIS TEST:
TXTTO - LU# n: LEFT CTU TEST COMPLETED
TXTTO - LU# n:
        INSERT 'SCRATCH' CARTRIDGE WITH RECORD TAB SET TO
        RECORD INTO RIGHT CTU SLOT. TYPE /C TO CONTINUE WITH
        CTU TEST OR TYPE /A TO ABORT THIS TEST:
TXTTO - LU#n: RIGHT CTU TEST COMPLETED
TXTTO - TERMINAL TEST RUNNING
TXTTO - TERMINAL TEST MENU
        THE FOLLOWING TERMINAL TESTS CAN BE SELECTED BY
        ENTERING THE CORRESPONDING TEST CODES:

              TEST                      TEST CODE
              ----                      ---------
        1) KEYBOARD/DISPLAY TEST          /K
        2) LEFT CTU TEST                  /L
        3) RIGHT CTU TEST                 /R
        4) END TEST                       /E

TFTTO - ENTER THE CODE FOR THE TERMINAL TEST YOU WISH TO RUN:
TXTTO - TERMINAL KEYBOARD/CRT TEST
TXTTO - LEFT CTU TEST
TXTTO - WHAT IS LEFT CTU LU#?
TXTTO - RIGHT CTU TEST
TXTTO - WHAT IS RIGHT CTU LU#?
```

Test Error Messages

```
TXTT0 - NO LU WAS SPECIFIED FOR TEST KEYBOARD/DISPLAY
        RERUN TEST SPECIFYING AN LU# FOR TEST KEYBOARD/DISPLAY
TXTT0 - TERMINAL TEST ABORTED!
TXTT0 - NO TEST LU NUMBERS SPECIFIED
        TXTT0 ABORTED!
TXTT0 - LU# SPECIFIED FOR KEYBOARD/DISPLAY IS ILLEGAL.
        RERUN TEST SPECIFYING AN INTEGER >0 AND <64 FOR LU#.
TXTT0 - LU# SPECIFIED FOR LEFT CTU IS ILLEGAL.
        RERUN TEST SPECIFYING AN INTEGER >0 AND <64 FOR LU#.
TXTT0 - LU# SPECIFIED FOR RIGHT CTU IS ILLEGAL.
        RERUN TEST SPECIFYING AN INTEGER >0 AND <64 FOR LU#.
TXTT0 - LU# n SPECIFIED FOR KEYBOARD/DISPLAY IS NOT ASSIGNED
        TO 2645/2648 TERMINAL. RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 2.)
TXTT0 - LU# n SPECIFIED FOR LEFT CTU IS NOT ASSIGNED TO
        2645/2648 TERMINAL. RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 2.)
TXTT0 - LU# n SPECIFIED FOR RIGHT CTU IS NOT ASSIGNED TO
        2645/2648 TERMINAL. RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 2.)
TXTT0 - LU# n: EQT OR LU FOR TEST TERMINAL IS DOWN.
        UP EQT AND RERUN TEST.
        (see general error note 3.)
TXTT0 - LU# n: DATA ENTRY OR TRANSMISSION ERROR
        TYPE /C TO CONTINUE NEXT TEST OR /A TO ABORT THIS TEST.
        (Repeat test checking operator input for errors. If error
         persists, run terminal self-test and check all cables for
         secure connection.)
TXTT0 - LU# n SPECIFIED FOR KEYBOARD/DISPLAY NOT ASSIGNED TO
        SUBCHANNEL 0. RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 4.)
TXTT0 - LU# n SPECIFIED FOR LEFT CTU NOT ASSIGNED TO
        SUBCHANNEL 1. RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 4.)
TXTT0 - LU# n SPECIFIED FOR RIGHT CTU NOT ASSIGNED TO
        SUBCHANNEL 2. RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 4.)
TXTT0 - LU# n: LEFT CTU READ/WRITE/CONTROL TEST FAILED!
        TYPE /C TO CONTINUE NEXT TEST OR TYPE /A TO
        ABORT THIS TEST:
        (Rerun test, then try a second mini-cartridge. If error
         persists run the terminal's tape test.)
```

```
TXTTO - LU# n: RIGHT CTU READ/WRITE/CONTROL TEST FAILED!
        TYPE /C TO CONTINUE NEXT TEST OR TYPE /A TO
        ABORT THIS TEST:
        (Rerun test, then try a second mini-cartridge. If error
         persists run the terminal's tape test.)
TXTTO - LU# n: LEFT CTU WRITE PROTECT TEST FAILED!
        TYPE /C TO CONTINUE NEXT TEST OR TYPE /A TO
        ABORT THIS TEST:
        (Check that the Record tab is in the protect position. Run
         the terminal's tape test.)
TXTTO - LU# n: RIGHT CTU WRITE PROTECT TEST FAILED!
        (Check that the Record tab is in the protect position. Run
         the terminal's tape test.)
TXTTO - LU# n: TERMINAL TEST ABORTED!
```

2645/48 Multipoint Terminal Verification (TXTT1)

```
Character strings  will be sent  to and  from the terminal  to verify
proper operation of the multipoint data path.
```

Required Hardware

```
*   HP 1000 M-Series, E-Series, or F-Series Computer.
*   HP 12790A Multipoint Interface.
*   HP 2645/2648 Terminal.
```

Required Software

```
*   RTE-IVB or RTE-6/VM Operating System.
*   Multipoint Driver DVR07.
*   A partition of at least 7 pages must be generated into
    the system.
```

File	File Description	Part Number
%TXTT1	2645/48 Multipoint Verification	91711-16246
#TXTT1	TXTT1 Loader Command File	91711-17012

```
*Required but not supplied with the 91711B package
```

Program Execution

> **NOTE**
> The multipoint line must be enabled and the multipoint terminal straps must match the initialization parameters.

        :RU,TXTT1,loglu,tstlu

        loglu is the LU for logging information and error messages

        tstlu is the LU# of the terminal to be tested

The test runs in approximately 5 seconds per terminal. The test can be run in a system environment with other programs scheduled and running.

Since use of the terminal cartridge tape units as system LU numbers is not supported by Multi-point, these units are not tested by this test.

Test Information Messages

```
TXTT1 - LU# n: MP TERMINAL TEST RUNNING
TXTT1 - LU# n: MP TERMINAL TEST FINISHED m ERRORS
TXTT1 - LU# n: MP TERMINAL TEST ABORTED!
```

Test Error Messages

```
TXTT1 - LU# n: NOT ASSIGNED, NOT TESTED!
        (See general error note 1.)
TXTT1 - LU# SPECIFIED FOR MP TERMINAL IS ILLEGAL.
        RERUN TEST SPECIFYING AN INTEGER >0 AND <64 FOR LU#.
TXTT1 - LU# n IS NOT ASSIGNED TO A MP TERMINAL.
        RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 2.)
TXTT1 - LU# n: EQT OR LU FOR TEST TERMINAL IS DOWN.
        UP EQT AND RERUN TEST.
        (See general error note 3.)
TXTT1 - LU# n: MP TERMINAL COULD NOT BE LOCKED!
        (The resource numbers are all taken. Rerun the test when the
         system is less busy.)
TXTT1 - LU# n: NO RESOURCE NUMBER AVAILABLE!
        (The resource numbers are all taken. Rerun the test when the
         system is less busy.)
```

```
TXTT1 - LU# n: MP TERMINAL ALREADY LOCKED!
        (The resource numbers are all taken. Rerun the test when the
        system is less busy.)
TXTT1 - LU# n: DATA TRANSMISSION ERROR.
        (Rerun the test. If the error persists run the multi-point
        card self test.)
TXTT1 - LU# n: MP TERMINAL TEST ABORTED!
```

3070 Data Terminal Verification (TXTD0)

This program is an operator interactive program which verifies the correct functional operation for the 3070A/B series of terminals. The program will interact with the operator to send and receive numeric data and test prompt lights and switches on the selected terminal. The card reader of the 3070B will be tested by reading the two standard test cards supplied with the unit and the printer will be tested by printing out the entire character set.

Required Hardware

*   HP 1000 M-Series, E-Series, or F-Series Computer.
*   HP 40280A Serial Link Data Terminal Interface.
*   HP 3070A/B Data Terminal with standard test cards.

Required Software

*   RTE-IVB Operating System (3070 A/B terminals are not supported under RTE-6/VM)
*   A partition of at least 6 pages must be generated into the system.

File	File Description	Part Number
%TXTD0	3070 Data Terminal Verification	91711-16248
#TXTD0	TXTD0 Loader Command File	91711-17014

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXTDO,loglu,tstlu

   loglu is the LU for logging information and error messages

   tstlu is the LU of the terminal to be tested
```

 The test runs in approximately two minutes.

Operator Considerations

Once the test is started, it can then be run entirely from the 3070
terminal.

When this test is run, initially, all the prompting lights and all
the numeric display segments will be lit. Press the "delete" key, to
clear the display, and then the "enter" key to start the test. The
buzzer will beep three times if the terminal is a 3070B. There are
four possible tests.

```
        01 - Numeric keyboard test
        02 - Special function key test
        03 - Card reader test
        04 - Printer test
```

If your terminal does not have one of the features, (for example a
card reader) that particular test will be skipped.

As each test runs, the 3070 terminal test will prompt the operator
with the test number, the action required, and any errors resulting
from that action.

TEST 01

This test prompts the operator to press each of the numeric keys in
turn. For example, the display,

                         01   7

prompts the operator to press the numeric key 7.

Continue testing the numeric keys as prompted.   The test will
automatically go on to the next test when all the numeric keys have
been tested.

If an incorrect key is pressed, error E1 will result and will be displayed. Simply press the correct key to continue. If the incorrect key is pressed again, one error will be logged, and test 01 will be aborted, and test 02 will begin.

TEST 02

This test prompts the operator to press each special function key in turn. These keys are numbered differently for the 3070A and 3070B as shown below:

```
                         3070A TERMINAL
           GOLD
           KEY
            1         2         3         4         5
            6         7         8         9        10


                         3070B TERMINAL                    GOLD
                                                           KEY
                                                            1
            2         3         4         4         6
            6         8         8        10        01
```

If an incorrect key is entered, error E1 will result. Simply enter the key to continue. If too many keys are entered, error E2 (transmission log error) will result. Enter the correct key and continue.

TEST 03

This test prompts the operator to insert each of the two test cards into the card reader on the 3070B terminal. The cards are clearly labeled #1 and #2. Insert the card prompted for that test. If the card is inserted incorrectly into the reader, the reader will reject it. Turn the card to its correct orientation and re-insert it. The card reader test can be terminated by pressing the gold key, which also logs one error.

TEST 04

This test requires no interaction as it prints the entire character set on the 3070B's printer. If the printer is "off" or there is no paper in the printer, an error E6 will result, and the test will terminate. If the operator wishes to run this test, put paper in the printer and rerun TXTD0, a successful completion of all these tests is indicated by a blank display screen.

If errors have occurred at any point in these tests, the number of of those errors will be indicated. For example, if one error occurred:

                                    1E

will be displayed on the 3070 terminal.

Test Information Messages

TXTDO - LU# n: DATA ENTRY TERMINAL TEST RUNNING
TXTDO - LU# n: DATA ENTRY TERMINAL TEST FINISHED m ERRORS
TXTDO - LU# n: DATA ENTRY TERMINAL TEST ABORTED!

Test Error Messages

Errors displayed on the log device:

TXTDO - LU# n: NOT ASSIGNED, NOT TESTED!
        (See general error note 1.)
TXTDO - LU# n SPECIFIED FOR TEST TERMINAL IS ILLEGAL
        RERUN TEST SPECIFYING AN INTEGER >0 AND <64 FOR LU#.
TXTDO - LU# n IS NOT ASSIGNED TO 3070 TERMINAL.
        RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 2.)
TXTDO - LU# n: EQT OR LU FOR TEST TERMINAL IS DOWN.
        UP EQT AND RERUN TEST.
        (See general error note 3.)
TXTDO - LU# n: DATA TRANSMISSION ERROR.
        ERROR REPORTED A=xxxx, B=yyyy
        (xxxx is the contents of the A-register and yyyy is the
         contents of the B-register at the time of the error. Run the
         off-line 92900 Terminal Subsystem diagnostic)
TXTDO - LU# n: TEST ABORTED!

Errors displayed on the 3070 terminal

    E1 Input error
       (An incorrect key was pressed in response to the prompt. Press
        the correct key.)
    E2 Transmission Log error
       (Incorrect keys were pressed. Rerun the test and press the
        correct keys.)

E3 Status error
   (A hardware error. Run the 92900 Terminal Subsystem Diagnostic)
E4 Card Reader error on card #1
   (Incorrect data read from the test card. Insert correct card or
    run the 92900 Terminal Subsystem Diagnostic)
E5 Card Reader error on card #2
   (Incorrect data read from the test card. Insert correct card or
    run the 92900 Terminal Subsystem Diagnostic
E6 End of paper or printer off
   (Put paper in the 3070 Terminal's printer then rerun the test
    or turn on printer and rerun test.)

3075/76/77 Data Terminal Verification (TXTD1)

This program is an operator interactive verification program which
provides a variety of multipoint service routines as well as verifies
the functional integrity of 3075A, 3076A, and 3077A data terminals.
This program does not use session LU numbers and requires system LU
numbers since checks are made on all LU numbers for proper DVR07
assignments. Any LU having a condition incompatible with the
operation under way will generate an error message indicating the
current LU condition. Since one goal of verification is to identify
and verify the presence of terminal hardware and report any
inconsistencies or incompatibilities, the program will exercise each
available LU and EQT under test in a short space of time with as
little operator interaction as possible.

By specifying sufficient parameters in the run string, program
control is directed to a verify mode where no operator interaction is
required. If additional information not available from the run
parameters is required, prompting messages and operator data entry
transactions control the program. The interactive portion uses a
small vocabulary of ASCII character pairs to select the service
routines.

Required Hardware

* HP 1000 M-Series, E-Series, or F-Series Computer.
* 3075A/76A/77A Data Terminal.
* HP 12790A Multipoint Subsystem

Required Software

* RTE-IVB or RTE-6/VM Operating System.
* Driver DVR07.
* A partition of at least 17 pages must be generated into the system.

File	File Description	Part Number
%TXTD1	3075A/76A/77A Verification	91711-16249
%TXTD2	3075A/76A/77A Verification (segment 1)	91711-16250
%TXTD3	3075A/76A/77A Verification (segment 2)	91711-16251
%CFTML	3075A/76A/77A Verification (segment 3)	91711-16252
%IWRZZ	3075A/76A/77A Verification (segment 4)	91711-16253
%IMPTM	3075A/76A/77A verification (segment 5)	91711-16254
$XXTD1	TXTD1 Library	91711-12031
#TXTD1	Program TXTD1 Loader Command File	91711-17015
*%DECAR	Decimal string arithmetic	24306-60001

*Required but not supplied with the 91711B package

System Generation Requirements

- An initialized multipoint line LU must be present before the program is run.
- The multipoint LUs must be "ordered" (i.e. the line LU must have the lowest LU# with terminal LUs following in order).
- The select code of the multipoint interface (5061-3402) must be less than or equal to 25 octal.
- In a multidrop environment, there can be only one device per node per group ID.

Default When no Operation Code is Specified

The run parameter data determines the sequence of operations executed by the program before interactive data entry is required. Specifying an operation code (OP CODE) determines interactive operation, therefore by leaving the OP CODE parameter empty, the LU parameters direct the program sequence.

For CODE or no LU Specified

The program sequence defaults to an LU survey (SV), then completion.

For no OP CODE and a Line LU Only

The line is first reported, then the defined line LU is used to verify the line, then completion. The line verify uses the defined line LU to verify all on-line and off-line terminals, using the assigned TRML LU numbers for on-line terminal verification, and using the first dormant LU assignment to initialize the terminal, verify the terminal, and remove the terminal for all off-line terminals. If there are no dormant LU assignments and there are off-line terminals to be verified, a list of the off-line terminals is reported.

For no OP CODE and a Terminal LU Only

The LU survey is reported, then the defined terminal LU is used to verify the terminal, and then completion. The terminal verification requires a line LU in order to collect the terminal ID belonging to the same group as the terminal under test. This line LU is found by doing the LU survey. If there is more than one line in the system, the line LU defined by the LU survey will be the last line LU encountered during the survey.

For no OP CODE and a Line and Terminal LU

The line list is reported, then the defined line LU is used to verify the defined terminal, and then completion.

Program Description for Line or Terminal Verify

The "who are you" driver operation (see DVR07 Manual) is used to collect all terminal ID, and then the following checks and procedures are made using the run parameters:

1) The data in the linked EQT structure defining the line is checked to be equivalent to the data collected by the who are you operation.

    A) Any duplicate ID found in either the EQT data or the who are you data is reported in the system LU survey message.

    B) Any ID found in the WRU and not in the EQT structure is reported as an off-line terminal.

C) Any ID found in the EQT structure and not found in the WRU is reported as an error.

2) The remaining ID are checked for current LU assignments. The LU's having DVR07 EQT assignments and those DVR07 EQT's having LU assignments are then qualified for terminal status poll. Any DVR07 EQT having no assigned LU at this time is discarded.

3) As certain suitability checks and procedures on the remaining terminal LU's are complete, status polls are made on all available terminal LU's.

A) All initialized terminals are verified and reported.

B) Off-line terminal ID are initialized to the first available dormant DVR07 EQT, verified, then removed in succession until all off-line ID are completed with all results being reported.

4) Those status responses determined to belong to data terminals have verify messages sent to those terminals. The status is reported in the survey and verify tables, where the left sides of both tables show linked EQT structure data and the right show status derived data. The verify is a more concise presentation of the survey table but both are created using the same methods.

Reassignment of LU to Point to EQT 0

The first figure shows the LU to EQT assignments typically found before reassignment of a LU number:

```
                 """"""""""<---------|
LU  N1   ---->| EQT M1 |            |
line             """"""""""--->|      |
                           |      ^
                           v      |
                           |      |        All LU's have normal EQT
                 """"""""""<---|      |        assignments.  All line and
LU  N2   ---->| EQT M2 |      |        group operations are
terminal         """"""""""--->|      |        available.
                           |      |
                           v      ^
                           |      |
                 """"""""""<---|      |
LU  N3   ---->| EQT M3 |      |
terminal         """"""""""-------->|
```

The next figure shows the line LU reassignment to point to EQT 0.
The I/O interrupts occurring on EQT N continue to be serviced by
DVR07, but LU N cannot be determined since the device reference table
(DRT) is not doubly linked. For this situation, the verify programs
can be provided with the ability to accomplish line and group
operations by programmatically assigning an Lu to the line EQT. This
can be done by an interactive FMGR command :SYLU,<lu>,<eqt> prior to
running the verify program. If the verify program is run using a
line LU pointed to EQT 0, no line operations are possible, therefore
the membership consistency checks break down. It is recommended that
a line LU be pointed to EQT 0 only if there are no initialized
terminals on the line:

```
                        " "" "" "" "" "" ""
                -->|  EQT 0   |
                |   " "" "" "" "" "" ""
                |
                |   " "" "" "" "" "" ""<---------|
LU  N1 --->|  | EQT N1 |              |
line          " "" "" "" "" ""--->|           |
                             |        ^
                             v        |
                             |        |
              " "" "" "" "" "" ""<---|        |
LU  N2  ---->| EQT N2 |              |
terminal      " "" "" "" "" ""--->|           |
                             |        |
                             v        ^
                             |        |
              " "" "" "" "" "" ""<---|        |
LU  N3  ---->| EQT N3 |              |
terminal      " "" "" "" "" ""-------->|
```

                                          Line LU has EQT = 0
                                          assignment. No line or
                                          group operations are
                                          available.

The third case involves a terminal LU pointed to EQT 0. All line and group operations are available and membership consistency checking does not break down. However, the survey message and the line list message produced by the verify program does not show the terminal LU which points to EQT 0, nor does the program show any EQT currently in a linked line for which there is no LU assignment:
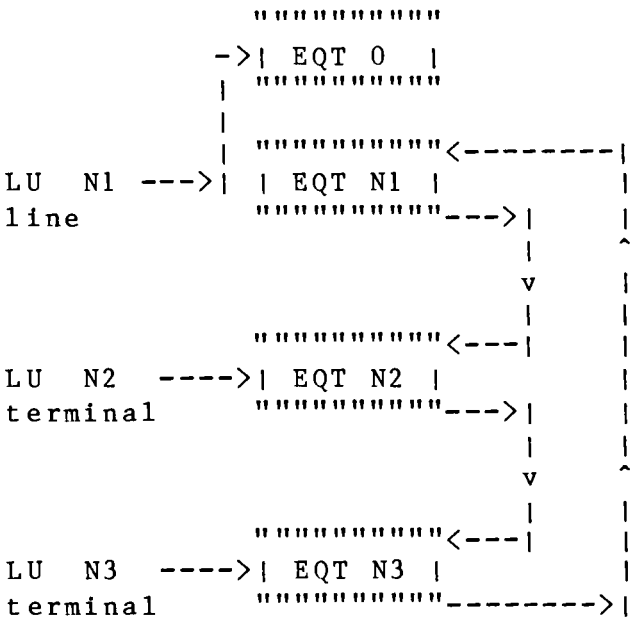
```
                     """"""""""<--------|
  LU   N1   --->  | EQT M1 |            |
  line             """"""""""--->|      |
                                 |      ^
                                 v      |          Terminal LU has EQT = 0.
                                 |      |          assignment.  All line and
                     """"""""""<---|    |          group operations are
  LU   N2   ---->| EQT M2 |        |    |          available.
  terminal         """"""""""--->|      |
                                 |      |
                                 v      ^.
                                 |      |
                     """"""""""<---|    |
  LU   N3   ---|  | EQT M3 |           |
  terminal     |    """"""""""-------->|
               |
               |  """""""""""
               -->| EQT 0 |
                  """""""""""
```
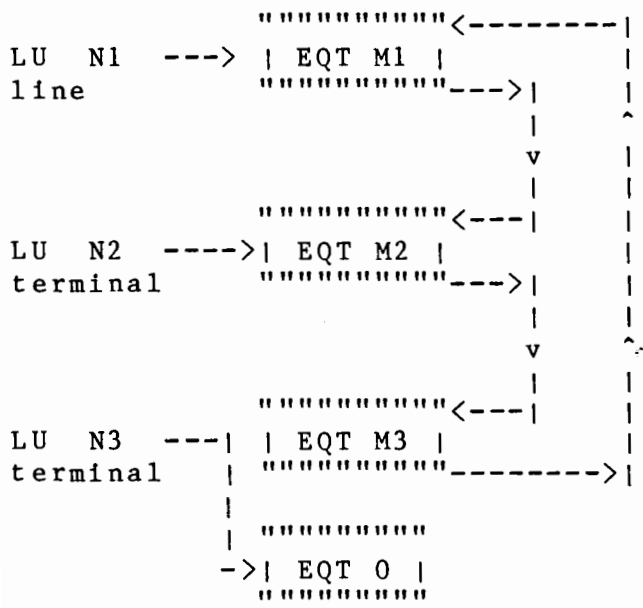
Resource Recovery — Multidrop Hazards

There are two cases where it is possible to lose resources in a multi-drop environment:

1) Terminal switch settings are not configured correctly.

2) Power is removed from an initialized terminal, or the terminal is unplugged from the link without first removing the ID from the EQT. Both cases result in either losing an LU or EQT or both. By careful assignment of group ID to all terminals, group poll will work normally.

However, case 1 opens a possible inconsistent assignment of more than one terminal with the same group ID, in which case both terminals will respond to a group poll at the same time since no clear-to-send/request-to-send chaining exists among the terminals in a multidrop environment.

In the first case, if the terminals switch setting is altered or incorrectly restored and an I/O transaction takes place on the terminal LU, the EQT is unavailable. Recovery requires finding all terminal ID's currently on-line, and for each ID, executing a membership operation of the ID currently inventoried among the EQT linked together on-line.

The verify program reports the inconsistent on-line assignment ID situation, making possible quick recovery of the EQT without having to physically approach the failed terminal. By substitution of another terminal with the necessary ID set in the address switch, an :UP,EQT command and subsquent removal of the terminal can recover the EQT.

The second case shows an I/O transaction (select or poll) to the terminal LU where the device has been unpluggeed from the link or the power to the terminal is off at the time of the transaction, resulting in an unavailable LU or EQT or both.

The verify program shows the terminal LU, EQT number, select code, line number, and ID assigned to the on-line terminal which is no longer responding to select or poll operations. Again, recovering the use of the EQT requires an on-line device that will respond to transactions through the EQT.

Program Execution

        :RU,TXTD1,loglu,ilu,iop,lilu,telu

    loglu   is the LU for logging information and error messages
                (default to operator console)

       ilu   is the operator console LU
                (must not be part of the multipoint system under test)

       iop   is the operation code (OP CODE, see details below)
                (default is SV)

```
           lilu    is the LU number of the multipoint line for test

           telu    is the LU number of the terminal to be tested
```

Program Operation Codes (OP CODES)

```
The following are the operation codes which are specified in
the "iop" field of the run statement.
          ??   Display list of operation codes.
          VL   Verify multipoint line then end.
          VT   Verify terminal.
          OF   Off-line terminals survey
          SV   Multipoint LU survey message.
          IL   Initialize a line.
          RL   Remove a line.
          IT   Initialize a terminal.
          RT   Remove a terminal.
          CF   Configure a terminal.
          GP   Who are you on all groups
          TG   Who are you on specified group?
          LN   Multipoint line assignment.
          EN   End.
          /E   End.
          EX   End.
          space space End.

During execution of  the program the following message  may appear on
the operator's console:

       TXTD1 - INPUT AN OP CODE_
This is an invitation to enter an operation code from the above list.
```

Configure Terminal Operation Code (CF)

```
If the  configure a  terminal operation  code CF  is chosen  then the
following message will appear after entry of basic information:

       TXTD1 - ENTER OP CODE (?? FOR CFTML OP CODE LIST):_
```

If ?? is entered, then the following terminal operation codes will
be printed and are valid while in the configure terminal mode:

    TB Set NAK, WAK terminal block size.
    EM Set edit mode and polling globals.
    ME Group-line select and send a message.
    SV Multipoint survey message (returns to main program)
    LN Multipoint line assignment.
    GP Who are you on all groups (returns to main program)
    TG Who are you on current terminals group?
    space space (returns to the main program)

The remaining messages requiring operator responses are
self-explanatory and may be found with the information and error
messages listed in the following section.

Test Information Messages

TXTD1 - RUNNING
TXTD1 - DONE
TXTD1 - INPUT AN OP CODE
TXTD1 - ENTER LINE LU (SYSTEM) (0 TO STOP):
TXTD1 - ENTER TRML LU (SYSTEM) (0 TO STOP):
TXTD1 - INITIALIZE A LINE
TXTD1 - REMOVE A LINE
TXTD1 - INITIALIZE A TERMINAL
TXTD1 - CORRECTIVE ACTION NEEDED
TXTD1 - REMOVE A TERMINAL
TXTD1 - ACTIVE TRML LU (SYSTEM) (0 TO STOP):
TXTD1 - TERMINAL LU n LINE NO m REMOVED
TXTD1 - ACTIVE LINE LU (SYSTEM) (0 TO STOP):
TXTD1 - LINE LU n LINE NO m REMOVED
TXTD1 - ENTER GROUP ID CHARCTER:
TXTD1 - x RESPONSE(S) FROM GROUP y
TXTD1 - TERMINAL LU n INITIALIZED, ASSIGNED LINE No. m
TXTD1 - CONFIGURE A TERMINAL
TXTD1 - ENTER OP CODE (?? FOR CFTML OP CODE LIST)
TXTD1 - SET NAK, WAK, TERMINAL BLOCK SIZE
TXTD1 - SET EDIT MODE AND POLLING GLOBALS
TXTD1 - GROUP-LINE SELECT AND SEND A MESSAGE
TXTD1 - ENTER GROUP ID CHARACTER (DEFAULT LINE n):
TXTD1 - ENTER DEVICE ID CHARACTER:
TXTD1 - MESSAGE TO LINE n:

```
TXTD1 - MESSAGE TO GROUP n:
TXTD1 - MESSAGE (n WORDS) SENT TO LINE m
TXTD1 - MESSAGE (n WORDS) SENT TO GROUP m
TXTD1 - ENTER TRANSMIT NAK COUNT (0 - 15):
TXTD1 - ENTER RECEIVE NAK COUNT (0 - 15):
TXTD1 - ENTER WACK COUNT (0-31):
TXTD1 - ENTER TRML BLOCK FACTOR (0-4):
TXTD1 - NO MULTIPOINT SYSTEM
TXTD1 - VERIFY GID a : PASS
TXTD1 - VERIFY MULTIPOINT TRML LU mm
TXTD1 - VERIFY LINE
TXTD1 - VERIFY TERMINAL
TXTD1 - VERIFY MULTIPOINT LINE LU mm
TXTD1 - VERIFY ACTIVE TERMINALS
TXTD1 - VERIFY MULTIPOINT TRML LU mm PASS
TXTD1 - VERIFY MULTIPOINT TRML LU mm FAIL
TXTD1 - VERIFY OFF LINE TERMINALS
TXTD1 - NO OFF LINE TERMINALS PRESENT
TXTD1 - ENTER TIMEOUT VALUE (0-30):
TXTD1 - ENTER LINE NUMBER (0-7):
TXTD1 - LINE LU mm INITIALIZED. ASSIGNED LINE NO. e
TXTD1 - LINE LU mm
TXTD1 - TNC:    RNC:    WC:    TBF:
TXTD1 - D  R  L  C  H  X  N  S  A
        ab OFF LINE
```

Verify Information Tables

The program generates several tables which have one of the following formats:

.System LU survey message format:

```
LU FBIT EQT AV EQW5 S.C. STATE   IN LN ID     MODEL K D LM RM INT PR
```

.Terminal verify message format:

```
TXTD1 - *VERIFY*  LU  EQT  ID       MODEL  K  D  LM  RM  INT  PR
```

. Line verify message format:

```
LN   ID   IN LU FBIT EQT AV S.C.
```

```
where LU       = line or terminal LU number
      FBIT     = 0 - device is up
               = 1 - device is down
      EQT      = equipment table number
      AV       = 0 - equipment available for use
               = 1 - equipment disabled (down)
               = 2 - equipment busy (currently in operation)
      EQW5     = equipment table word five  (equipment status)
      S.C.     = line or terminal select code
      STATE    = EQT extension word 17 (see DVR07 manual)
      IN       = 0 - EQT is not initialized
               = 1 - EQT is initialized
      LN       = line number
      ID       = line or terminal identity
      MODEL    = device model number
      K        = A - alpha keyboard
               = N - numeric keyboard
      D        = A - alpha display
               = N - numeric display
      LM       = - no left module
               = M - multifunction reader in left module
               = V - type 5 reader in left module
               = P - printer in left module
      RM       = - no right module
               = M - multifunction reader in right module
               = V - type 5 reader in right module
               = P - printer in right module
      INT      = terminal interrupt status (see terminal manuals)
      PR       = 0 - printer not busy
               = 1 - printer busy
```

Test Error Messages

```
TXTD1 - LU n HAS NONZERO SUBCHANNEL ASSIGNMENT
TXTD1 - LU n IS ASSIGNED TO A DORMANT MULTIPOINT TERMINAL
TXTD1 - LU n IS NOT ASSIGNED TO A DEVICE
TXTD1 - LU n IS DOWN
TXTD1 - EQT p IS DOWN
TXTD1 - LU n IS ASSIGNED TO A DORMANT MULTIPOINT LINE
TXTD1 - LU n IS NOT ASSIGNED, NOT TESTED
TXTD1 - LU n IS AN INITIALIZED MULTIPOINT TERMINAL
TXTD1 - LU n IS INITIALIZED, NO TERMINALS ASSIGNED
TXTD1 - LU n IS NOT IN A LINKED LIST
TXTD1 - LU n IS INITIALIZED, TERMINALS ARE ASSIGNED
TXTD1 - VERIFY GID a : FAIL
TXTD1 * ab NOT VERIFIED
```

```
TXTD1 - NO STATUS RESPONSE FROM LU mm
TXTD1 * ab APPEARS n TIMES IN EQT
TXTD1 * ab APPEARS OFF LINE n TIMES
TXTD1 * LINE NO. n TL nnnn NOT VERIFIED
```

Test Information Messages at 3075A/76A/77A

```
*LN   e   TL   mm      OFFLN*   (result of RT op code)
*LN   e   TL   mm     VERIFY*   (result of VT op code)
*LN   e   TL   mm       ONLN*   (result of IT op code)
```

RS 232 Terminal Verification (TXTR0)

This program verifies the ability of an RS232 terminal to send and receive data strings when running under RTE-IVB or RTE-6/VM and using DVR00. The test is run with and without the echo function disabled. During the test, the operator is prompted to copy a special character string that has been written to the terminal. Care should be taken to copy the string exactly (including embedded blanks) followed by a return. If an error occurs in this portion of the test, the test should be rerun as a check on any operator errors.

Required Hardware

```
*   HP 1000 M-Series, E-Series, or F-Series Computer.
*   RS232 Terminal.
```

Required Software

```
*   RTE-IVB or RTE-6/VM Operating System.
*   Driver DVR00.
*   A partition of at least 7 pages must be generated into the
    system.
```

File	File Description	Part Number
%TXTR0	RS232 terminal verification program	91711-16247
#TXTR0	Program TXTR0 loader command file	91711-17013

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXTRO,loglu,tstlu

        loglu is the LU# for logging information and error messages

        tstlu is the LU# of the terminal to be tested
```

This program requires operator interaction. The program can be run in a system environment with other programs scheduled and running.

Test Information Messages

```
TXTRO - LU# n: RS232 TERMINAL TEST RUNNING
TXTRO - LU# n:
        TYPE THE FOLLOWING CHARACTERS, THEN PRESS THE RETURN
        KEY. THE CHARACTERS SHOULD ECHO ON THE TEST DISPLAY
        AS THEY ARE TYPED.
        U*3LG8 =
TXTRO - LU# n:
        THERE SHOULD BE 5 LINES OF SPACE BETWEEN THIS LINE...
        ...AND THIS LINE.
TXTRO - LU# n: RS232 TERMINAL TEST FINISHED m ERRORS
```


Test Error Messages

```
TXTRO - LU# n: NOT ASSIGNED, NOT TESTED!
        (See general error note 1.)
TXTRO - LU# SPECIFIED FOR RS232 TERMINAL IS ILLEGAL.
        RERUN TEST SPECIFYING AN INTEGER >0 AND <64 FOR LU#.
TXTRO - LU# n IS NOT ASSIGNED TO RS232 TERMINAL.
        RERUN TEST SPECIFYING CORRECT LU#.
        (See general error note 2.)
TXTRO - LU# n: EQT OR LU FOR TEST TERMINAL IS DOWN.
        UP EQT AND RERUN TEST.
        (See general error note 3.)
TXTRO - LU# n: DATA ENTRY OR TRANSMISSION ERROR.
        TYPE /C TO CONTINUE NEXT TEST OR TYPE /A TO ABORT
        THIS TEST:
        (Rerun test checking for operator errors and if error
         persists, run the off-line I/O interface diagnostic.)
TXTRO - LU# n: RS232 TERMINAL TEST ABORTED!
```

HP-IB Bus Verification (TXIB0)

This test verifies correct installation of the HP-IB bus. The bus
will be set to a known state and then the Remote Enable (REN) line
will be set and reset. The HP-IB status will be read each time to
determine if each operation was successful. This test does not
require that a device be connected to the HP-IB bus.

Required Hardware

* HP 1000 M-Series, E-Series, or F-Series Computer.
* HP 59310B HP-IB Interface.

Required Software

* RTE-IVB or RTE-6/VM Operating System.
* A partition of at least 6 pages must be generated into the
  system.

File	File Description	Part Number
%TXIB0	HP-IB interface verification program	91711-16242
#TXIB0	Program TXIB0 loader command file	91711-17008
* %IB4A	HP-IB library for RTE-IVB	59310-12001
* $IB6A	HP-IB library for RTE-6/VM	92084-12036

*Required but not supplied with the 91711B package

Program Execution

:RU,TXIB0,loglu,tstlu

    loglu   is the LU for logging information and error messages

    tstlu   is the LU of the HP-IB interface to be tested

This program requires no operator interaction. This program can be
run in a system environment with other programs scheduled and
running.

Test Information Messages

```
TXBIO - LU# n:  HP-IB TEST RUNNING
TXBIO - LU# n:  HP-IB TEST FINISHED m ERRORS
TXBIO - LU# n:  HP-IB TEST ABORTED!
```

Test Error Messages

```
TXBIO - LU# n:  NOT ASSIGNED, NOT TESTED!
TXBIO - LU# n SPECIFIED FOR HP-IB INTERFACE IS ILLEGAL.
       RERUN TEST SPECIFYING AN INTEGER >0
       AND <64 FOR LU#.
TXBIO - LU# n SPECIFIED FOR HP-IB INTERFACE IS NOT
       ASSIGNED TO SUBCHANNEL 0. RERUN
       TEST SPECIFYING CORRECT LU#.
TXBIO - LU# n:  EQT OR LU FOR TEST HP-IB IS DOWN.
       UP EQT AND RERUN TEST.
TXBIO - LU# n:  `REN' CONTROL LINE WAS NOT SET.
TXBIO - LU# n:  `REN' CONTROL LINE WAS NOT RESET.
```

H Series and 13037 Controlled Disc Drive Verification

The program TXMV1 will verify the operation of a 7906H, 7920H, 7925H, 9895A ICD disc drive or a 7906, 7920, 7925 disc with a 13037 disc controller for any LU that is available to the terminal running the program.

In operation a type 1 file, called "TEST" is created for test data on the selected LU. This file is then opened, written to, read from, the data verified, the file closed and then purged. These operations exercise and test most of the disc hardware as well as file and directory areas of each disc LU tested. During the tests many different conditions may occur, and these are reported in a series of information and error messages. The test file @TEST@ defaults to a size of 24 blocks. It is only necessary to test one LU on each drive unless a media check is desired. If an entire media check is desired, remove all disc files, initialize the LU (FMGR command "IN"), run the format disc utility (program FORMT) for 9895, and then run TXMV1 with the media test option.

This program supports the "break mode" to stop program execution. Using the break mode will cause an orderly termination of the program and purge the test file TEST. The media test mode uses all the remaining available disc as the test file. If there is not enough room on the LU for a 24 block file, a file manager error -033 (not enough room on the disc) will be reported by the program and it will terminate. If the file TEST already exists, then the file manager error -002 (duplicate file name) is reported and the program terminates.

The program will not run if the PROTECT/READ ONLY switch is on. The system will report a track error, and the program will be aborted by the system. If for some reason the EQT for the test LU should time out (the EQT is downed by the system), the program will abort without purging the test file TEST.

All the above conditions must be satisfied by the operator before running TXMV1.

Required Hardware

* HP 1000 M-Series, E-Series, or F-Series Computer.
* HP 7906/20/25 Disc with 13037 Disc Controller and corresponding disc interface.

                          --OR--

* HP 7906H/20H/25H, 9895 Disc with 12821A disc interface.

Required Software

* RTE-IVB orRTE-6/VM Operating System
* A partition of at least 14 pages must be generated into the system.

File	File Description	Part Number
%TXMV1	7906H/20H/25H, 9895, or 13037 Controlled Disc Verification Program	91711-16266
* %DSCLB	ICD Disc Driver Library	92067-12002
#TXMV1	Program TXMV1 loader command file	91711-17016

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXMV1,loglu,disclu,ST,MT or MM,xxx
```

        loglu   is the LU for logging information and
                          error messages.

        disclu   is the legal disc LU for testing.

        ST   if "ST" is specified, the optional self test
                          for H-Series discs will be run. Default is
                          no self test.

        MT   if "MT" is specified the optional media test will
                          be executed (test file = rest of cartridge).

        MM   same as MT, but information messages are returned
                          indicating the % completion as the test executes.

        xxx   is the optional number of passes (default = 1)

The test requires no operator interaction. The test can be run
in a system environment with other programs scheduled and running.

Test Information Messages

In the following messages "n" is the LU number of the disc cartridge
under test:

```
TXMV1 - LU# n : DISC TEST RUNNING
TXMV1 - LU# n : DISC TEST xx.x% COMPLETE
                (only with MM mode, this message is issued
                every 15 to 25 seconds)
TXMV1 - LU# n : SELF-TEST PASSED
TXMV1 - LU# n : SELF-TEST NOT AVAILABLE!
                (self-test available on H-series discs only)
TXMV1 - LU# n : DISC TEST FINISHED xxx PASSES xxx ERRORS
```

Test Error Messages

```
TXMV1 - LU# SPECIFIED FOR TEST DISC IS ILLEGAL.
        RERUN TEST SPECIFYING AN INTEGER >0 AND
        <64 FOR LU#.
TXMV1 - DISC TEST ABORTED!
TXMV1 - LU# n : NOT ASSIGNED, NOT TESTED!
TXMV1 - LU# n IS NOT A LEGAL DISC.
        RERUN TEST SPECIFYING CORRECT LU#
TXMV1 - LU# n : EQT OR LU FOR TEST DISC IS DOWN.
        UP EQT AND RERUN TEST
        (see general error note 3)
TXMV1 - LU# n : CARTRIDGE NOT MOUNTED
        MOUNT CARTRIDGE AND RERUN TEST.
TXMV1 - LU# n : DISC TEST ABORTED!
TXMV1 - LU# n : DRIVE NOT READY.
TXMV1 - LU# n : DISC TRACK MAP TABLE ERROR!
TXMV1 - LU# n : SELF TEST FAILED!
TXMV1 - LU# n : LOCK UNLOCK ERROR!
TXMV1 - LU# n : POWER-ON ERROR, RERUN TEST!
TXMV1 - LU# n : HP-IB PARITY ERROR, RERUN TEST!
TXMV1 - LU# n : TIME-OUT ERROR RERUN TEST
TXMV1 - LU# n : ERROR FMP-XXX ON TEST FILE @TEST@
TXMV1 - LU# n : WRITE-READ DATA COMPARE ERROR!
```

The following error messages are issued as a result of a disc status call and may serve to guide the system manager in the correct analysis of errors. All status-1 and status-2 errors are reported after the main error message:

```
TXMV1 - LU# n : DISC STATUS ERROR! S1=xxxxxxB S2=xxxxxxB
TXMV1 - LU# n : DISC READ ERROR! S1=xxxxxxB S2=xxxxxxB
        TRACK# xxx, CYL# xxx, HEAD# x, UNIT# x
TXMV1 - LU# n : DISC VERIFY ERROR! S1=xxxxxxB S2=xxxxxxB
        TRACK# xxx, CYL# xxx, HEAD# x, UNIT# x
TXMV1 - LU# n : WRITE/READ DATA COMPARE ERROR!
        TRACK# xxx, CYL# xxx, HEAD# x, UNIT# x
        DATA xxxxxxB SHOULD BE xxxxxxB
        NUMBER OF DATA COMPARE ERRORS: xxx
        (only the first three are displayed)
```

Possible status-1 errors:

    STATUS-1 ERROR: ILLEGAL OPCODE
    STATUS-1 ERROR: ILLEGAL DRIVER TYPE
    STATUE-1 ERROR: CYLINDER MISCOMPARE
    STATUS-1 ERROR: UNCORRECTABLE DATA ERROR
    STATUS-1 ERROR: HEAD/SECTOR MISCOMPARE
    STATUS-1 ERROR: I/O PROGRAM ERROR
    STATUS-1 ERROR: END OF CYLINDER
    STATUS-1 ERROR: DATA OVERRUN
    STATUS-1 ERROR: ILLEGAL ACCESS TO SPARE TRACK
    STATUS-1 ERROR: DEFECTIVE TRACK
    STATUS-1 ERROR: ACCESS NOT READY DURING OPERATION
    STATUS-1 ERROR: STATUS-2 ERROR
    STATUS-1 ERROR: ATTEMPT TO WRITE ON PROTECTED TRACK
    STATUS-1 ERROR: UNIT UNAVAILABLE
    STATUS-1 ERROR: DRIVE ATTENTION

Possible status-2 errors

    STATUS-2 ERROR: DRIVE BUSY
    STATUS-2 ERROR: DRIVE NOT READY
    STATUS-2 ERROR: NO DISC OR HEADS UNLOADED
    STATUS-2 ERROR: SEEK OUT OF BOUNDS
    STATUS-2 ERROR: FIRST STATUS BIT SET
    STATUS-2 ERROR: DRIVE FAULT

Distributed System Verification (TXDS0)

This test verifies the ability of the system to communicate with a remote DS/1000 IV node via either a modem or hardwired link. The node number of an initialized remote node that is connected to the system can be input as a run string paramter, or interactively. The LU number of the DS/1000 interface under test must be input as a run string paramter. The program checks communication with the remote node by reading the time at the remote node twice and checking for a valid time change between readings.

Required Hardware

*   HP 1000 M-Series Computer.
*   DS/1000 hardwired or modem interface card
    with DS/1000 firmware.

                    --OR--

*   DS/1000-IV hardwired or modem interface card.
    with DS/1000-IV firmware.

Required Software

*   RTE-IVB or RTE-6/VM Operating System.
*   HP 91740A/B, DS/1000 software.

            -OR-

*   HP 91750A DS/1000-IV software.

File	File Description	Part Number
%TXDS0	Distributed system verification	91711-16241
#TXDS0	Program TXDS0 loader command file	91711-17007

*Required but not supplied with the 91711B package

Program Execution

    :RU,TXDS0,loglu,tstlu,node#

        loglu   is the LU for logging information and error messages

        tstlu   is the LU of the DS/1000 interface under test

        node#   is the remote node number to which the test is run
                    if = 0, the program requests the operator to input
                    the node#

The operator should consult the DS/1000 Programmer's Manual, DS/1000
Network Manager's Manual, and Guide for New Users of DS/1000 for
information regarding initialization of remote and local nodes for
testing.

Test Information Messages

```
TXDSO - LU# n:   BE SURE THAT THE REMOTE SYSTEM TO BE TESTED
                 HAS BEEN INITIALIZED AND IS CONNECTED TO THE
                 HARDWARE INTERFACE CONFIGURED TO LU# n IN
                 THIS LOCAL SYSTEM
TXDSO - LU# n:   BE SURE THAT THE REMOTE SYSTEM TO BE TESTED
                 HAS BEEN INITIALIZED AND IS CONNECTED TO THE
                 MODEM INTERFACE CONFIGURED TO LU# n IN
                 THIS LOCAL SYSTEM
TXSDO - LU# n:   ENTER A NODE NUMBER BETWEEN 1 AND 32767
                 FOR THE REMOTE SYSTEM TO BE TESTED OR
                 TYPE /A TO ABORT THIS TEST
TXDSO - LU# n:   DS/1000 TEST RUNNING ON NODE# n
TXDSO - LU# n:   DS/1000 TEST FINISHED ON NODE# n, m ERRORS

Note: This is only an example of TXDSO running under RTE-VB.
      Under other Op systems  these messages will be slightly differe??
```

Test Error Messages

```
TXDSO - LU# n:   m IS AN ILLEGAL NODE NUMBER.
TXDSO - LU# n SPECIFIED FOR DS/1000 LINK IS ILLEGAL.
                 RERUN TEST SPECIFYING AN INTEGER >0
                 AND <64 FOR LU#.
TXDSO - LU# n:   NOT ASSIGNED, NOT TESTED!
TXDSO - LU# n IS NOT ASSIGNED TO A DS/1000 LINK.
                 RERUN TEST SPECIFYING CORRECT LU#.
TXDSO - LU# n:   EQT OR LU FOR DS/1000 LINK IS DOWN.
                 UP EQT AND RERUN TEST.
TXDSO - LU# n, NODE# m:  TIME TEST FAILED!
TXDSO - LU# n:   DS/1000 TEST ABORTED!
```

Chapter 5
On-Line Diagnostic Programs

Hardware Floating Point Diagnostic (TXPF1)

The following single precision and extended precision floating point instructions which utilize the Hardware Floating Point Processor (HFPP) are executed by the diagnostic. The value returned by the HFPP is checked and a failure is reported if the correct result was not returned. Double precision instructions are not tested.

Single Precision		Extended Precision	
FAD	FIX	.XADD	.XFXS
FSB	FLT	.XSUB	.XFXD
FMP	.FIXD	.XMPY	.XFTS
FDV	.FLTD	.XDIV	.XFTD

Required Hardware

* HP 1000 F-Series Computer.
* HP 1000 F-Series Computer.

Required Software

* RTE-IVB or RTE-6/VM Operating Systems.
* A partition of at least 5 pages must be generated into the system.

File	File Description	Part Number
%TXPF1	HFPP diagnostic	91711-16258
%RODSK	HFPP diagnostic subroutine	91711-16256
%HFPVF	HFPP verification	91711-16235
#TXPF1	Program TXPF1 loader command file	91711-17017

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXPF1,loglu,passes

        loglu is the LU for logging information and error messages

        passes is the number of passes to be run
```

The program requires no operator interaction. The program can be run
in a system environment with other programs scheduled and running.

Test Information Messages

```
TXPF1 - HFPP TEST RUNNING
TXPF1 - HFPP TEST FINISHED xx PASSES yy ERRORS
```

Test Error Messages

```
TXPF1 - HFPP NOT INSTALLED AND TEST ABORTED!
        (If the HFPP/SIS is installed check that the power
        control cable is attached, the signal cable between the
        HFPP and the front panel is installed, and the HFPP is
        powered up.)
TXPF1 - HFPP TEST FAILURE
        (This indicates that an error occurred in executing an HFPP
        instruction. Check that the HFPP unit is ON and the signal
        cable between the HFPP and the front panel is installed. If
        the failure persists, run the FPP/SIS/FFP off-line
        diagnostic.)

TXPF1 - STOP 10
        (Error halt, HFPP not installed.)
```

Scientific Instruction Set Diagnostic (TXPF2)

The following Scientific Instruction Set instructions are tested:

```
SIN       EXP       TANH
COS       ALOG      ATAN
TAN       ALOGT     SQRT
```

The following instructions which are contained in the latest SIS firmware version are not tested by the diagnostic:

```
DPOLY     .FPWR
/ATLG     .TPWR
```

The program first checks to see if SIS firmware is installed. If not installed, the program will issue an error message and execute a STOP 10. The program next checks to see if the HFPP firmware is installed and issues an error message and executes a STOP 11 if it is not.

Required Hardware

*   HP 1000 F-Series Computer.

Required Software

*   RTE-IVB or RTE-6/VM Operating Systems.

File	File Description	Part Number
%TXPF2	SIS diagnostic program	91711-16259
%RODTK	SIS subroutine	91711-16257
%HFPVF	HPF verification	91711-16235
%SISVF	SIS verification	91711-16236
%MORFE	Processor determination	91711-16233
#TXPF2	Program TXPF2 loader command file	91711-17018

*Required but not supplied with the 91711B package

Program Execution

```
:RU,TXPF2,loglu,passes

        loglu is the LU for logging information and error messages

        #passes is the number of passes to be run
```

The program requires no operator interaction. The program can be run in a system environment with other programs scheduled and running.

Test Information Messages

```
TXPF2 - SIS TEST RUNNING
TXPF2 - SIS TEST FINISHED xx PASSES yy ERRORS
```

Test Error Messages

```
TXPF2 - SIS NOT INSTALLED AND TEST ABORTED!
        (Check that the SIS ROMs are properly installed.)
TXPF2 - HFPP NOT INSTALLED AND TEST ABORTED!
        (If the HFPP/SIS is installed, check that the signal cable
         between the HFPP and the front panel, and the power status
         cable are installed. Verify that the HFPP is powered up.)
TXPF2 - SIS TEST FAILURE
        (This indicates that an error occurred in executing an SIS
         instruction. Check that the SIS ROMs are installed properly.
         Run the FPP/SIS/FFP off-line diagnostic.)
TXPF2 : STOP 10          (Error halt, SIS not installed)
TXPF2 : STOP 11          (Error halt, HFPP not installed)
```

RTE-IVB Extended Memory Area Diagnostic (TXPF3)

This diagnostic confirms the operation of the Extended Memory Area (EMA) of an HP 1000 E/F Series computer running under RTE-IVB. While the diagnostic will operate in a computer with 96K bytes of memory, it will not be able to perform a complete check (in this memory size). For a complete check, a 38-page partition is required. If the partition is too small for a complete check, the operator is advised and certain tests are omitted.

The diagnostic locks itself into memory, making it unswappable while running the tests. It does unlock itself for a short time at the completion of each pass through the tests to allow swapping.

The program TXPF3 executes the following tests on the EMA firmware routines:

    Test 00   Call MMAP with negative offset.
    Test 01   Call MMAP with negative number of pages.
    Test 02   Call MMAP and ask for more pages than in MSEG.
    Test 03   Call MMAP and ask for pages beyond EMA.
    Test 04   Call MMAP and ask for zero offset and
               an MSEG number of pages.
    Test 05   Call MMAP and ask for one page beyond the end of EMA
               to check read and write bits.
    Test 06   Call .EMAP to access non-EMA array from EMA program.
    Test 07   Call .EMAP on a zero dimensional array.
    Test 08   Call .EMAP with a negative number of dimensions.
    Test 09   Call .EMAP with subscript below lower bound.
    Test 10   Call .EMAP with negative dimension size.
    Test 11   Call .EMAP with offset too large.
    Test 12   Call .EMAP and ask for element 2,000,001.
    Test 13   Call .EMAP and cause double precision integer
               calculation overflow.
    Test 14   Call .EMAP with displacement too large.
    Test 15   Call .EMAP with a two-dimensional EMA array, no errors.
    Test 16   Call .EMAP with negative dimensions,
               non-EMA array calculations.
    Test 17   Call .EMAP with subscript below lower bound,
               non-EMA array calculations.
    Test 18   Call .EMAP with dimension size negative,
               non-EMA calculations.
    Test 19   Call .EMAP and force 15 bit overflow in
               non-EMA array calculations.
    Test 20   Call .EMAP and force 16 bit overflow in
               non-Ema array calculations.
    Test 21   Call .EMAP for a 2-dimensional array, no errors.
    Test 22   Call .EMAP and cause single precision integer overflow,
               non-EMA calculations.
    Test 23   Call .EMIO and give negative buffer length.
    Test 24   Call .EMIO with buffer length that overflows end of EMA.
    Test 25   Call .EMIO with buffer one page greater than an MSEG.
    Test 26   Call .EMIO with buffer in a standard MSEG.
    Test 27   Call .EMIO with buffer that forced non-standard MSEG.
    Test 28   Call .EMIO from a non-EMA program. This is done by
               going privileged and clearing the ID extension address.

Test 29   Call MMAP from non-EMA program as in test 28.
Test 30   Call .EMIO from non-EMA program as in test 28.
Test 31   Call MMAP to map in a standard MSEG, then request the
          last element with .EMAP to check the setting of the
          non-standard MSEG bit and the read/write protection
          of the second MSEG page. This test is not performed if
          EMA software is being used.

Required Hardware

*   HP 1000 F-Series or E-Series Computer.
*   RTE-IVB EMA firmware.

Required Software

*   RTE-IVB Operating System.
*   A partition of at least 7 pages must be generated into the
    system.

File	File Description	Part Number
%TXPF3	EMA diagnostic	91711-16260
#TXPF3	Program TXPF3 loader command file	91711-17019

*Required but not supplied with the 91711B package

Program Execution

:RU,TXPF3,loglu,passes

        loglu is the LU for logging information and error messages

        #passes is the number of passes to be run

The program requires no operator intervention. The program can be
run in a system environment while other programs are scheduled and
running.

Test Information Messages

```
TXPF3 - WARNING - PARTION TOO SMALL FOR FULL TEST
TXPF3 - WARNING - EMA DIAGNOSTIC USING SOFTWARE NOT FIRMWARE
TXPF3 - PARTITION IS TOO SMALL TO EXECUTE THE DIAGNOSTIC
TXPF3 - EMA ON-LINE DIAGNOSTIC TERMINATED
TXPF3 - EMA FAILED TO PASS DIAGNOSTIC*** xx ERRORS
TXPF3 - DIAGNOSTIC COMPLETED SUCCESSFULLY
TXPF3 - ERROR. NO EMA FIRMWARE INSTALLED.
```

Test Error Messages

The general form of the error message is:

TEST zz:

followed by one of the following messages:

```
   name DID NOT DETECT ERROR CONDITION A=xxxxxB B=xxxxxB
   name INCORRECT ERROR RETURN A=xxxxxB B=xxxxxB
   MMAP ERROR. FIRST MAP REGISTER TO MISCOMPARE = xx, CNTNTS =yy
   EMAP ERROR. EXPECTED B=xxxxxB ACTUAL B=xxxxxB
   EMAP MAPPING ERROR
        MAP REG nn = mmmmm
        MAP REG jj = kkkkk
   EMIO ERROR. EXPECTED B=xxxxxB ACTUAL B=xxxxxB
   IO EXT. WORD ZERO WRONG. EXPECTED = yyyyyB ACTUAL = xxxxxB
```

RTE-IVB, Vector Instruction Set Diagnostic (TXPF4)

This diagnostic (TXPF4) verifies the operation of VIS (Vector Instruction Set) on an RTE-IVB system. It is well worth noting that both TXPF4 and VISO6 (discussed later) which verifies RTE-6/VM VIS ROM's are named VISOD. While they share the name, each is coded differently to verify its respective product. This should not present a problem, since the alternate use of operating systems on the same CPU is improbable.

However, to clarify discussions, it is recommended that when discussing RTE-IVB, a convention of calling this diagnostic TXPF4 while reserving VISOD for reference to its RTE-6 counterpart be observed.

The VIS instructions for TXPF4 are:

VADD	VSSB	VSUM	VMIN	.ESEG
VSUB	VSMY	VNRM	VMIB	.VSET
VMPY	VSDV	VDOT	VMOV	WSUM
VDIV	VPIV	VMAX	VSWP	
VSAD	VABS	VMAB	.ERES	

TXPF4 requires a 12 page partition for operation. If the system contains no mother partitions, the program must be assigned to a suitably sized partition. Since certain of these routines will default to Type 0 (system resident) if they are generated into the system, it is recommended that they be loaded on-line to avoid needless use of system space.

The diagnostic contains three sections: self-test, non-privileged and privileged. In the self-test section, the VIS self-test op-code (105477B) is executed and checked for proper results. If the self-test fails, a message is issued and the program executes a STOP 11.

The non-privileged section contains all the tests that can be performed in a non-privileged user environment. These include all the non-EMA VIS instructions as well as the .ERES, the EMA call-by-reference address resolver. Any error will cause a message to be issued and a STOP 11 executed.

NOTE

The privileged section tests the VIS instructions .ESEG and .VSET by temporarily entering a privileged user environment. In addition, the program must lock itself into memory for this portion of the tests. It is recommended that this section be executed only on a quiescent system.

Required Hardware

* HP 1000 F-Series Computer.
* HP 12824A VIS firmware.
* HP 12791A Firmware Expansion Module
  (for installation of VIS firmware).

Required Software

* RTE-IVB Operating System.
* A partition of at least 12 pages must be generated into the system.

File	File Description	Part Number
%TXPF4	VIS diagnostic	91711-16261
* %VLIB1	VIS FORTRAN interface library	12824-12001
* %VISOD	VIS on-line diagnostic	12824-16002
#TXPF4	Program TXPF4 loader command file	91711-17020

*Required but not supplied with the 91711B package

Program Execution

:RU,TXPF4,loglu,#passes,priv

    loglu is the LU for logging information and error messages

    #passes is the number of passes to be run

    priv is the privileged section flag (default is 0)

        (0 = privileged section not executed)
        (1 = privileged section is executed)

The program requires no operator intervention. The program can be run in a system environment with other programs scheduled and running.

Test Information Messages

TXPF4 - VECTOR INSTRUCTION SET DIAGNOSTIC
TXPF4 - WARNING, PRIVILEGED INSTRUCTIONS UNTESTED
TXPF4 - VIS DIAGNOSTIC COMPLETE: NO ERRORS

Test Error Messages

TXPF4 - SELF-TEST FAILURE
TXPF4 - ERROR IN INSTRUCTION xxxx

    where xxxx is one of the following instructions

    VADD   VSUB   VMPY   VDIV   VSAD   VSSB   VSMY   VSDV
    VPIV   VABS   VSUM   VNRM   VDOT   VMAX   VMAB   VMIN
    VMIB   VMOV   VSWP   .ERES   .ESEG   .VSET   WSUM

RTE-6/VM Virtual Memory Area Microcode Diagnostic (TXPF5)

This diagnostic executes every line of code in the RTE-6/VM VMA microcode and reports any errors found. It also executes every line of code in the $LOC microcode. Every instruction in the $LOC microcode is executed with the exception of eight instructions involving the generation of an MP violation and three instructions involving the powerfail sequence. TXPF5 must be loaded as an MLS program with more than one node to execute the $LOC microcode. It is recommended that %CIRES and %CJRES be put into two lead nodes under all the rest of the program. This program is not designed to run the software equivalents of the VMA firmware routines. It checks (using subroutine UCHCK) to see if the program is loaded with firmware, and if not prints out an error message and aborts.

Required Hardware

* HP1000 Series E or F Computer
* RTE-6/VM Firmware

Required Software

* RTE-6/VM Operating System
* A generated partition of at least 10 pages

File	File Description	HP Part No.
%VMACK	VMA diagnostic	92084-16423
#VMACK	Loader command file	91711-17021
* $VCLIB	VMACK library	92084-12016
* $MLSLB	MLS loader library	92084-12015

*Required but not supplied with the 91711B package

Program Execution

:RU,VMACK,loglu,#passes

    loglu   is the LU for logging information and error messages

    #passes is the number of passes to be run

VMACK can be run while other programs are being run

(text deleted)

SELF TEST

The initial test performed is a call to the VMA microcode diagnostic. Unlike all other tests, this has no test number. If this test fails, a special message will be printed and the program will terminate without excuting any further tests. The self test is executed at the start of every pass.

TEST #1

Call .IMAR (via .IRES). Array has zero dimensions and an offset of zero. Check that the returned values in A and B Registers are both zero.

TEST #2

Call .IMAR (via .IRES) for element (0). Array has one dimension, one word/element and an offset of zero. Check that the returned values in A and B Registers are both zero.

TEST #3

Call .IMAR (via .IRES) for element (1). Array has one dimension, one word/element and an offset of 65535. Check that the returned values in the A and B Registers are one and zero respectively.

TEST #4

Call .IMAR (via .IRES) for element (0,0). Array has two dimensions, 2000B elements in the first dimension, two word/elements and an offset of zero. Check that the values returned in the A and B Registers are both zero.

TEST #5

Call .IMAR (via .IRES) for element (0,0). Array has two dimensions, zero elements in the first dimension, one word/element and an offset of zero. Check that the returned values in the A and B Registers are both zero.

TEST #6

Call .IMAR (via .IRES) for element (-1, 8, 9). Array has three dimensions, nine elements in the 1st dimension, 40000B elements in the 2nd dimension, one word/element and an offset of zero. Check that the returned values in the A and B Registers are 22B and 107B respectively.

TEST #7

Call .JMAR (via .JRES) for element (52526B). Array has one dimension, three word/elements and an offset of 65536B. Check that the returned values in the A and B Registers are both two.

TEST #8

Call .JMAR (via .JRES) for element (0,0). Array has two dimensions, 2000B elements in the 1st dimension, one word/element and an offset of zero. Check that the returned values in the A and B Registers are both zero.

TEST #9

Call .JMAR (via .JRES) for element (1, 65535). Array has two dimensions, 2000B elements in the 1st dimension, two words per element and an offset of zero. Check that the returned values in the A and B Registers are 3777B and 174002B respectively.

TEST #10

Call .JMAR (via .JRES) for element (2,2). Array has two dimensions, 65536 elements in the 1st dimension, three words per element and an offset of zero. Check that the retrurned values in the A and B Registers are both six.

TEST #11

Call .LBP with a double word VMA address of 177777B -1. (this is a local reference call and no mapping occurs). Check that the returned values in the A and B Registers are 177777B and 1 respectively.

TEST #12

Call .LBP for a local reference (sign bit of high order word in VMA address set) with a 100 level indirect local address in the low order word. Check that the returned value in the B Register is correct (all the indirection on the low order word have been resolved).

TEST #13

Call .LBP with a VMA address of 177B - 176000B. Check that the returned values in the A and B Registers are 8191B and 76000B respectively.

TEST #14

Check that the pages mapped through map registers 30 and 31 by the
.LBP call in TEST #13 are both the first page past the page table
(PTE).

TEST #15

Reset the VMA size to 65536 pages. Then call .LBP with a VMA address
of 1777B - 176000B. Check that the returned values in the A and B
Registers are 177777B and 76000B respectively.

TEST #16

Check that the physical pages mapped by TEST #15 through map
registers 30 and 31 are both the first page past the page table
(PTE).

TEST #17

Call .LBPR with a local reference (sign bit of high order word of VMA
address set) with a 100 level indirect address in the low order word
of the VMA address. Check that the returned value in the B Register
is correct (indirection is completely resolved).

TEST #18

Call .LBPR with a VMA address of zero. Check that the returned
values in the A and B Registers are zero and 74000B respectively.

TEST #19

Check that the pages mapped through map registers 30 and 31 by TEST
#18 are the 2nd and 3rd physical pages past the page table (PTE).

TEST #20

Call .LPX with a VMA address of 65535 and an offset of one. Check
that the returned values in the A and B Registers are 100B and 74000B
respectively.

TEST #21

Check that pages mapped through map registers 30 and 31 by TEST # 20
are the 4th and 5th physical pages past the page table (PTE).

TEST #22

Call .LPXR with a VMA address of 65535 and an offset of one. Check that the returned values in the A and B Registers are 100B and 74000B respectively.

TEST #23

Check that the pages mapped through map registers 30 and 31 in TEST #22 are the 4th and 5th physical pages past the page table (PTE).

TEST # 24

Call .PMAP requesting that the virtual page zero be mapped through user page register 32 (illegal page register). Check that a P+1 return is made from the .PMAP call and that an 80 returns in the A Register.

TEST #25

CALL .PMAP requesting that virtual page 20 be mapped through user page register 31. However, set the sign bit on the user page register value (which is placed in the A Register before the .PMAP call). Setting this bit forces all faults to VMA to return to the P+1 return point after the .PMAP call. Check that a P+1 return is made from the .PMAP call.

TEST #26

Check that the returned values in the X and Y Registers from the .PMAP call made in TEST #25 are 20 and either 76000B or 176000B respectively.

TEST #27

Reinitialize the VMA system, again to a size of 65536 pages. Call .PMAP requesting that virtual page 65535 be mapped in through map register 31. Check that the returned value in the A and B Register are zero and 32B respectively.

TEST #28

Check that the page mapped through map register 31 by the .PMAP call made in TEST #27 is the first physical page past the page table (PTE).

TEST #29

Call .IMAP for element (1). Array is one dimension and has one word
per element and an offset of zero. Check that the returned values in
the A and B Registers are zero and 74001B respectively.

TEST #30

Check that the pages mapped through map registers 30 and 31 by the
.IMAP call in TEST #29 are the 2nd and 3rd physical pages past the
page table (PTE).

TEST #31

Call .JMAP for element (20001B). Array has one dimension, one word
per element and an offset of zero. Check that the returned values in
the A and B Registers are one and 74001B respectively.

TEST #32

Check that the pages mapped through map registers 30 and 31 by the
.JMAP call in TEST #31 are the 3rd and 4th physical pages past the
page table (PTE).

RTE-6/VM, VIS On-Line Diagnostic (VIS06)

VIS06 is the RTE-6/VM on-line diagnostic for the 12829A, VIS (Vector
Instruction Set). As previously discussed, VIS06 shares the name
VISOD with TXPF4. Each verifies VIS operation under its respective
operating system but is dissimilarly coded to verify the installation
and operation of its respective VIS ROM's (Read-Only-Memory). While
there is almost zero probability that operating systems will be
alternated on the same CPU, it will clarify discussions if a
convention of using TXPF4 only in reference to RTE-IVB operations and
VISOD reserved for discussing RTE-6/VM is observed.

Required Hardware

* HP 1000 F-Series Computer or Computer System
* 12791A, Firmware Expansion Module (FEM) in Select Code 10 or 11
  of the CPU Backplane cabled to the CPU and FAB with a 50-pin
  flat cable.
* VIS Firmware, HP Part No. 12824-80007 through -80009 installed
  on the FEM board.

Required Software

* RTE-6/VM Operating System
* A generated partition of at least 12 pages

File	File Description	HP Part No.
* $VLB6A	Firmware Interface Library	12829-12001
%VIS06	RTE-6/VM VIS Diagnostic	12829-16006
#VIS06	Loader Command File	91711-17022

  *Required but not supplied with the 91711B package

If the system contains no mother partitions, the program must be
assigned to a suitably-sized partition at load time. VIS06 should
not be loaded at system generation time (a duplicate entry point
error will occur).

Test Sections

The VIS06 program is divided into three main sections :

* Self-Test

* Non-Privileged

* Privileged

1) Self-Test:

The VIS self-test opcode (105477B) is executed and checked for proper
results. The self- test should return the octal value 102077B in the
S Register of the CPU. Note that VIS06 preserves the initial value
of the S Register.

If the self-test section does not return the correct results, the
following message is displayed on the output device and the program
stops:

**** SELFTEST FAILURE****

2) Non-privileged:

This section contains all of the tests that can be performed in a non-privileged user environment. These include all of the non-EMA VIS instructions and .ERES which resolves EMA call by reference addressing.

An error in any VIS instruction causes the following message to appear on the output device and the program stops:

ERROR IN INSTRUCTION

where xxxxx is the VIS instruction name. A successful pass displays:

VIS ON-LINE DIAGNOSTIC SUCCESSFUL COMPLETION

on the output device. If the privileged section is not to be tested, the message is:

WARNING - PRIVILEGED INSTRUCTIONS NOT TESTED

precedes the above completion message.

3) Privileged

This section tests the VIS instructions .ESEG and .VSET by temporarily entering a privileged environment. In addition, the program must lock itself into memory for this portion of the testing. In this privileged mode, malfunctions in VIS firmware could cause catastrophic system failure. Therefore, it is recommended that this section be executed only on a quiescent system.

CAUTION

When executing the privileged section, malfunctions in VIS firmware could cause overwriting of the operating system. It is not recommended that other critical tasks execute concurrently with diagnostics in a privileged section.

The last test in the privileged section executes the VIS EMA sum routine, WSUM, to assure that individually tested instructions correctly perform together.

An error in any of these instructions, (.ESEG, .VSET or WSUM) causes this message to be displayed on the system console:

                    ERROR IN INSTRUCTION xxxxx

             where xxxxx is the VIS instruction name.

Program Execution

Before operating the diagnostic, the system (RTE-6/VM) should be up and running. The proper entry points for VIS firmware should be specified during generation or declared to the loader with a separate RPL file.

The diagnostic program is supplied as a relocatable file which is loaded using the LOADR command file #VIS06 described in the RTE-6/VM Loader Reference Manual, HP Part No. 92084-90008.

                              NOTE

If the Firmware Interface Library ($VLB6A) is already generated into the RTE system, then it should be removed from the LOADR command file.

1) Execution:

Once the diagnostic has been loaded, it can be executed as follows:

:RU,VISOD[,LU][,#PASSES][,PRIV]

   LU   =   output logical unit number. Specifies where messages are to be output. If zero or not specified, defaults to user'?? terminal.

  #PASSES = number of passes to be run. If zero or not specified, one pass is run.

   PRIV   = privileged section flag. If zero or not specified, do not run privileged section test. If one, run privileged section test.

2) Examples:

:RU,VISOD   print messages on user terminal, run one pass, do
not run privileged section test.

:RU,VISOD,,1,0   print messages on user terminal, run one pass, do
not run privileged section test.

:RU,VISOD,0G,3,1   print messages on user terminal, run three passes,
run all sections.

:RU,VISOD,6,1   print messages on LU six, run one pass, do not run
privileged section test.

:RU,VISOD,,0,1   print messages on user terminal, run one pass, run
privileged section test.

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