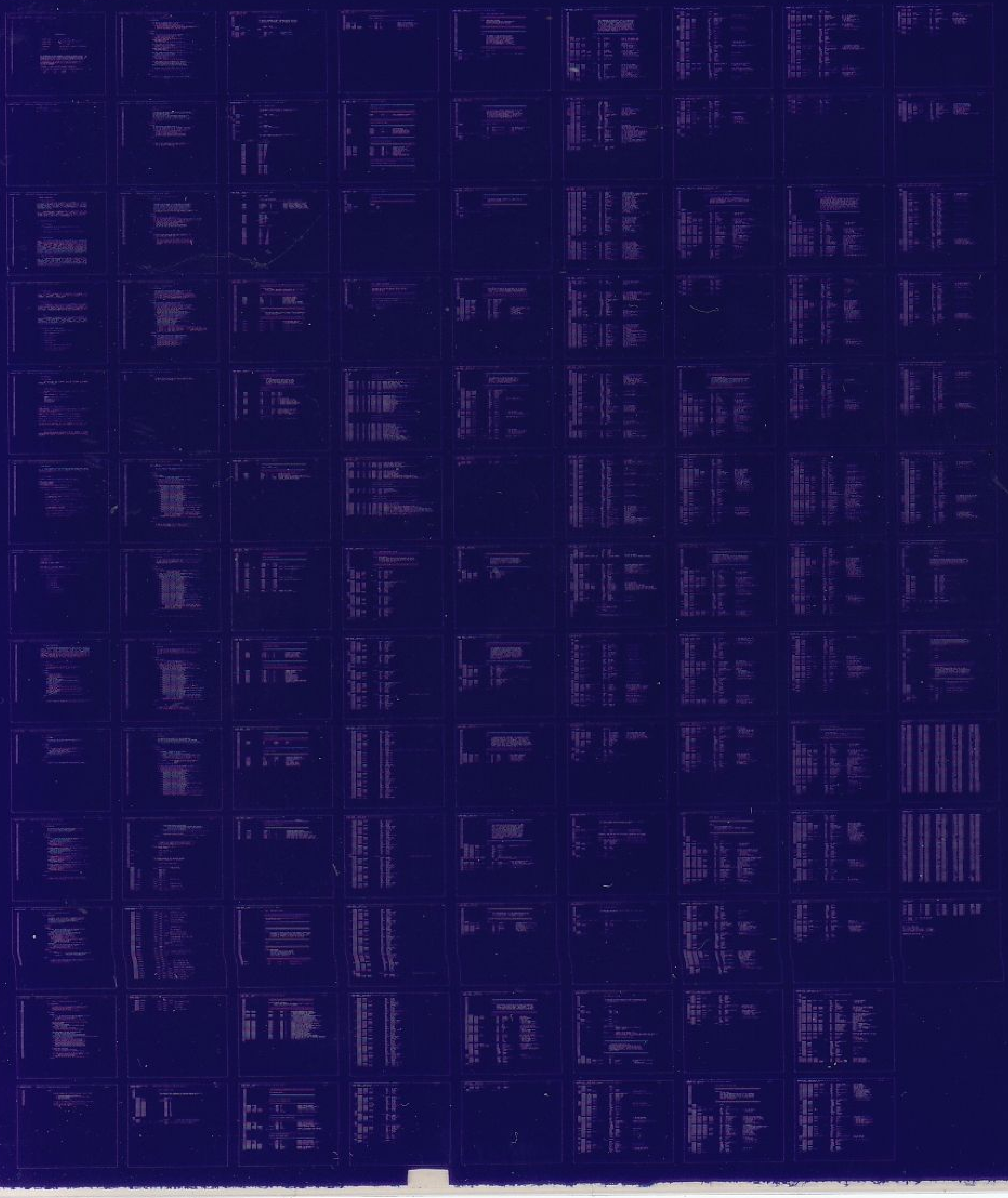
# TU81

TU81 FRONT END FUNC
CZTU2A0

AH-FG16A-MC
1 OF 1 OCT 1985

digital
MADE IN USA



```
                        .REM @










                                        IDENTIFICATION
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                             PRODUCT CODE:           AC - FG15A - MC

                             PRODUCT NAME:           CZTU2A0 TU81 FRONT END FUNC TEST

                             PRODUCT DATE:           26 - JUL - 1985

                             MAINTAINER:             TAPE AND OPTICAL DIAGNOSTIC ENGINEERING

                             AUTHOR:                 RAYMOND CHANG





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                              REVISION HISTORY

                                        JUL 1985        NEW RELEASE
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# 1 GENERAL INFORMATION

## 1.1 Product Description

The TU81 Functional Diagnostic is intended to provide confidence in the basic functionality of the TU81 subsystem. As such, this should be the first host level diagnostic run on the TU81 subsystem to verify installation, or for troubleshooting. Throughout the program, emphasis is placed on isolating faults to the Field Replaceable Unit (FRU).

The program runs in standalone mode in conjunction with the PDP-11 family Diagnostic Supervisor. In addition to host level testing, the program will implicitly invoke the TU81's controller resident Level 1 self-test microdiagnostics as well as explicitly invoking the controller's Level 2 microdiagnostics.

## 1.2 Product Users And Uses

1. DMT testing
2. As appropriate at various manufacturing facilities
3. Field service personnel
4. DEC customers who choose to provide their own maintainance

## 1.3 Performance Goals

This program will test up to four TU81's in a sequential manner. To run a full pass of the program, a scratch tape must be mounted on the transport and an operator must be present to perform manual intervention. However, appropriate subsets of the program can be run if there is no scratch tape, or the operator inhibits manual intervention tests. Furthermore, the first pass of the program will run in "quick verify" mode; i.e., a single iteration of each test will be performed. If multiple passes are specified by the operator, the second and all subsequent passes will run with each test executed with multiple iterations. First pass execution time will be approximately 20 minutes while second pass execution time will be approximately 24 minutes. These pass times are based on a single unit under test.

## 1.4 Pass/Fail Criteria

This program employs a bottom-up approach to testing the TU81; that is, Test 1 will attempt to verify the simplest level of host-to-controller communication as outlined in UQSSP. Each subsequent test builds upon the functionality already verified in previous tests. Hence, most errors encountered by the program will be considered as fatal device errors and the failing unit will be dropped from the rest of the test sequence.

### 1.5 Failsoft Goals

Unit specific problems will be handled by the program. CPU faults (i.e., illegal traps or interrupts) will be handled by the Diagnostic Supervisor. System faults will be handled by the Diagnostic Supervisor, fault dependent.

### 1.6 Restrictions

Although basic read/write testing is performed, this program is not interested in measuring the subsystem's data reliability. While recoverable data errors will be reported by the program, no attempt will be made to determine the subsystem's compliance with error rates. Unrecoverable data errors will be considered as fatal device errors, although the media could be the causative factor.

### 1.7 Non-Goals

This program is intended to verify the gross functionality of host-to-controller communications, the integrity of the controller hardware, controller-to-drive communication and the basic functionality of the drive. It is not intended as a verification of TMSCP protocol as implemented in the controller firmware, and no testing of TMSCP commands is provided.

### 1.8 Runtime Environment Requirements

Runtime environment requirements include:

1. XXDP+ Diagnostic Supervisor
2. PDP-11 family CPU
3. 28 KW memory
4. Console Terminal
5. Load Device
6. 1 to 4 TU81 tape drives with controllers
7. 1 to 4 TU81 scratch tapes (optional)
8. LCP-5 UFD software (optional)

## 2 USER INTERFACE

### 2.1 User Dialogue

The following user dialogue will be provided at program start-time to allow the user to establish certain operational parameters of the program.

#### 2.1.1 Hardware Questions -

This set of questions must be answered when the program is first started.

```
CHANGE HARDWARE (L)?  no default

NUMBER OF UNITS (D)?  enter number from 1-4
UNIT x
BASE ADDRESS (O) 774500?
VECTOR (O) 260?
UNIT NUMBER (O)?
```

#### 2.1.2 Definition Of Hardware Questions -

CHANGE HARDWARE - This question merely wants to know if you want to reconfigure the units under test. It must be answered "yes" on the first pass of the program.

NUMBER OF UNITS - Enter the number of TU81's to be tested.

BASE ADDRESS - Enter the IO address of the unit to be tested.

VECTOR - Enter the vector location to be used for the unit.

UNIT NUMBER - Enter the MSCP-specified unit number for the unit.

This entire set of questions will be repeated up to four times, depending on the user's response to the "number of units" question.

#### 2.1.3 Software Questions -

Most of the optional functionality of the program is either handled automatically by the program or through established procedures provided by the Diagnostic Supervisor hence there are no software questions.

## 3 ERROR REPORTS

Error reports will have two basic formats as described below. It is anticipated that, due to program partitioning, it will be possible to unambiguously define a single FRU as the cause of any error condition.

### 3.1 Error Format 1

This basic format will be used by all host level testing.

```
CZTU2  error  eeeee on unit ll test ttt sub sss PC: xxxxxx
SA CONTENTS IN ERROR
INIT SEQUENCE STEP #: n
SA RE: wwwwww EXPCTD: yyyyyy  ACTUAL SA: zzzzzz

****FAILING FRU: LESI/CONTROLLER/CABLE****
```

In this example, the fields have the following meanings:

- eeeee = discrete error number as defined by program
- ll = logical unit number assigned to unit-in-error during hardware questions
- ttt = test number during which error occurred
- sss = subtest number
- xxxxxx = program location of error call
- n = step number of the UQSSP initialization sequence which detected the error condition
- wwwwww = physical address of the SA register
- yyyyyy = expected contents of SA register for this step
- zzzzzz = actual SA register contents

### 3.2 Error Format 2

This format will be used for errors detected by the Level 2 microdiagnostics.

```
CZTU2A0 DVC FTL error  eeeee on unit ll test ttt sub sss  PC: xxxxxx
INTERNAL DRIVE TEST FAILED


FAULT CODE: ff    SUB-FAULT CODE: cc
REFER TO PATHFINDER FOR EXPLANATION OF CODES.

****FAILING FRU: DRIVE****
```

In this example, the fields have the following meanings:

- eeeee = see above

- ll = see above

- ttt = see above

- sss = see above

- xxxxxx = see above

- ff = refer to pathfinder

- cc = refer to pathfinder

## 4 FUNCTIONAL DESCRIPTION

The following test descriptions all have certain points in common. All errors specified below will cause the unit to be dropped from the test, unless specifically noted to the contrary. Furthermore, if the operator has chosen loop-on-error (LOE flag set) scope loops will return to the beginning of the test containing the failure. Exceptions to this will also be noted explicitly below. To understand the normal four step initialization sequence, refer to the UQSSP; the descriptions of tests that use this sequence will only highlight unique features utilized by that specific test.

### 4.2 TEST 1 < Existence Verfication Test > -

TEST DESCRIPTION:

This test verifies the TU81 IP and SA registers can be accessed on the unibus through the UBA.

TEST STEPS:

```
BGNTEST
     Initialize the Unibus
     IF error on initialize
          THEN Print System error and ABORT program
     Clear UBA status
     IF error on Clear status
          THEN  Print System error and ABORT program
     Read the IP register
     Wait 100 microseconds for possible Unibus timeout
     Read UBA status
     IF Unibus timeout error
          THEN Print Fatal device error and drop unit
     IF any UBA error
          THEN Print Fatal device error and ABORT program
     Read the SA register
     Wait 100 microseconds for possible Unibus timeout
     Read UBA status
     IF any UBA error
          THEN Print Fatal device error and ABORT program
ENDTEST
```

DEBUG:

No error looping is allowed all errors abort the test or program
The FRU is the Lesi Adapter for all errors in this test.

```
4.2      TEST 2   < Initialization Test > -

 TEST DESCRIPTION:

        This test will do a TU81 controller hard initialize
        to cause the rom resident power up diagnostics
        in the tu81 to be run.

 TEST STEPS:

    BGNTEST
        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN print fatal device error and drop unit
        Compare step 1 data expd with recv
        IF data compare error
            THEN print fatal device error and drop unit
    ENDTEST


 DEBUG:

        If loop on error specified then loop to start of test.
        The FRU is the Lesi Adapter for all errors in this test.
```

```
4.3     TEST 3 < Initialization Test > -

 TEST DESCRIPTION:

        This test will do a TU81 controller hard initialize
        then do initialization steps 1 through 3.
        It will wait for step 4 to be entered but no step 4
        testing will be done in this test.

 TEST STEPS:

    BGNTEST
        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN print fatal device error and drop unit
        Compare step 1 data expd with recv
        IF data compare error
            THEN print fatal device error and drop unit

        Call dup__step1 to write step 1 bit pattern and wait step 2
        IF the TU81 fails to enter STEP 2
            THEN print fatal device error and drop unit
        Compare step 2 data expd with recv
        IF data compare error
            THEN print fatal device error and drop unit

        Call dup__step2 to write step 2 bit pattern and wait step 3
        IF enter the TU81 fails to enter STEP 3
            THEN print fatal device error and drop unit
        Compare step 3 data expd with recv
        IF data compare error
            THEN print fatal device error and drop unit

        Call dup__step3 to write step 3 bit pattern and wait step 4
        IF the TU81 fails to enter STEP 4
            THEN print fatal device error and drop unit
        Compare step 4 data expd with recv
        IF data compare error
            THEN print fatal device error and drop unit
    ENDTEST


DEBUG:

        If loop on error specified then loop to start of test.
        The FRU is the Lesi Adapter for all errors in this test.
```

```
4.4     TEST 4 < SA Register Wrap Test > -

 TEST DESCRIPTION:

        The TU81 will be initialized in diagnostic wrap mode
        and then a one (1) bit will be floated through the
        SA register to see that it echoes properly.
        The process will be repeated to float a zero (0)
        through the SA register.

 TEST STEPS:

    BGNTEST
        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN print fatal device error and drop unit
        Call dup__step__1 to set diagnostic wrap mode
        REPEAT for all data in FLOAT__table
            Write data pattern into SA register
            Start a 10 second  timer
            Read SA register until the read pattern equals the
                write pattern or 10 second timer times out.
            IF 10 second timer expired
                THEN  Print Fatal device error and drop unit
        END-REPEAT
        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN print fatal device error and drop unit
    ENDTEST

        FLOAT__table:
                FLOATING 1'S    1,2,4,10,20,40,100,200,400,1000,2000
                                4000,10000,20000,40000,100000
                FLOATING 0'S    Floating 1's complemented

 DEBUG:

        If loop on error specified then loop on failing write and read.
        The FRU is the Lesi Adapter and tu81 controller
        for all errors in this test.
```

```
4.5     TEST 5   < Vector And BR Level Test > -

 TEST DESCRIPTION:

        The TU81 will be initialized with interrupt enable
        set to verify that the TU81 interrupts to the
        correct vector and BR level.
        This test is only run on the first pass.

 TEST STEPS:

    BGNTEST
        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN Print fatal device error and drop unit

        Set IPL to highest priority to lock out interrupts
        Clear UBA status
        IF error on Clear status
            THEN  Print System error and ABORT program
        Enable UBA interrupts
        IF error on enable uba interrupts
            THEN Print System error and ABORT program

        Call dup__step__1 to set interrupt enable
        IF the TU81 fails to enter STEP 2
            THEN Print Fatal device error and drop unit
        (A tu81 step 2 interrupt should be pending here)
        Lower the IPL until interrupt occurs or level equals X10 (lowest)
        IF no Tu81 interrupt occurred
            THEN Print Fatal device error and drop unit
        IF any error detected in interrupt service
            THEN Print Fatal system error and ABORT test
        IF the interrupt occurred at the wrong vector
            THEN Print Fatal device error and drop unit
        IF the interrupt occurred at the wrong BR level
            THEN Print Fatal device error and drop unit

        Disable UBA interrupts
        IF error on Disable uba interrupts
            THEN Print System error and ABORT program

        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN Print Fatal device error and drop unit
    ENDTEST
```

```
DEBUG:

        Possible reasons for incorrect interrupt vector include:

            1. Incorrect hardware configuration
            2. The ATTACH command specified the wrong vector
            3. Bad Lesi adapter
            4. Bad TU81 controller

        If loop on error specified then loop to start of the test

        The FRU is the Lesi Adapter and tu81 controller
        for all errors in this test.
```

```
4.6     TEST 6   < Purge And Poll Test > -

 TEST DESCRIPTION:

        This test will perform steps 1-3 of the initialize sequence
        then set the purge/poll bit in step 3.
        The purge/poll sequence will then proceed to:
            1. Write 0's to the SA register to simulate uba purge complete.
            2. Read and disregard the IP register to start polling
            3. Wait for the controller to go into step 4.

 TEST STEPS:

    BGNTEST
        Call dup__ipinit to write to the Ip register to begin
                hard initialize and wait for STEP 1.
        IF the TU81 fails to enter STEP 1
            THEN Print fatal device error and drop unit
        Compare step 1 data expd with recv
        IF data compare error
            THEN Print fatal device error and drop unit

        Call dup__step1 to write step 1 bit pattern and wait step 2
        IF the TU81 fails to enter STEP 2
            THEN Print fatal device error and drop unit
        Compare step 2 data expd with recv
        IF data compare error
            THEN Print fatal device error and drop unit

        Call dup__step2 to write step 2 bit pattern and wait step 3
        IF the TU81 fails to enter STEP 3
            THEN Print fatal device error and drop unit
        Compare step 3 data expd with recv
        IF data compare error
            THEN Print fatal device error and drop unit
*
        Call dup__step3 to write purge/poll bit (sa_pp_3)
        IF the controller fails to clear the SA within 100 micros
            THEN Print fatal device error and drop unit
        Write 0's to the SA to simulate uba purge complete
        Read and disregard the IP register to start polling
*
        IF the TU81 fails to enter STEP 4 within 10 seconds
            THEN Print fatal device error and drop unit
    ENDTEST


DEBUG:

        If loop on error specified then loop to start of test.
        The FRU is the Lesi Adapter for all errors in this test.
```

```
4.7     TEST 7   < Small Ring Test > -

 TEST DESCRIPTION:

        This test will do steps 1-4 of the TU81 initialization,
        with the smallest ring buffer size (1 cmd and 1 rsp buffer)
        and interrupts disabled.
        The test will verify the controller clears the ring
        descriptor field in the host communications area.
        This is the first time the initialize sequence is carried
        out to the point where the controller npr's to memory
        are verified.

 TEST STEPS:

    BGNTEST
        Set cmd and rsp ring descriptors to -1
        Set cmd ring length word to 0 to indicate 1 cmd buffer
        Set rsp ring length word to 0 to indicate 1 rsp buffer
        Call Dup_Init to write to the Ip register to force
            a hard initialize, then perform steps 1-4.
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit
        IF the cmd and rsp ring descriptors not cleared
            THEN print fatal device error and drop unit
    ENDTEST


 DEBUG:

        If loop on error specified then loop to start of test.
        The FRU is the Lesi Adapter and TU81 controller
            for all errors in this test.
```

```
4.8     TEST 8   < Maximum Ring Buffer Test > -

 TEST DESCRIPTION:



        This test will do steps 1-4 of the TU81 initialization,
        with the largest number of ring descriptors allowed
        (128 cmd and 128 rsp buffers) and interrupts disabled.
        The test will verify the controller clears the ring
        descriptor field in the host communications area.
        This test verifies the controller can access the complete
        host commmunication area in Vax memory (1024+4 words).

 TEST STEPS:

    BGNTEST
        Set cmd and rsp ring descriptors to -1
        Set cmd ring length word to 7 to indicate 128 cmd buffers (2**7=128)
        Set rsp ring length word to 7 to indicate 128 rsp buffers (2**7=128)
        Call Dup__Init to write to the Ip register to force
            a hard initialize, then perform steps 1-4.
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit
        IF the cmd and rsp ring descriptors not cleared
            THEN print fatal device error and drop unit
    ENDTEST


DEBUG:

        If loop on error specified then loop to start of test.
        The FRU is the Lesi Adapter and TU81 controller
            for all errors in this test.
        Note:
            This test overlays the host communications area with
            128 cmd ring descriptors and 128 rsp ring descriptors.
            The actual associated ring buffers are not allocated.
            The rest of the tests use just one cmd and one rsp
            buffer.
```

```
4.9     TEST 9   < Get DUST Status > -

 TEST DESCRIPTION:

        This test will request the DUST status and verify the
        response packet is received as expected.
        It is also verifies invalid command status is returned
        when illegal modifiers are specified in the command packet.
        The GET DUST command does not allow any command modifiers.
        This is the first time a command packet is actually sent to
        the controller and a response packet received.

 TEST STEPS:

    BGNSUB 1 *Get DUST command with valid modifiers*
        Set cmd and rsp ring descriptors to -1
        Set cmd ring length word to 0 to indicate 1 cmd buffer
        Set rsp ring length word to 0 to indicate 1 rsp buffer
        Call Dup__Init to write to the Ip register to force
            a hard initialize, then perform steps 1-4. Go bit set to 1
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit
        IF the cmd and rsp ring descriptors are not cleared
            THEN print fatal device error and drop unit
        Call exe__getdust to execute a GET DUST command
        IF Exe__getdust returns SS$__TIMEOUT code
            THEN print fatal device timeout error and drop unit
        IF the rsp Command reference number NOT = 1
            THEN print hard device error
        IF the rsp Endcode NOT= (get_dust code + 200 octal)
            THEN print hard device error
        IF the rsp Status NOT= success
            THEN print hard device error
        IF the rsp buffer FLAGS data is NOT as follows:
            1. Bit<0> = 1  !du_p_dust__flag__dis     - disable other servers
            2. Bit<1> = 1  !dup__dust__flag__media   - server has local media (rom)
            3. Bit<2> = 1  !dup__dust__flag__nosup   - exe__supplied cmd not allowed
            4. Bit<3> = 0  !dup__dust__fla_g_act          - server not active
            THEN print hard device error
    ENDSUB 1

    BGNSUB 2 *Get DUST command with illegal modifiers*
        Call exe__getdust to execute a GET DUST command
        IF Exe__getdust returns SS$__TIMEOUT code
            THEN print fatal device timeout error and drop unit
        IF the rsp Command reference number NOT = 2
            THEN print hard device error
        IF the rsp Endcode NOT= (get__dust code + 80 hex)
            THEN print hard device error
        IF the rsp Status NOT= INVALID COMMAND
            THEN print hard device error
    ENDSUB 2

    ENDTEST
```

```
            DEBUG:

                    If loop on error specified then loop to start of test.
                    The FRU is the lesi adapter or the TU81 controller/server
                    for all errors in this test.
```

```
4.10    TEST 10  < Functional Fault Detection Test (Internal Drive Test 1 > -
 TEST DESCRIPTION:

        This is a manual (/sec:manual) intervention test that will execute
        the TU81 internal microdiagnostic _#1.


 TEST STEPS:

    BGNTEST <MANUAL>
        Print message to mount tape untensioned but loaded
                       "Is the tape ready?"
        Call dup_init to write to the Ip register to force
            a hard initialize, then perform steps 1-4. Go bit set to 1
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit

        Call DUP_EXELOCAL to execute an EXECUTE LOCAL PROGRAM command
            IF Dup_exelocal returns SS_GETDUSTMO
                THEN print Get dust command timeout
            IF Dup_exelocal returns SS_NOTIDLE
                THEN print controller not in idle state
            IF Dup_exelocal returns SS$_TIMEOUT
                THEN print controller failed to return packet
            IF Dup_exelocal returns SS_EXEBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS_NOTSUCCESS
                THEN print controller failed to return success in packet
            IF Dup_EXELOCAL returns SS_DUSTBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS$_DEVINACT
                THEN print controller failed to enter active state
            IF Dup_exelocal returns SS_RECVTMO
                THEN print Controller failed to accept receive data command
            IF Dup_exelocal returns SS_PROGTMO
                THEN print progress indicator not updated before timeout
            IF Dup_exelocal returns SS_RECVINVMSG
                THEN print Receive data returned invalid message number
            IF Dup_exelocal returns SS_RECVERR2
                THEN print Receive data returned internal test failed
                     and print the message buffer fault code and subcode.
                     and print refer to SAMS for fault code meanings.
            IF Dup_exelocal returns SS_SAERR
                THEN print controller error while in execute local program
    ENDTEST


DEBUG:

        If loop on error specified then loop to start of test.
        The FRU is lesi Adapter for initialize errors
        or the TU81 controller/server for all other errors.
```

```
4.11    TEST 11  < Tension Fault Isolation Test (Internal Drive Test 2)> -

 TEST DESCRIPTION:

        This is a Fault (/sec:Fault) intervention test that will execute
        the TU81 internal microdiagnostic _#2.
        Internal test _#2 isolates servo faults by checking different
        assemblies of the STU.


 TEST STEPS:

    BGNTEST <Fault>
        Print message "Mount a scratch tape THREADED but UNTENSIONED"
                      "Is the tape ready?"
        Call dup__init to write to the Ip register to force
            a hard initialize, then perform steps 1-4. Go bit set to 1
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit
        Call DUP_EXELOCAL to execute an EXECUTE LOCAL PROGRAM command
            IF Dup_exelocal returns SS_GETDUSTMO
                THEN print Get dust command timeout
            IF Dup_exelocal returns SS_NOTIDLE
                THEN print controller not in idle state
            IF Dup_exelocal returns SS$_TIMEOUT
                THEN print controller failed to return packet
            IF Dup_exelocal returns SS_EXEBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS_NOTSUCCESS
                THEN print controller failed to return success in packet
            IF Dup_EXELOCAL returns SS_DUSTBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS$_DEVINACT
                THEN print controller failed to enter active state
            IF Dup_exelocal returns SS_RECVTMO
                THEN print Controller failed to accept receive data command
            IF Dup_exelocal returns SS_PROGTMO
                THEN print progress indicator not updated before timeout
            IF Dup_exelocal returns SS_RECVINVMSG
                THEN print Receive data returned invalid message number
            IF Dup_exelocal returns SS_RECVERR2
                THEN print Receive data returned internal test failed
                     and print the message buffer fault code and subcode.
                     and print refer to SAMS for fault code meanings.
            IF Dup_exelocal returns SS_SAERR
                THEN print controller error while in execute local program
    ENDTEST


 DEBUG:

        If loop on error specified then loop to start of test.
```

```
4.12    TEST 12  < Velocity Fault Isolation Test (Internal Drive Test 3)> -

 TEST DESCRIPTION:

        This is a Fault (/sec:Fault) intervention test that will execute
        the TU81 internal microdiagnostic _#3.
        Internal test _#3 isolates velocity servo faults by checking
        the take__up motor/tach assembly and the velocity servo
        loop.


 TEST STEPS:

    BGNTEST <Fault>
        Print message "Remove the tape from the drive"
                       "Is the tape REMOVED?"
        Call dup__init to write to the Ip register to force
            a hard initialize, then perform steps 1-4. Go bit set to 1
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit
        Call DUP_EXELOCAL to execute an EXECUTE LOCAL PROGRAM command
            IF Dup_exelocal returns SS_GETDUSTMO
                THEN print Get dust command timeout
            IF Dup_exelocal returns SS_NOTIDLE
                THEN print controller not in idle state
            IF Dup_exelocal returns SS$_TIMEOUT
                THEN print controller failed to return packet
            IF Dup_exelocal returns SS_EXEBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS_NOTSUCCESS
                THEN print controller failed to return success in packet
            IF Dup_EXELOCAL returns SS_DUSTBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS$_DEVINACT
                THEN print controller failed to enter active state
            IF Dup_exelocal returns SS_RECVTMO
                THEN print Controller failed to accept receive data command
            IF Dup_exelocal returns SS_PROGTMO
                THEN print progress indicator not updated before timeout
            IF Dup_exelocal returns SS_RECVINVMSG
                THEN print Receive data returned invalid message number
            IF Dup_exelocal returns SS_RECVERR2
                THEN print Receive data returned internal test failed
                     and print the message buffer fault code and subcode.
                     and print refer to SAMS for fault code meanings.
            IF Dup_exelocal returns SS_SAERR
                THEN print controller error while in execute local program
    ENDTEST


DEBUG:

       If loop on error specified then loop to start of test.
       The FRU is lesi Adapter for initialize errors
       or the TU81 controller/server for all other errors.
```

```
4.13    TEST 13 < Select A Drive Resident Test (Internal Drive Tests 1-99) > -

 TEST DESCRIPTION:

        This section (/sec:FAULT) will ask the operator
        to select a drive resident microdiagnostic. The resident
        test will be started using the Dup Execute local program
        function and monitored by Dup Get Dust status function calls.
        The internal tests are described in the Drive maintenance manual.


 TEST STEPS:

    BGNTEST <FAULT>

        Print message   "Enter drive unit number :"
            IF the unit number is invalid
                THEN Print error message and ask again
        Print message   "Enter controller internal test number <1-99>:"
            IF the resident test name is not in the valid name table
                THEN Print error message and ask again

        Print message   "Setup the tape drive per the Maintenance
                                manual for this internal test
                                READY?
        Accept any response as ready

        Call dup__init to write to the Ip register to force
            a hard initialize, then perform steps 1-4. Go bit set to 1
        IF the TU81 fails to enter any step
            THEN print fatal device error and drop unit
        Call DUP_EXELOCAL to execute an EXECUTE LOCAL PROGRAM command
            IF Dup_exelocal returns SS_GETDUSTMO
                THEN print Get dust command timeout
            IF Dup_exelocal returns SS_NOTIDLE
                THEN print controller not in idle state
            IF Dup_exelocal returns SS$_TIMEOUT
                THEN print controller failed to return packet
            IF Dup_exelocal returns SS_EXEBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS_NOTSUCCESS
                THEN print controller failed to return success in packet
            IF Dup_EXELOCAL returns SS_DUSTBADREF
                THEN print invalid command reference
            IF Dup_exelocal returns SS$_DEVINACT
                THEN print controller failed to enter active state
            IF Dup_exelocal returns SS_RECVTMO
                THEN print Controller failed to accept receive data command
            IF Dup_exelocal returns SS_PROGTMO
                THEN print progress indicator not updated before timeout
            IF Dup_exelocal returns SS_RECVINVMSG
                THEN print Receive data returned invalid message number
```

```



                                    IF Dup_exelocal returns SS_RECVERR2
                                        THEN print Receive data returned internal test failed
                                             and print the message buffer fault code and subcode.
                                             and print refer to SAMS for fault code meanings.
                                    IF Dup_exelocal returns SS_RECVMSG3
                                        THEN print contents of receive data message buffer (not an error)

                                    IF Dup_exelocal returns SS_SAERR
                                        THEN print controller error while in execute local program
                            ENDTEST



                         DEBUG:

                                If loop on error specified then loop to start of test.
                                The FRU is lesi Adapter for initialize errors
                                or the TU81 controller/server for all other errors.
                        @
                        .TITLE PROGRAM HEADER AND TABLES
                        .SBTTL  PROGRAM HEADER

000000                          .ENABL  ABS,AMA
        002000                  .       =       2000
                                .NLIST  BEX

002000                          BGNMOD


                        ;++
                        ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                        ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                        ;--

002000                          POINTER BGNDU,ERRTBL,BGNRPT



002000                          HEADER  CZTU2,A,0,120.,0,PRI00
002000                  L$NAME::                ;DIAGNOSTIC NAME
002000     103                  .ASCII /C/
002001     132                  .ASCII /Z/
002002     124                  .ASCII /T/
002003     125                  .ASCII /U/
002004     062                  .ASCII /2/
002005     000                  .BYTE   0
002006     000                  .BYTE   0
002007     000                  .BYTE   0
002010                  L$REV::                 ;REVISION LEVEL
002010     101                  .ASCII  /A/
002011                  L$DEPO::                ;0
002011     060                  .ASCII  /0/
002012                  L$UNIT::                ;NUMBER OF UNITS
002012  000000                  .WORD   0
002014                  L$TIML::                ;LONGEST TEST TIME
002014  000170                  .WORD   120.
002016                  L$HPCP::                ;POINTER TO H.W. QUES.
002016  043110                  .WORD   L$HARD
```

```
        002020                          L$SPCP::                        ;POINTER TO S.W. QUES.
        002020  000000                          .WORD   0
        002022                          L$HPTP::                        ;PTR. TO DEF. H.W. PTABLE
        002022  002224                          .WORD   L$HW
        002024                          L$SPTP::                        ;PTR. TO S.W. PTABLE
        002024  000000                          .WORD   0
        002026                          L$LADP::                        ;DIAG. END ADDRESS
        002026  062130                          .WORD   L$LAST
        002030                          L$STA::                         ;RESERVED FOR APT STATS
        002030  000000                          .WORD   0
        002032                          L$CO::
        002032  000000                          .WORD   0
        002034                          L$DTYP::                        ;DIAGNOSTIC TYPE
        002034  000000                          .WORD   0
        002036                          L$APT::                         ;APT EXPANSION
        002036  000000                          .WORD   0
        002040                          L$DTP::                         ;PTR. TO DISPATCH TABLE
        002040  002124                          .WORD   L$DISPATCH
        002042                          L$PRIO::                        ;DIAGNOSTIC RUN PRIORITY
        002042  000000                          .WORD   PRIO0
        002044                          L$ENVI::                        ;FLAGS DESCRIBE HOW IT WAS SETUP
        002044  000000                          .WORD   0
        002046                          L$EXP1::                        ;EXPANSION WORD
        002046  000000                          .WORD   0
        002050                          L$MREV::                        ;SVC REV AND EDIT #
        002050     004                          .BYTE   C$REVISION
        002051     000                          .BYTE   C$EDIT
        002052                          L$EF::                          ;DIAG. EVENT FLAGS
        002052  000000                          .WORD   0
        002054  000000                          .WORD   0
        002056                          L$SPC::
        002056  000000                          .WORD   0
        002060                          L$DEVP::                        ; POINTER TO DEVICE TYPE LIST
        002060  022766                          .WORD   L$DVTYP
        002062                          L$REPP::                        ;PTR. TO REPORT CODE
        002062  000000G                         .WORD   L$RPT
        002064                          L$EXP4::
        002064  000000                          .WORD   0
        002066                          L$EXP5::
        002066  000000                          .WORD   0
        002070                          L$AUT::                         ;PTR. TO ADD UNIT CODE
        002070  000000                          .WORD   0
        002072                          L$DUT::                         ;PTR. TO DROP UNIT CODE
        002072  033774                          .WORD   L$DU
        002074                          L$LUN::                         ;LUN FOR EXERCISERS TO FILL
        002074  000000                          .WORD   0
        002076                          L$DESP::                        ;POINTER TO DIAG. DESCRIPTION
        002076  002156                          .WORD   L$DESC
        002100                          L$LOAD::                        ;GENERATE SPECIAL AUTOLOAD EMT
        002100  104035                         EMT      E$LOAD
        002102                          L$ETP::                         ;POINTER TO ERRTBL
        002102  000000G                         .WORD   L$ERRTBL
        002104                          L$ICP::                         ;PTR. TO INIT CODE
        002104  033464                          .WORD   L$INIT
        002106                          L$CCP::                         ;PTR. TO CLEAN-UP CODE
        002106  033744                          .WORD   L$CLEAN
        002110                          L$ACP::                         ;PTR. TO AUTO CODE
        002110  000000G                    .WORD   L$AUTO
        002112                     L$PRT::                  ;PTR. TO PROTECT TABLE
        002112  022760                     .WORD   L$PROT
        002114                     L$TEST::                 ;TEST NUMBER
        002114  000000                     .WORD   0
        002116                     L$DLY::                  ;DELAY COUNT
        002116  000000                     .WORD   0
        002120                     L$HIME::                 ;PTR. TO HIGH MEM
        002120  000000                     .WORD   0
```

```
                                        .SBTTL  DISPATCH TABLE

                                        ;++
                                        ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                                        ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                        ;--

002122                                          DISPATCH 13.
002122  000015                                  .WORD   13
002124                                  L$DISPATCH::
002124  034016                                  .WORD   T1
002126  034514                                  .WORD   T2
002130  034744                                  .WORD   T3
002132  035362                                  .WORD   T4
002134  036124                                  .WORD   T5
002136  037256                                  .WORD   T6
002140  040702                                  .WORD   T7
002142  041444                                  .WORD   T8
002144  042206                                  .WORD   T9
002146  042270                                  .WORD   T10
002150  042452                                  .WORD   T11
002152  042574                                  .WORD   T12
002154  042716                                  .WORD   T13


002156                                          DESCRIPT        <CZTU2A0 TU81 FUNCTIONAL DIAGNOSTIC>
002156                                  L$DESC::
002156     103     132     124                  .ASCIZ  /CZTU2A0 TU81 FUNCTIONAL DIAGNOSTIC/
                                                .EVEN

```

```
                                  .SBTTL  DEFAULT HARDWARE P-TABLE

                                  ;++
                                  ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                  ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                  ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES.
                                  ;--

     002222                               BGNHW   DFPTBL
     002222  000003                       .WORD   L10000-L$HW/2
     002224                       L$HW::
     002224                       DFPTBL::

     002224  174500                       .WORD   174500          ;TUIP BASE ADDRESS
     002226  000260                       .WORD   260             ;VECTOR
     002230  000000                       .WORD   0               ;T/MSCP UNIT NUMBER
     002232                               ENDHW
     002232                       L10000:
```

```
                        .SBTTL  SOFTWARE P-TABLE

                        ;++
                        ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                        ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                        ;--

002232                          BGNSW   SFPTBL
002232  000000                  .WORD   L10001-L$SW/2
002234                  L$SW::
002234                  SFPTBL::


002234                          ENDSW
002234                  L10001:

002234                          ENDMOD
                        .TITLE GLOBAL AREAS
                        .SBTTL  GLOBAL EQUATES SECTION


002234                          BGNMOD

                        ;++
                        ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                        ; ARE USED IN MORE THAN ONE TEST.
                        ;--

002234                          EQUALS
                        ;
                        ; BIT DIFINITIONS
                        ;
        100000          BIT15== 100000
        040000          BIT14== 40000
        020000          BIT13== 20000
        010000          BIT12== 10000
        004000          BIT11== 4000
        002000          BIT10== 2000
        001000          BIT09== 1000
        000400          BIT08== 400
        000200          BIT07== 200
        000100          BIT06== 100
        000040          BIT05== 40
        000020          BIT04== 20
        000010          BIT03== 10
        000004          BIT02== 4
        000002          BIT01== 2
        000001          BIT00== 1
                        ;
        001000          BIT9==  BIT09
        000400          BIT8==  BIT08
        000200          BIT7==  BIT07
        000100          BIT6==  BIT06
        000040          BIT5==  BIT05
        000020          BIT4==  BIT04
        000010          BIT3==  BIT03
        000004          BIT2==  BIT02
        000002                  BIT1==  BIT01
        000001                  BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;    EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;
                                ;                               ;  BIT POSITION IN SECOND STATUS WORD
        000040                  EF.START==        32.           ; (100000) START COMMAND WAS ISSUED
        000037                  EF.RESTART==      31.           ; (040000) RESTART COMMAND WAS ISSUED
        000036                  EF.CONTINUE==     30.           ; (020000) CONTINUE COMMAND WAS ISSUED
        000035                  EF.NEW==          29.           ; (010000) A NEW PASS HAS BEEN STARTED
        000034                  EF.PWR==          28.           ; (004000) A POWER-FAIL/POWER-UP OCCURRED
                                ;
                                ;
                                ; PRIORITY LEVEL DEFINITIONS
                                ;
        000340                  PRI07== 340
        000300                  PRI06== 300
        000240                  PRI05== 240
        000200                  PRI04== 200
        000140                  PRI03== 140
        000100                  PRI02== 100
        000040                  PRI01== 40
        000000                  PRI00== 0
                                ;
                                ;OPERATOR FLAG BITS
                                ;
        000004                  EVL==         4
        000010                  LOT==        10
        000020                  ADR==        20
        000040                  IDU==        40
        000100                  ISR==       100
        000200                  UAM==       200
        000400                  BOE==       400
        001000                  PNT==      1000
        002000                  PRI==      2000
        004000                  IXE==      4000
        010000                  IBE==     10000
        020000                  IER==     20000
        040000                  LOE==     40000
        100000                  HOE==    100000
```

```
                                  ;;***************************************************************
                                  ;;***************************************************************
                                  ;
                                  ;LUN_BLOCK OFFSETS
                                  ;       THESE LITERALS ARE USED AS WORD OFFSETS INTO THE LUNBLK, WHICH
                                  ;       IS POINTED TO THROUGHOUT THE PROGRAM BY R4.
                                  ;
                                  ;;***************************************************************
                                  ;;***************************************************************

        000000                    TUIP    ==      0               ;TUIP REGISTER ADDRESS
        000002                    TUSA    ==      2               ;TUSA REGISTER ADDRESS
        000004                    TUVEC   ==      4               ;TU INTERRUPT VECTOR
        000006                    MSCPUN  ==      6               ;T/MSCP UNIT NUMBER
        000010                    TUIPSV  ==     10               ;SAVE LOCATION FOR IP CONTENTS
        000012                    TUSASV  ==     12               ;SAVE LOCATION FOR SA CONTENTS
        000014                    LUNFLG  ==     14               ;BIT-SPECIFIC MEANINGS AS DEFINED BELOW


                                  ;;***************************************************************
                                  ;;***************************************************************
                                  ;
                                  ;LUNFLG
                                  ;       THIS WORD IN LUNBLK IS USED TO CONVEY VARIOUS INFORMATION
                                  ;       IN A BIT-SPECIFIC MANNER.  BITS USED BY THE PROGRAM ARE
                                  ;       DEFINED AS FOLLOWS.
                                  ;
                                  ;;***************************************************************
                                  ;;***************************************************************

        000001                    DRPFLG  ==      BIT0            ;=0 UUT AVAILABLE FOR TEST
                                                                  ;=1 UUT HAS BEEN DROPPED
        000002                    INTFLG  ==      BIT1            ;=1 EXPECTED INTERRUPT OCCURRED

        000004                    BRFLAG  ==      BIT2            ;=1 INTERRUPT PRIORITY TEST

        000010                    TEST.9  ==      BIT3            ;=1 TEST 9 FLAG

        000020                    DONEFL  ==      BIT4            ;=1 INTERNAL DRIVE TEST DONE

```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;
                                ;UQ-PORT EQUATES
                                ;       THIS SECTION DEFINES THOSE LITERALS USED
                                ;       BY THE DIAGNOSTIC IN THE UQ-PORT PROTOCOL.
                                ;       IN GENERAL THEY HAVE BEEN FORMED BY USING
                                ;       THE TWO LETTER MNEMONIC DEFINED IN UQSSP,
                                ;       PRECEDED BY "B." INDICATING THEY ARE BITS.
                                ;
                                ;;*****************************************************************
                                ;;*****************************************************************

                                ;READ-ONLY BITS

        004000                  B.S1    ==      BIT11   ;STEP 1
        010000                  B.S2    ==      BIT12   ;STEP 2
        020000                  B.S3    ==      BIT13   ;STEP 3
        040000                  B.S4    ==      BIT14   ;STEP 4

        100000                  B.ER    ==      BIT15   ;ERROR INDICATION
        002000                  B.NV    ==      BIT10   ;=0 VECTOR IS HOST SETTABLE
        001000                  B.QB    ==      BIT9    ;=1 SUPPORTS 22 BIT HOST BUS
        000400                  B.DI    ==      BIT8    ;=1 SUPPORTS ENHANCED DIAGNOSTICS
        000200                  B.OD    ==      BIT7    ;=1 SUPPORTS ODD BUFFER ADDRESSES
        000100                  B.MP    ==      BIT6    ;=1 SUPPORTS ADDRESS MAPPING

                                ;WRITE-ONLY BITS

        100000                  B.PP    ==      BIT15   ;PERFORM PURGE AND POLL TESTS
        040000                  B.WR    ==      BIT14   ;ENTER DIAGNOSTIC WRAP MODE
        000002                  B.LF    ==      BIT1    ;LAST FAIL REQUEST
        000001                  B.PI    ==      BIT0    ;ENABLE ADAPTER PURGE INTERRUPTS
        000001                  B.GO    ==      BIT0    ;GO BIT - START RUNNING

                                ;READ/WRITE BITS

        000200                  B.IE    ==      BIT7    ;STEP X-TION INTERRUPT ENABLE
```

```
                              ;;****************************************************************
                              ;;****************************************************************
                              ;
                              ;GENERAL PURPOSE EQUATES
                              ;
                              ;;****************************************************************
                              ;;****************************************************************

          000004              VEC4    ==      4       ;VECTOR FOUR - NXM TIMEOUTS, ETC.
          000003              CNTRLC  ==      3       ;CONTROL C (ASCII)
          000014              DISCAC  ==      14      ;BIT POSITIONS 2 AND 3 DISABLE CACHE IN CCR
          177560              RCSR    ==      177560  ;TERMINAL RECEIVE CONTROL/STATUS REGISTER ADDRESS
          177562              RBUF    ==      177562  ;TERMINAL RECEIVE BUFFER ADDRESS
          177746              CCR     ==      177746  ;CACHE CONTROL REGISTER ADDRESS
```

```
                                ;;****************************************************************
                                ;;****************************************************************
                                ;
                                ;MEMORY MANAGEMENT EQUATES
                                ;
                                ;;****************************************************************
                                ;;****************************************************************

        177572                  MMUSR0  ==      177572  ;STATUS REG 0
        177574                  MMUSR1  ==      177574
        177576                  MMUSR2  ==      177576
        172516                  MMUSR3  ==      172516  ;SHOULD ONLY BE PRESENT ON 22 BIT CPU'S

        172340                  KPAR0   ==      172340  ;KERNEL MODE PAGE ADDRESS REG 0
        172342                  KPAR1   ==      172342
        172344                  KPAR2   ==      172344
        172346                  KPAR3   ==      172346
        172350                  KPAR4   ==      172350
        172352                  KPAR5   ==      172352
        172354                  KPAR6   ==      172354
        172356                  KPAR7   ==      172356  ;ALWAYS FOR I/O PAGE

        172300                  KPDR0   ==      172300  ;KERNEL MODE PAGE DESCRIPTOR REG 0
        172302                  KPDR1   ==      172302
        172304                  KPDR2   ==      172304
        172306                  KPDR3   ==      172306
        172310                  KPDR4   ==      172310
        172312                  KPDR5   ==      172312
        172314                  KPDR6   ==      172314
        172316                  KPDR7   ==      172316

        000001                  MMON    ==      BIT0    ;ENABLE MMU - MMUSR0
        000020                  MM22ON  ==      BIT4    ;ENABLE 22 BIT MMU - MMUSR3
```

```
                                      ;;***************************************************************
                                      ;;***************************************************************
                                      ;
                                      ;COMMAND PACKET OPCODES
                                      ;
                                      ;;***************************************************************
                                      ;;***************************************************************

          000001                      OP.GDS  ==      01              ;GET DUST STATUS OPCODE
          000003                      OP.ELP  ==      03              ;EXECUTE LOCAL PROGRAM OPCODE
          000005                      OP.REC  ==      05              ;RECEIVE DATA OPCODE
          000006                      OP.ABT  ==      06              ;ABORT PROGRAM OPCODE
          000200                      OP.END  ==      200             ;END MESSAGE FLAG OPCODE


                                      ;;***************************************************************
                                      ;;***************************************************************
                                      ;
                                      ;DUP COMMAND AND END MESSAGE OFFSETS
                                      ;
                                      ;;***************************************************************
                                      ;;***************************************************************

          000000                      P.CRF   ==       0              ;COMMAND REFERENCE NUMBER
          000010                      P.OPCD  ==      10              ;COMMAND OPCODE
          000012                      P.MOD   ==      12              ;COMMAND MODIFIERS
          000014                      P.BCNT  ==      14              ;BYTE COUNT
          000020                      P.BUFF  ==      20              ;BUFFER DESCRIPTOR
          000010                      P.ENDC  ==      10              ;END MESSAGE ENDCODE
          000012                      P.STS   ==      12              ;END MESSAGE STATUS
          000017                      P.FLGS  ==      17              ;END MESSAGE FLAGS
          000020                      P.IND1  ==      20              ;1ST WORD OF PROGRESS INDICATOR
          000022                      P.IND2  ==      22              ;2ND WORD OF PROGRESS INDICATOR
          000024                      P.TIMO  ==      24              ;TIMEOUT VALUE
```

```
                                        ;;***************************************************************
                                        ;;***************************************************************
                                        ;
                                        ;TUSA BIT DEFINITIONS
                                        ;
                                        ;;***************************************************************
                                        ;;***************************************************************

        100000                          ERR     ==      100000          ;ERROR
        004000                          S1      ==      004000          ;STEP 1
        000001                          GO      ==      000001          ;GO


                                        ;;***************************************************************
                                        ;;***************************************************************
                                        ;
                                        ;U/Q PORT LITERALS
                                        ;
                                        ;;***************************************************************
                                        ;;***************************************************************

        100000                          OWN     ==      100000          ;DESCRIPTOR OWNERSHIP BIT
        040000                          FLAG    ==      040000          ;DESCRIPTOR INTERUPT FLAG BIT
        000200                          IMM     ==      000200          ;IMMEDIATE COMMAND FLAG
        000010                          TF.BLK  ==      10              ;TAPE FORMAT
        000000                          HSTIMO  ==      0               ;HOST TIMEOUT VALUE
        000000                          MSCPVR  ==      0               ;MSCP VERSION NUMBER
        000004                          RNGSTP  ==       4.             ;DESCRIPTOR RING STEP
        000104                          RSPSTP  ==      68.             ;RESPONCE BUFFER STEP
```

```
                                ;;***************************************************************
                                ;;***************************************************************
                                ;
                                ;TMSCP DRIVER BUFFER OFFSETS
                                ;
                                ;;***************************************************************
                                ;;***************************************************************

        000002                  HIADDR  ==       2.             ;DESCRIPTOR ADDRESS OFFSET
        177777                  CONID   ==      -1.             ;COMMAND/RESPONSE CONNECTION TYPE I.D.
        177776                  CRD     ==      -2.             ;COMMAND/RESPONSE CREDIT LIMIT OFFSET
        177774                  MSGLEN  ==      -4.             ;COMMAND/RESPONSE MESSAGE LENGTH
        000005                  TXFER   ==       5.             ;ERROR FORMAT FOR "TAPE TRANSFER" ERROR LOG
        000011                  DRVER   ==       9.             ;ERROR FORMAT FOR "DRIVE ERROR" ERROR LOG
        000000                  CNTER   ==       0.             ;ERROR FORMAT FOR "CONTROLLER ERROR" ERROR LOG
```

```
                                .SBTTL  GLOBAL DATA SECTION


                                ;;***************************************************************
                                ;;***************************************************************
                                ;
                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ; IN MORE THAN ONE TEST.
                                ;
                                ;;***************************************************************
                                ;;***************************************************************



                                ;;***************************************************************
                                ;;***************************************************************
                                ;
                                ;LUNBLK
                                ;       THIS BLOCK OF MEMORY IS USED TO STORE VARIABLE INFORMATION
                                ;       PERTAINING TO THE CURRENT LOGICAL UNIT UNDER TEST.  LUNBLK
                                ;       IS POINTED TO THROUGHOUT THE PROGRAM BY R4 AND INDIVIDUAL
                                ;       LOCATIONS ARE ACCESSED VIA LITERALS DEFINED ABOVE.
                                ;
                                ;;***************************************************************
                                ;;***************************************************************

     002234                     LUNBLK::        .BLKW   15.



                                ;;***************************************************************
                                ;;***************************************************************
                                ;
                                ;UQ-PORT NECESSITIES
                                ;       THESE TABLES ARE SET UP BY VARIOUS
                                ;       TESTS WITH VALUES TO BE WRITTEN TO
                                ;       THE PORT, AND COMPARISON VALUES TO
                                ;       CHECK THE PORT AFTER EACH STEP TRAN-
                                ;       SITION OCCURS, RESPECTIVELY.
                                ;
                                ;;***************************************************************
                                ;;***************************************************************

     002272                     STPTBL::        .BLKW   4       ;VALUES WRITTEN TO THE PORT

     002302                     CMPTBL::        .BLKW   4       ;COMPARISON VALUES

```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;
                                ;PROGRAM CONTROL VARIABLES
                                ;       THESE GLOBAL VARIABLES ARE GENERALLY USED TO CONTROL THE
                                ;       OVERALL EXECUTION OF THE DIAGNOSTIC.
                                ;
                                ;;*****************************************************************
                                ;;*****************************************************************

002312  000000                  PASCNT::        .WORD   0       ;CUMULATIVE PROGRAM PASS COUNTER
002314  000000                  KTFLAG::        .WORD   0       ;=0 MEMORY MANAGEMENT NOT AVAILABLE
                                                                ;=1 MEMORY MANAGEMENT IS AVAILABLE
002316  000000                  TRP4FG::        .WORD   0       ;=1 TRAP TO VECTOR OCCURRED
002320  000000                  PAROFF::        .WORD   0       ;USED IN TEST 7 TO STEP THROUGH UPPER MEMORY
002322  000000                  CMMERR::        .WORD   0       ;=0 NO ERROR IN COMMUNICATION AREA
                                                                ;=1 ERROR WITHIN COMMUNICATION AREA
                                                                ;=-1 ERROR BEYOND BOUNDS OF COMM AREA
002324  000000                  CMTBLG::        .WORD   0       ;# OF CONTIGUOUS WORDS IN ERROR IN COMM AREA
002326  000000                  CMARLG::        .WORD   0       ;LENGTH OF COMM AREA FOR TEST N
002330  000000                  FRUIS::         .WORD   0       ;POINTER TO FAULTY FRU ASCII FOR PRINTOUT
002332  000000                  LOGUNT::        .WORD   0       ;LOGICAL UNIT # OF CURRENT UUT
002334  000000                  SAEXP::         .WORD   0       ;LOADED WITH EXPECTED SA FOR ERROR CHECKING
002336  000000                  INISTP::        .WORD   0       ;CURRENT STEP OF INIT SEQUENCE
0C2340  000000                  STEPST::        .WORD   0       ;SUCCESS/FAIL STATUS FROM STEP SUBROUTINES
002342  000000                  WRDATA::        .WORD   0       ;LOADED WITH DATA FRO WRAP MODE TEST
002344  000000                  INNER::         .WORD   0       ;COUNTER FOR PDELAY ROUTINE
002346  000000                  OUTER::         .WORD   0       ;OTHER COUNTER FOR PDELAY
002350  000000                  TOUT::          .WORD   0       ;TIMEOUT INDICATOR FOR PDELAY
002352  000000                  TEMP::          .WORD   0       ;TEMPORARY STORAGE LOCATION
002354  000000                  ANSWER::        .WORD   0       ;LOGICAL ANSWER IN MANUAL TEST SECTION
002356  000000                  PROGRL::        .WORD   0       ;SAVE LOCATION FOR 1ST WORD OF PROGRESS INDICATOR
002360  000000                  PROGRH::        .WORD   0       ;SAVE LOCATION FOR 2ND WORD OF PROGRESS INDICATOR
002362  000000                  CPFLAG::        .WORD   0       ;CACHE PRESENT FLAG
```

```
                                ;;****************************************************************
                                ;;****************************************************************
                                ;
                                ;DUP COMMAND PACKETS
                                ;
                                ;;****************************************************************
                                ;;****************************************************************

                                ;;****************************************************************
                                ;
                                ;GET DUST STATUS COMMAND PACKET
                                ;
                                ;;****************************************************************

002364  000020                          .WORD   16.                     ;PACKET LENGTH IN BYTES
002366     020                          .BYTE   20                      ;MSGTYP = 1 (DATAGRAM); CREDITS = 0
002367     002                          .BYTE   2                       ;CONNECTION ID = 2 (DUP)
002370  000001  000000          GDUST:  .WORD   1,0                     ;COMMAND REFERENCE NUMBER = 1
002374  000000  000000                  .WORD   0,0
002400  000001  000000                  .WORD   OP.GDS,0                ;OPCODE = 1 (GET DUST STATUS)


                                ;;****************************************************************
                                ;
                                ;EXECUTE LOCAL PROGRAM COMMAND PACKET
                                ;
                                ;;****************************************************************

002404  000022                          .WORD   18.                     ;PACKET LENGTH IN BYTES
002406     020                          .BYTE   20                      ;MSGTYP = 1 (DATAGRAM); CREDITS = 0
002407     002                          .BYTE   2                       ;CONNECTION ID = 2 (DUP)
002410  000002  000000          EXELOC: .WORD   2,0                     ;COMMAND REFERENCE NUMBER = 2
002414  000000  000000                  .WORD   0,0
002420  000003  000001                  .WORD   OP.ELP,1                ;OPCODE = 3 (EXECUTE LOCAL PROGRAM)
002424     040     040     040  TSTNAM: .ASCII  /      /                ;LOCAL PROGRAM NAME (FILLED AT TEST)


                                ;;****************************************************************
                                ;
                                ;RECEIVE DATA COMMAND PACKET
                                ;
                                ;;****************************************************************

002432  000024                          .WORD   20.                     ;PACKET LENGTH IN BYTES
002434     000                          .BYTE   0                       ;MSGTYP = 0 (SEQUENTIAL); CREDITS = 0
002435     002                          .BYTE   2                       ;CONNECTION ID = 2 (DUP)
002436  000003  000000          RCVDAT: .WORD   3,0                     ;COMMAND REFERENCE NUMBER = 3
002442  000000  000000                  .WORD   0,0
002446  000005  000000                  .WORD   OP.REC,0                ;OPCODE = 5 (RECEIVE DATA)
002452  000156  000000                  .WORD   110.,0                  ;BUFFER SIZE IN BYTES
002456  060000  000000                  .WORD   RDBUF,0                 ;BUFFER ADDRESS

```

```
                                            ;;*****************************************************************
                                            ;
                                            ;ABORT COMMAND PACKET
                                            ;
                                            ;;*****************************************************************

     002462  000014                                  .WORD   12.                     ;PACKET LENGTH IN BYTES
     002464     020                                  .BYTE   20                      ;MSGTYP = 1 (DATAGRAM); CREDITS = 0
     002465     002                                  .BYTE   2                       ;CONNECTION ID = 2 (DUP)
     002466  000004  000000                 ABORT:  .WORD   4,0                     ;COMMAND REFERENCE NUMBER = 4
     002472  000000  000000                         .WORD   0,0
     002476  000006  000000                         .WORD   OP.ABT,0                ;OPCODE = 6 (ABORT)
```

```
                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;
                        ;CLASS DRIVER BUFFERS
                        ;
                        ;;*****************************************************************
                        ;;*****************************************************************

002502                  RESPBF::        .BLKW   2.      ;TOP 4 LOCATIONS OF RESPONSE BUFFER
002506                  RSPBUF::        .BLKW   66.     ;DRIVER RESPONSE BUFFER


                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;
                        ;U/Q PORT DESCRIPTOR RINGS
                        ;
                        ;;*****************************************************************
                        ;;*****************************************************************

002712                  DSCRNG::        .BLKW   2.      ;DESCRIPTOR RING
002716                  RSPEND::                        ;END OF RESPONSE BUFFER
002716                  RSPRNG::        .BLKW   4.      ;RESPONSE DESCRIPTOR RING
002726                  CMDRNG::        .BLKW   4.      ;COMMAND DESCRIPTOR RING
0C2736                  DSCEND::                        ;END OF DESCRIPTOR RING


                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;
                        ;CLASS AND PORT DRIVER VARIABLES
                        ;
                        ;;*****************************************************************
                        ;;*****************************************************************

002736  000000          CNTHI::         .WORD   0       ;VALUE OF THE HIGH TIMEOUT
002740  000000          CNTFLG::        .WORD   0       ;CONTROLLER FLAGS
002742  000000          PCKSIZ::        .WORD   0       ;PACKET SIZE IN BYTES
002744  000000          CMDREF::        .WORD   0       ;COMMAND REFERENCE NUMBER
002746  000000          CMDCNT::        .WORD   0       ;COMMAND COUNT
002750                  WRBUF::         .BLKW   4096.   ;WRITE BUFFER
022750  000000          CMDSAV::        .WORD   0       ;COMMAND DESCRIPTOR SAVE
022752  000000          RSPSAV::        .WORD   0       ;RESPONSE DESCRIPTOR SAVE


                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;
                        ;MANUAL INTERVENTION INPUT DATA TABLE
                        ;
                        ;;*****************************************************************
                        ;;*****************************************************************

022754                  MANTBL::        .BLKB   3       ;TWO BYTES OF INPUT, 3RD BYTE ZERO
                                        .EVEN
```

```
 1553                                   ;;******************************************************************
 1554                                   ;;******************************************************************
 1555                                   ;
 1556                                   ;PROTECTION TABLE
 1557                                   ;
 1558                                   ;;******************************************************************
 1559                                   ;;******************************************************************
 1563
 1564 022760                            BGNPROT
      022760                            L$PROT::
 1565 022760  000000                            .WORD   0
 1566 022762  177777                            .WORD   -1
 1567 022764  177777                            .WORD   -1
 1568
 1569 022766                            ENDPROT
 1570
```

```
                                 .SBTTL  GLOBAL TEXT SECTION
                                 ;;***************************************************************
                                 ;;***************************************************************
                                 ;
                                 ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                 ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                 ; MORE THAN ONE TEST.
                                 ;
                                 ;;***************************************************************
                                 ;;***************************************************************


                                 ;;***************************************************************
                                 ;
                                 ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                 ;
                                 ;;***************************************************************

022766                                   DEVTYP  <TU81>
022766                          L$DVTYP::
022766     124     125     070           .ASCIZ  %TU81%
                                         .EVEN

```

```

                                          ;;*****************************************************************
                                          ;
                                          ;FORMAT STATEMENTS
                                          ;
                                          ;;*****************************************************************

022774      045      101      111  LINE1:: .ASCIZ   ?%AINIT SEQUENCE STEP #: %D1?
023030      045      116      045  LINE2:: .ASCIZ   ?%N%ASA REG: %06%A EXPCTD: %06%A  ACTUAL SA: %06?
023110      045      116      045  LINE3:: .ASCIZ   ?%N%AIP REG ADDRESS: %06?
023140      045      116      062  LINE4:: .ASCIZ   ?%N2%A****FAILING FRU: %T%A****%N%N?
023203      045      101      122  LINE5:: .ASCIZ   ?%ARELOCATION CONSTANT: %06%A  VIRT. ADD: %06?
023260      045      116      045  LINE6:: .ASCIZ   ?%N%AEXPECTED: %06%A  RECEIVED: %06?
023323      045      101      120  LINE7:: .ASCIZ   ?%APHYSICAL ADD: %06?
                                           .EVEN

023350      045      116      045  WR1::   .ASCIZ   ?%N%ASA REG: %06%A SA CONTENTS: %06?
                                           .EVEN

023414      045      116      062  PKSENT::.ASCIZ   ?%N2%APACKET SENT:?
023436      045      116      045  CREFNO::.ASCIZ   ?%N%ACOMMAND REFERENCE NUMBER: %06?
023500      045      116      045  OPCODE::.ASCIZ   ?%N%AOPCODE: %03?
023520      045      116      045  MODIFY::.ASCIZ   ?%N%AMODIFIERS: %06?
023543      045      116      045  PRGNAM::.ASCIZ   ?%N%APROGRAM NAME: %03%A %03%A %03%A %03%A %03%A %03?
023627      045      116      045  BYTCNT::.ASCIZ   ?%N%ABYTE COUNT: %06?
023653      045      116      045  BUFDES::.ASCIZ   ?%N%ABUFFER DESCRIPTOR: %06?
023706      045      116      062  PKRECV::.ASCIZ   ?%N2%APACKET RECEIVED:?
023734      045      116      045  ENCODE::.ASCIZ   ?%N%AENDCODE: %03?
023755      045      116      045  STATUS::.ASCIZ   ?%N%ASTATUS: %06?
023775      045      116      045  PRGVER::.ASCIZ   ?%N%APROGRAM VERSION: %06?
024026      045      116      045  TIMOUT::.ASCIZ   ?%N%ATIMEOUT: %03?
024047      045      116      045  FLAGS:: .ASCIZ   ?%N%AFLAGS: %03?
024066      045      116      045  FAULTC::.ASCIZ   ?%N%AFAULT CODE:         SUB-FAULT CODE:   ?
                                           .EVEN

                                          ;;*****************************************************************
                                          ;
                                          ;ERROR MESSAGES
                                          ;
                                          ;;*****************************************************************


024140      116      130      115  EMSG5:: .ASCIZ   ?NXM ON READ TUIP?
024161      124      125      111  EMSG6:: .ASCIZ   ?TUIP NOT 0 ON FIRST READ?
024212      116      130      115  EMSG7:: .ASCIZ   ?NXM ON READ TUSA?
024233      123      101      040  EMSG8:: .ASCIZ   ?SA REG IN ERROR ON FIRST READ?
024271      123      101      040  EMSG9:: .ASCIZ   ?SA CONTENTS IN ERROR?
024316      123      101      040  EMSG10::.ASCIZ   ?SA WRONG IN DATA WRAP?
024344      105      130      120  EMSG11::.ASCIZ   ?EXPECTED INTERRUPT DID NOT OCCUR?
024405      111      116      124  EMSG12::.ASCIZ   ?INTRRPT OCCURRED WITH CPU PRIORITY = 7?
024454      123      101      040  EMSG13::.ASCIZ   ?SA NOT 0 IN PURGE/POLL?
024503      120      125      122  EMSG14::.ASCIZ   ?PURGE/POLL TEST FAILED?
024532      105      130      124  EMSG15::.ASCIZ   ?EXTENDED ADDRESS TEST FAILED?
024567      042      105      130  EMSG16::.ASCIZ   ?"EXECUTE LOCAL PROGRAM" COMMAND TIMEOUT?
024637      042      107      105  EMSG17::.ASCIZ   ?"GET DUST STATUS" COMMAND TIMEOUT?
024701      042      107      105  EMSG18::.ASCIZ   ?"GET DUST STATUS" COMMAND FAILURE?
024743      042      105      130  EMSG19::.ASCIZ   ?"EXECUTE LOCAL PROGRAM" COMMAND FAILURE?
```

```
 025013     042    122    105  EMSG20::.ASCIZ  ?"RECEIVE DATA" COMMAND FAILURE?
 025052     101    102    117  EMSG21::.ASCIZ  ?ABORT COMMANDS DON'T WORK?
 025104     111    116    124  EMSG22::.ASCIZ  ?INTERNAL DRIVE TEST HUNG?
 025135     111    116    126  EMSG23::.ASCIZ  ?INVALID MESSAGE NUMBER FROM INTERNAL DRIVE TEST?
 025215     111    116    124  EMSG24::.ASCIZ  ?INTERNAL DRIVE TEST FAILED?
                                        .EVEN

 025250     124    111    115  WRER1:: .ASCIZ  ?TIME OUT DURING PORT INIT?
 025302     120    117    122  WRER2:: .ASCIZ  ?PORT INIT FAILED?
 025323     124    115    123  WRER3:: .ASCIZ  ?TMSCP COMMAND FAILURE?
 025351     120    117    122  WRER4:: .ASCIZ  ?PORT DETECTED ERROR?
 025375     111    116    103  WRER5:: .ASCIZ  ?INCORRECT COMMAND REFERENCE NUMBER RECEIVED.?
 025452     045    116    045  WRER6:: .ASCIZ  ?%N%AREFER TO PATHFINDER FOR EXPLANATION OF CODES.?
 025534     045    116    045  WRER7:: .ASCIZ  ?%N%ARECEIVED INVALID MESSAGE NUMBER FROM INTERNAL DRIVE TEST.?
                                        .EVEN

                               ;;*****************************************************************
                               ;
                               ;MISCELLANEOUS ERROR MESSAGES
                               ;
                               ;;*****************************************************************

 025632     114    105    123  LESI::  .ASCIZ  ?LESI ADAPTER?
 025647     103    117    116  CTRL::  .ASCIZ  ?CONTROLLER/CABLE?
 025670     114    105    123  LSCT::  .ASCIZ  ?LESI/CONTROLLER/CABLE?
 025716     104    122    111  DRVE::  .ASCIZ  ?DRIVE?
                                        .EVEN

                               ;;*****************************************************************
                               ;
                               ;MANUAL TEST MESSAGES
                               ;
                               ;;*****************************************************************

 025724     045    116    045  T10MS1::.ASCIZ  \%N%ATest 10: FUNCTIONAL FAULT DETECTION TEST (Drive Resident Test #1)\
 026032     045    116    062  T10MS2::.ASCIZ  \%N2%A*** CAUTION ***\
 026057     045    116    045  T10MS3::.ASCIZ  \%N%AThis test will destroy the data on tape.\
 026134     045    116    045  T10MS4::.ASCIZ  \%N%AMount a scratch tape UNTENSIONED but THREADED.%N\
 026221     045    116    045  T11MS1::.ASCIZ  \%N%ATest 11: TENSION FAULT ISOLATION TEST (Drive Resident Test #2)\
 026324     045    116    045  T12MS1::.ASCIZ  \%N%ATest 12: VELOCITY FAULT ISOLATION TEST (Drive Resident Test #3)\
 026430     045    116    045  T13MS1::.ASCIZ  \%N%ATest 13: SELECT A DRIVE RESIDENT TEST (Drive Resident Tests 1-99)\
 026536     045    116    062  MMSG::.ASCIZ    \%N2%A*** REFER TO PATHFINDER FOR TEST REQUIREMENTS BEFORE PROCEDING ***\
 026646     105    156    164  SELTST::.ASCIZ  \Enter drive resident test number (1-99)\
 026716     111    163    040  QUESTN::.ASCIZ  \Is the drive ready (To bypass this test hit return)\
                                        .EVEN
```

```
                                .SBTTL  GLOBAL ERROR REPORT SECTION
                                ;;****************************************************************
                                ;;****************************************************************
                                ;
                                ;GLOBAL ERROR REPORTS
                                ;       THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB
                                ;       AND PRINTX CALLS THAT ARE USED IN MORE THAN ONE TEST.
                                ;       IT ALSO INCLUDES THE ASCII MESSAGES THAT ARE USED BY
                                ;       THE PRINTB AND PRINTX CALLS.
                                ;

                                ;;****************************************************************
                                ;;****************************************************************

027002                                  BGNMSG

027002                          PRIINI::
027002                                  PRINTX  #LINE1,INISTP
027002  013746  002336                  MOV     INISTP,-(SP)
027006  012746  022774                  MOV     #LINE1,-(SP)
027012  012746  000002                  MOV     #2,-(SP)
027016  010600                          MOV     SP,R0
027020  104415                          TRAP    C$PNTX
027022  062706  000006                  ADD     #6,SP

027026                          PRISA::
027026                                  PRINTX  #LINE2,TUSA(R4),SAEXP,TUSASV(R4)
027026  016446  000012                  MOV     TUSASV(R4),-(SP)
027032  013746  002334                  MOV     SAEXP,-(SP)
027036  016446  000002                  MOV     TUSA(R4),-(SP)
027042  012746  023030                  MOV     #LINE2,-(SP)
027046  012746  000004                  MOV     #4,-(SP)
027052  010600                          MOV     SP,R0
027054  104415                          TRAP    C$PNTX
027056  062706  000012                  ADD     #12,SP
027062  000137  030624                  JMP     FRUERR

027066                          PRIPAD::
027066                                  PRINTX  #LINE7,R2
027066  010246                          MOV     R2,-(SP)
027070  012746  023323                  MOV     #LINE7,-(SP)
027074  012746  000002                  MOV     #2,-(SP)
027100  010600                          MOV     SP,R0
027102  104415                          TRAP    C$PNTX
027104  062706  000006                  ADD     #6,SP
027110  000137  027142                  JMP     PRIDAT

027114                          PRIVAD::
027114                                  PRINTX  #LINE5,KPAR3,R2
027114  010246                          MOV     R2,-(SP)
027116  013746  172346                  MOV     KPAR3,-(SP)
027122  012746  023203                  MOV     #LINE5,-(SP)
027126  012746  000003                  MOV     #3,-(SP)
027132  010600                          MOV     SP,R0
027134  104415                          TRAP    C$PNTX
027136  062706  000010                  ADD     #10,SP

027142                          PRIDAT::
     027142                                     PRINTX  #LINE6,R1,(R2)
     027142  011246                             MOV     (R2),-(SP)
     027144  010146                             MOV     R1,-(SP)
     027146  012746  023260                     MOV     #LINE6,-(SP)
     027152  012746  000003                     MOV     #3,-(SP)
     027156  010600                             MOV     SP,R0
     027160  104415                             TRAP    C$PNTX
     027162  062706  000010                     ADD     #10,SP
     027166  000137  030624                     JMP     FRUERR

     027172                           PRIIP::
     027172                                     PRINTX  #LINE3,TUIP(R4)
     027172  016446  000000                     MOV     TUIP(R4),-(SP)
     027176  012746  023110                     MOV     #LINE3,-(SP)
     027202  012746  000002                     MOV     #2,-(SP)
     027206  010600                             MOV     SP,R0
     027210  104415                             TRAP    C$PNTX
     027212  062706  000006                     ADD     #6,SP
     027216  000137  030624                     JMP     FRUERR

     027222                           PRIERR::
     027222  000137  030624                     JMP     FRUERR


     027226                           WRINTO::
     027226                                     PRINTX  #LINE1,INISTP
     027226  013746  002336                     MOV     INISTP,-(SP)
     027232  012746  022774                     MOV     #LINE1,-(SP)
     027236  012746  000002                     MOV     #2,-(SP)
     027242  010600                             MOV     SP,R0
     027244  104415                             TRAP    C$PNTX
     027246  062706  000006                     ADD     #6,SP

     027252                           WRPRTE::
     027252                                     PRINTX  #WR1,TUSA(R4),TUSASV(R4)
     027252  016446  000012                     MOV     TUSASV(R4),-(SP)
     027256  016446  000002                     MOV     TUSA(R4),-(SP)
     027262  012746  023350                     MOV     #WR1,-(SP)
     027266  012746  000003                     MOV     #3,-(SP)
     027272  010600                             MOV     SP,R0
     027274  104415                             TRAP    C$PNTX
     027276  062706  000010                     ADD     #10,SP
     027302  000137  030624                     JMP     FRUERR

     027306                           ELPERR::                                      ;COMMAND/RESPONSE PACKET PRINTOUT
     027306                                     PRINTB  #PKSENT
     027306  012746  023414                     MOV     #PKSENT,-(SP)
     027312  012746  000001                     MOV     #1,-(SP)
     027316  010600                             MOV     SP,R0
     027320  104414                             TRAP    C$PNTB
     027322  062706  000004                     ADD     #4,SP
     027326                                     PRINTB  #CREFNO,(R5)
     027326  011546                             MOV     (R5),-(SP)
     027330  012746  023436                     MOV     #CREFNO,-(SP)
     027334  012746  000002                     MOV     #2,-(SP)
     027340  010600                             MOV     SP,R0
     027342  104414                             TRAP    C$PNTB
     027344  062706  000006                        ADD     #6,SP
1762 027350                                        PRINTB  #OPCODE,<B,10(R5)>
     027350  005046                                CLR     -(SP)
     027352  156516  000010                        BISB    10(R5),(SP)
     027356  012746  023500                        MOV     #OPCODE,-(SP)
     027362  012746  000002                        MOV     #2,-(SP)
     027366  010600                                MOV     SP,R0
     027370  104414                                TRAP    C$PNTB
     027372  062706  000006                        ADD     #6,SP
1763 027376                                        PRINTB  #MODIFY,12(R5)
     027376  016546  000012                        MOV     12(R5),-(SP)
     027402  012746  023520                        MOV     #MODIFY,-(SP)
     027406  012746  000002                        MOV     #2,-(SP)
     027412  010600                                MOV     SP,R0
     027414  104414                                TRAP    C$PNTB
     027416  062706  000006                        ADD     #6,SP
1764 027422                                        PRINTB  #PRGNAM,<B,14(R5)>,<B,15(R5)>,<B,16(R5)>,<B,17(R5)>,<B,20(R5)>,<B,21(R5)>
     027422  005046                                CLR     -(SP)
     027424  156516  000021                        BISB    21(R5),(SP)
     027430  005046                                CLR     -(SP)
     027432  156516  000020                        BISB    20(R5),(SP)
     027436  005046                                CLR     -(SP)
     027440  156516  000017                        BISB    17(R5),(SP)
     027444  005046                                CLR     -(SP)
     027446  156516  000016                        BISB    16(R5),(SP)
     027452  005046                                CLR     -(SP)
     027454  156516  000015                        BISB    15(R5),(SP)
     027460  005046                                CLR     -(SP)
     027462  156516  000014                        BISB    14(R5),(SP)
     027466  012746  023543                        MOV     #PRGNAM,-(SP)
     027472  012746  000007                        MOV     #7,-(SP)
     027476  010600                                MOV     SP,R0
     027500  104414                                TRAP    C$PNTB
     027502  062706  000020                        ADD     #20,SP
1765 027506                                        PRINTB  #PKRECV
     027506  012746  023706                        MOV     #PKRECV,-(SP)
     027512  012746  000001                        MOV     #1,-(SP)
     027516  010600                                MOV     SP,R0
     027520  104414                                TRAP    C$PNTB
     027522  062706  000004                        ADD     #4,SP
1766 027526                                        PRINTB  #CREFNO,(R3)
     027526  011346                                MOV     (R3),-(SP)
     027530  012746  023436                        MOV     #CREFNO,-(SP)
     027534  012746  000002                        MOV     #2,-(SP)
     027540  010600                                MOV     SP,R0
     027542  104414                                TRAP    C$PNTB
     027544  062706  000006                        ADD     #6,SP
1767 027550                                        PRINTB  #ENCODE,<B,10(R3)>
     027550  005046                                CLR     -(SP)
     027552  156316  000010                        BISB    10(R3),(SP)
     027556  012746  023734                        MOV     #ENCODE,-(SP)
     027562  012746  000002                        MOV     #2,-(SP)
     027566  010600                                MOV     SP,R0
     027570  104414                                TRAP    C$PNTB
     027572  062706  000006                        ADD     #6,SP
1768 027576                                        PRINTB  #STATUS,12(R3)
     027576  016346  000012                        MOV     12(R3),-(SP)
```

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      027602  012746  023755                    MOV     #STATUS,-(SP)
      027606  012746  000002                    MOV     #2,-(SP)
      027612  010600                            MOV     SP,R0
      027614  104414                            TRAP    C$PNTB
      027616  062706  000006                    ADD     #6,SP
 1769 027622                                    PRINTB  #PRGVER,14(R3)
      027622  016346  000014                    MOV     14(R3),-(SP)
      027626  012746  023775                    MOV     #PRGVER,-(SP)
      027632  012746  000002                    MOV     #2,-(SP)
      027636  010600                            MOV     SP,R0
      027640  104414                            TRAP    C$PNTB
      027642  062706  000006                    ADD     #6,SP
 1770 027646                                    PRINTB  #TIMOUT,<B,15(R3)>
      027646  005046                            CLR     -(SP)
      027650  156316  000015                    BISB    15(R3),(SP)
      027654  012746  024026                    MOV     #TIMOUT,-(SP)
      027660  012746  000002                    MOV     #2,-(SP)
      027664  010600                            MOV     SP,R0
      027666  104414                            TRAP    C$PNTB
      027670  062706  000006                    ADD     #6,SP
 1771 027674                                    PRINTB  #FLAGS,<B,16(R3)>
      027674  005046                            CLR     -(SP)
      027676  156316  000016                    BISB    16(R3),(SP)
      027702  012746  024047                    MOV     #FLAGS,-(SP)
      027706  012746  000002                    MOV     #2,-(SP)
      027712  010600                            MOV     SP,R0
      027714  104414                            TRAP    C$PNTB
      027716  062706  000006                    ADD     #6,SP
 1772 027722  000137  030624                    JMP     FRUERR
 1773
 1774 027726                            RCVERR::                                        ;COMMAND/RESPONSE PACKET PRINTOUT
 1775 027726                                    PRINTB  #PKSENT
      027726  012746  023414                    MOV     #PKSENT,-(SP)
      027732  012746  000001                    MOV     #1,-(SP)
      027736  010600                            MOV     SP,R0
      027740  104414                            TRAP    C$PNTB
      027742  062706  000004                    ADD     #4,SP
 1776 027746                                    PRINTB  #CREFNO,(R5)
      027746  011546                            MOV     (R5),-(SP)
      027750  012746  023436                    MOV     #CREFNO,-(SP)
      027754  012746  000002                    MOV     #2,-(SP)
      027760  010600                            MOV     SP,R0
      027762  104414                            TRAP    C$PNTB
      027764  062706  000006                    ADD     #6,SP
 1777 027770                                    PRINTB  #OPCODE,<B,10(R5)>
      027770  005046                            CLR     -(SP)
      027772  156516  000010                    BISB    10(R5),(SP)
      027776  012746  023500                    MOV     #OPCODE,-(SP)
      030002  012746  000002                    MOV     #2,-(SP)
      030006  010600                            MOV     SP,R0
      030010  104414                            TRAP    C$PNTB
      030012  062706  000006                    ADD     #6,SP
 1778 030016                                    PRINTB  #MODIFY,12(R5)
      030016  016546  000012                    MOV     12(R5),-(SP)
      030022  012746  023520                    MOV     #MODIFY,-(SP)
      030026  012746  000002                    MOV     #2,-(SP)
      030032  010600                            MOV     SP,R0
```

```
     030034  104414                          TRAP    C$PNTB
     030036  062706  000006                  ADD     #6,SP
     030042                                  PRINTB  #BYTCNT,14(R5)
     030042  016546  000014                  MOV     14(R5),-(SP)
     030046  012746  023627                  MOV     #BYTCNT,-(SP)
     030052  012746  000002                  MOV     #2,-(SP)
     030056  010600                          MOV     SP,R0
     030060  104414                          TRAP    C$PNTB
     030062  062706  000006                  ADD     #6,SP
     030066                                  PRINTB  #BUFDES,20(R5)
     030066  016546  000020                  MOV     20(R5),-(SP)
     030072  012746  023653                  MOV     #BUFDES,-(SP)
     030076  012746  000002                  MOV     #2,-(SP)
     030102  010600                          MOV     SP,R0
     030104  104414                          TRAP    C$PNTB
     030106  062706  000006                  ADD     #6,SP
     030112                                  PRINTB  #PKRECV
     030112  012746  023706                  MOV     #PKRECV,-(SP)
     030116  012746  000001                  MOV     #1,-(SP)
     030122  010600                          MOV     SP,R0
     030124  104414                          TRAP    C$PNTB
     030126  062706  000004                  ADD     #4,SP
     030132                                  PRINTB  #CREFNO,(R3)
     030132  011346                          MOV     (R3),-(SP)
     030134  012746  023436                  MOV     #CREFNO,-(SP)
     030140  012746  000002                  MOV     #2,-(SP)
     030144  010600                          MOV     SP,R0
     030146  104414                          TRAP    C$PNTB
     030150  062706  000006                  ADD     #6,SP
     030154                                  PRINTB  #ENCODE,<B,10(R3)>
     030154  005046                          CLR     -(SP)
     030156  156316  000010                  BISB    10(R3),(SP)
     030162  012746  023734                  MOV     #ENCODE,-(SP)
     030166  012746  000002                  MOV     #2,-(SP)
     030172  010600                          MOV     SP,R0
     030174  104414                          TRAP    C$PNTB
     030176  062706  000006                  ADD     #6,SP
     030202                                  PRINTB  #STATUS,12(R3)
     030202  016346  000012                  MOV     12(R3),-(SP)
     030206  012746  023755                  MOV     #STATUS,-(SP)
     030212  012746  000002                  MOV     #2,-(SP)
     030216  010600                          MOV     SP,R0
     030220  104414                          TRAP    C$PNTB
     030222  062706  000006                  ADD     #6,SP
     030226                                  PRINTB  #BYTCNT,14(R3)
     030226  016346  000014                  MOV     14(R3),-(SP)
     030232  012746  023627                  MOV     #BYTCNT,-(SP)
     030236  012746  000002                  MOV     #2,-(SP)
     030242  010600                          MOV     SP,R0
     030244  104414                          TRAP    C$PNTB
     030246  062706  000006                  ADD     #6,SP
     030252  000137  030624                  JMP     FRUERR

     030256                        GDSERR::                                                ;COMMAND/RESPONSE PACKET PRINTOUT
     030256                                  PRINTB  #PKSENT
     030256  012746  023414                  MOV     #PKSENT,-(SP)
     030262  012746  000001                  MOV     #1,-(SP)
     030266  010600                   MOV     SP,R0
     030270  104414                   TRAP    C$PNTB
     030272  062706  000004           ADD     #4,SP
     030276                           PRINTB  #CREFNO,(R5)
     030276  011546                   MOV     (R5),-(SP)
     030300  012746  023436           MOV     #CREFNO,-(SP)
     030304  012746  000002           MOV     #2,-(SP)
     030310  010600                   MOV     SP,R0
     030312  104414                   TRAP    C$PNTB
     030314  062706  000006           ADD     #6,SP
     030320                           PRINTB  #OPCODE,<B,10(R5)>
     030320  005046                   CLR     -(SP)
     030322  156516  000010           BISB    10(R5),(SP)
     030326  012746  023500           MOV     #OPCODE,-(SP)
     030332  012746  000002           MOV     #2,-(SP)
     030336  010600                   MOV     SP,R0
     030340  104414                   TRAP    C$PNTB
     030342  062706  000006           ADD     #6,SP
     030346                           PRINTB  #MODIFY,12(R5)
     030346  016546  000012           MOV     12(R5),-(SP)
     030352  012746  023520           MOV     #MODIFY,-(SP)
     030356  012746  000002           MOV     #2,-(SP)
     030362  010600                   MOV     SP,R0
     030364  104414                   TRAP    C$PNTB
     030366  062706  000006           ADD     #6,SP
     030372                           PRINTB  #PKRECV
     030372  012746  023706           MOV     #PKRECV,-(SP)
     030376  012746  000001           MOV     #1,-(SP)
     030402  010600                   MOV     SP,R0
     030404  104414                   TRAP    C$PNTB
     030406  062706  000004           ADD     #4,SP
     030412                           PRINTB  #CREFNO,(R3)
     030412  011346                   MOV     (R3),-(SP)
     030414  012746  023436           MOV     #CREFNO,-(SP)
     030420  012746  000002           MOV     #2,-(SP)
     030424  010600                   MOV     SP,R0
     030426  104414                   TRAP    C$PNTB
     030430  062706  000006           ADD     #6,SP
     030434                           PRINTB  #ENCODE,<B,10(R3)>
     030434  005046                   CLR     -(SP)
     030436  156316  000010           BISB    10(R3),(SP)
     030442  012746  023734           MOV     #ENCODE,-(SP)
     030446  012746  000002           MOV     #2,-(SP)
     030452  010600                   MOV     SP,R0
     030454  104414                   TRAP    C$PNTB
     030456  062706  000006           ADD     #6,SP
     030462                           PRINTB  #STATUS,12(R3)
     030462  016346  000012           MOV     12(R3),-(SP)
     030466  012746  023755           MOV     #STATUS,-(SP)
     030472  012746  000002           MOV     #2,-(SP)
     030476  010600                   MOV     SP,R0
     030500  104414                   TRAP    C$PNTB
     030502  062706  000006           ADD     #6,SP
     030506                           PRINTB  #FLAGS,<B,17(R3)>
     030506  005046                   CLR     -(SP)
     030510  156316  000017           BISB    17(R3),(SP)
     030514  012746  024047           MOV     #FLAGS,-(SP)
     030520  012746  000002                 MOV     #2,-(SP)
     030524  010600                         MOV     SP,R0
     030526  104414                         TRAP    C$PNTB
     030530  062706  000006                 ADD     #6,SP
1798 030534  000137  030624                 JMP     FRUERR
1799
1800 030540                         INTMSG::
1801 030540                                 PRINTB  #FAULTC
     030540  012746  024066                 MOV     #FAULTC,-(SP)
     030544  012746  000001                 MOV     #1,-(SP)
     030550  010600                         MOV     SP,R0
     030552  104414                         TRAP    C$PNTB
     030554  062706  000004                 ADD     #4,SP
1802 030560                                 PRINTB  #WRER6
     030560  012746  025452                 MOV     #WRER6,-(SP)
     030564  012746  000001                 MOV     #1,-(SP)
     030570  010600                         MOV     SP,R0
     030572  104414                         TRAP    C$PNTB
     030574  062706  000004                 ADD     #4,SP
1803 030600  000137  030624                 JMP     FRUERR
1804
1805 030604                         INVMSG::
1806 030604                                 PRINTB  #WRER7
     030604  012746  025534                 MOV     #WRER7,-(SP)
     030610  012746  000001                 MOV     #1,-(SP)
     030614  010600                         MOV     SP,R0
     030616  104414                         TRAP    C$PNTB
     030620  062706  000004                 ADD     #4,SP
1807
1808
1809 030624                         FRUERR::
1810 030624                                 PRINTB  #LINE4,FRUIS
     030624  013746  002330                 MOV     FRUIS,-(SP)
     030630  012746  023140                 MOV     #LINE4,-(SP)
     030634  012746  000002                 MOV     #2,-(SP)
     030640  010600                         MOV     SP,R0
     030642  104414                         TRAP    C$PNTB
     030644  062706  000006                 ADD     #6,SP
1811
1812 030650                         PRIEX:  EXIT    MSG
     030650  000167                         .WORD   J$JMP
     030652  000000                         .WORD   L10003-2-.
1813
1814 030654                                 ENDMSG
     030654                         L10003:
     030654  104423                         TRAP    C$MSG
1815
```

```
                                .SBTTL  GLOBAL SUBROUTINES SECTION

                                ;;***************************************************************
                                ;;***************************************************************
                                ;
                                ;GLOBAL SUBROUTINES SECTION
                                ;       THIS SECTION CONTAINS ALL SUBROUTINES AND
                                ;       INTERRUPT SERVICE ROUTINES THAT ARE AC-
                                ;       CESSED FROM ANYWHERE IN THE PROGRAM.
                                ;
                                ;;***************************************************************
                                ;;***************************************************************


                                ;;***************************************************************
                                ;;***************************************************************
                                ;
                                ;TRAP4
                                ;       THE ADDRESS OF THIS ROUTINE IS LOADED
                                ;       INTO VECTOR 4 WHENEVER THE PROGRAM IS
                                ;       ATTEMPTING TO ACCESS A PIECE OF HARDWARE
                                ;       FOR THE FIRST TIME.  IT IS INTENDED TO
                                ;       CATCH NON-EXISTENT MEMORY TIMEOUTS IN
                                ;       THE EVENT THE HARDWARE IS NOT REALLY PRE-
                                ;       SENT OR IS MALFUNCTIONING.  IT SIMPLY
                                ;       SETS A FLAG, INDICATING THE TRAP OCCURRED.
                                ;
                                ;;***************************************************************
                                ;;***************************************************************

030656                                  BGNSRV  TRAP4
030656                          TRAP4::

030656  005237  002316                  INC     TRP4FG          ;SET THE FLAG - TRAP OCCURRED

030662                                  ENDSRV
030662                          L10004:
030662  000002                          RTI

```

```


                                        ;;*****************************************************************
                                        ;;*****************************************************************
                                        ;
                                        ;INTRCV
                                        ;         THIS IS THE TU81 INTERRUPT HANDLER USED BY THE PRO-
                                        ;         GRAM WHEN INTERRUPTS HAVE BEEN ENABLED.  IF THE
                                        ;         BRFALG IS CLEAR, THE ROUTINE SETS A FLAG INDICATING
                                        ;         THE EXPECTED INTERRUPT OCCURRED.  IF BRFLAG IS SET,
                                        ;         IT INDICATES THAT PROCESOR PRIORITY WAS SET TO A
                                        ;         LEVEL THAT SHOULD HAVE INHIBITED THE INTERRUPT, SO
                                        ;         THE ROUTINE SETS AN ERROR INDICATOR.
                                        ;
                                        ;;*****************************************************************
                                        ;;*****************************************************************

030664                                            BGNSRV   INTRCV
030664                                  INTRCV::

                                        ;         BIT      #BRFLAG,LUNFLG(R4)            ;IF NOT PRIORITY LEVEL TESTING
                                        ;         BEQ      5$                            ;  THEN SKIP AROUND
                                        ;         MOV      #DRPFLG,LUNFLG(R4)            ;  ELSE SET FAILED BIT
                                        ;         BR       EXTINT                        ;RETURN

030664    052764    000002    000014    5$:       BIS      #INTFLG,LUNFLG(R4)            ;SET THE FLAG

030672                                  EXTINT:
030672                                            ENDSRV
030672                                  L10005:
030672    000002                                  RTI

```

```

                                        ;;*****************************************************************
                                        ;;*****************************************************************
                                        ;
                                        ;ILLINT
                                        ;       THIS HANDLER ROUTINE'S ADDRESS IS LOADED INTO THE
                                        ;       CURRENT UUT'S VECTOR FOR ALL TESTS THAT DO NOT EN-
                                        ;       ABLE DEVICE INTERRUPTS.
                                        ;
                                        ;;*****************************************************************
                                        ;;*****************************************************************

 030674                                         BGNSRV  ILLINT
 030674                                 ILLINT::

 030674 052764  000001  000014                  BIS     #DRPFLG,LUNFLG(R4)


 030702                                         ENDSRV
 030702                                 L10006:
 030702 000002                                  RTI

```

```

                                  ;;*****************************************************************
                                  ;;*****************************************************************
                                  ;
                                  ;CHKCAC
                                  ;       THIS ROUTINE IS USED IN THE DATA WRAP TEST TO CHECK IF
                                  ;       CACHE MEMORY IS PRESENT AND ENABLED ON THE SYSTEM BEING
                                  ;       TESTED.  IF SO, CACHE IS DISABLED BEFORE PROCEEDING
                                  ;       TO PREVENT THE TEST FROM INCORRECTLY REPORTING AN ERROR.
                                  ;
                                  ;;*****************************************************************
                                  ;;*****************************************************************

 030704                           CHKCAC::
 030704                                   SETVEC  #VEC4,#TRAP4,#PRIO7       ;SET UP FOR POSSIBLE ILLEGAL INT
 030704  012746  000000G                  MOV     #PRIO7,-(SP)
 030710  012746  030656                   MOV     #TRAP4,-(SP)
 030714  012746  000004                   MOV     #VEC4,-(SP)
 030720  012746  000003                   MOV     #3,-(SP)
 030724  104437                           TRAP    C$SVEC
 030726  062706  000010                   ADD     #10,SP
 030732  005037  002362                   CLR     CPFLAG                    ;CLEAR "CACHE PRESENT" FLAG
 030736  005737  177746                   TST     CCR                       ;READ CACHE CONTROL REGISTER
 030742  005737  002316                   TST     TRP4FG                    ;CACHE PRESENT ?
 030746  001005                           BNE     10$                       ;NO, BRANCH
 030750  052737  000014  177746           BIS     #DISCAC,CCR               ;DISABLE CACHE
 030756  005237  002362                   INC     CPFLAG                    ;SET "CACHE PRESENT" FLAG
 030762                           10$:    CLRVEC  #VEC4                     ;RESTORE VECTOR
 030762  012700  000004                   MOV     #VEC4,R0
 030766  104436                           TRAP    C$CVEC
 030770  005037  002316                   CLR     TRP4FG                    ;MORE HOUSEKEEPING
 030774  000207                           RTS     PC

```

```

                                      ;;************************************************************
                                      ;;************************************************************
                                      ;
                                      ;KTTEST
                                      ;       THIS SUBROUTINE IS USED BY THE INIT CODE TO
                                      ;       DETERMINE IF THE MEMORY MANAGEMENT UNIT IS
                                      ;       PRESENT.  IF SO, IT RETURNS A FLAG IN THE
                                      ;       SET STATE.  OTHERWISE THE FALG IS CLEAR IN
                                      ;       WHICH CASE TEST SEVEN IS BYPASSED.
                                      ;
                                      ;;************************************************************
                                      ;;************************************************************

 030776                               KTTEST::
 030776                                       SETVEC  #VEC4,#TRAP4,#PRI07     ;SET UP FOR POSSIBLE NXM
 030776  012746  000340                       MOV     #PRI07,-(SP)
 031002  012746  030656                       MOV     #TRAP4,-(SP)
 031006  012746  000004                       MOV     #VEC4,-(SP)
 031012  012746  000003                       MOV     #3,-(SP)
 031016  104437                               TRAP    C$SVEC
 031020  062706  000010                       ADD     #10,SP
 031024  005737  177572                       TST     MMUSR0          ;ARE YOU THERE, MMU?
 031030                                       DELAY   1               ;GIVE NXM TIMEOUT A CHANCE
 031030  012727  000001                       MOV     #1,(PC)+
 031034  000000                               .WORD   0
 031036  013727  002116                       MOV     L$DLY,(PC)+
 031042  000000                               .WORD   0
 031044  005367  177772                       DEC     -6(PC)
 031050  001375                               BNE     .-4
 031052  005367  177756                       DEC     -22(PC)
 031056  001367                               BNE     .-20

 031060  005737  002316                       TST     TRP4FG          ;IF NXM OCCURRED
 031064  001026                               BNE     NOKT            ;  THEN NO MMU IS PRESENT
 031066  005237  002314                       INC     KTFLAG          ;  ELSE SAY WE FOUND 18 BIT SO FAR

 031072  005737  172516                       TST     MMUSR3          ;NOW LOOK FOR 22 BIT MAPPING
 031076                                       DELAY   1               ;GIVE NXM A CHANCE
 031076  012727  000001                       MOV     #1,(PC)+
 031102  000000                               .WORD   0
 031104  013727  002116                       MOV     L$DLY,(PC)+
 031110  000000                               .WORD   0
 031112  005367  177772                       DEC     -6(PC)
 031116  001375                               BNE     .-4
 031120  005367  177756                       DEC     -22(PC)
 031124  001367                               BNE     .-20

 031126  005737  002316                       TST     TRP4FG          ;IF NXM OCCURRED
 031132  001005                               BNE     KTEXT           ;  THEN 18 BIT IS ALL WE'VE GOT
 031134  005237  002314                       INC     KTFLAG          ;  ELSE SAY WE'VE GOT 22 BIT
 031140  000402                               BR      KTEXT           ;    AND BRANCH AROUND NEXT

 031142  005037  002314               NOKT:   CLR     KTFLAG          ;NO MMU - CLEAR FLAG

 031146                               KTEXT:  CLRVEC  #VEC4           ;RESTORE VECTOR
 031146  012700  000004                       MOV     #VEC4,R0
```

```
     031152  104436                    TRAP    C$CVEC
     031154  005037  002316            CLR     TRP4FG          ;MORE HOUSEKEEPING
     031160  000207                    RTS     PC
```

```



                                        ;;*****************************************************************
                                        ;;*****************************************************************
                                        ;
                                        ;RSTVEC
                                        ;       THIS ROUTINE IS CALLED FROM VARIOUS PLACES
                                        ;       IN THE PROGRAM TO SET THE UUT'S INTERRUPT
                                        ;       VECTOR WITH THE ADDRESS OF A HANDLER ROUTINE
                                        ;       WHICH WILL CATCH ILLEGAL DEVICE INTERRUPTS,
                                        ;       SPECIFICALLY "ILLINT".  INTERRUPT PRIORITY
                                        ;       IS SET TO 0.
                                        ;
                                        ;;*****************************************************************
                                        ;;*****************************************************************

     031162                             RSTVEC::
     031162                                     SETVEC  TUVEC(R4),#ILLINT,#PRIO0
     031162  012746  000000                     MOV     #PRIO0,-(SP)
     031166  012746  030674                     MOV     #ILLINT,-(SP)
     031172  016446  000004                     MOV     TUVEC(R4),-(SP)
     031176  012746  000003                     MOV     #3,-(SP)
     031202  104437                             TRAP    C$SVEC
     031204  062706  000010                     ADD     #10,SP

     031210  000207                             RTS     PC

```

```



                                        ;;**************************************************************
                                        ;;**************************************************************
                                        ;
                                        ;VECTOR
                                        ;       THIS ROUTINE IS CALLED FROM VARIOUS PLACES
                                        ;       IN THE PROGRAM TO SET THE UUT'S VECTOR WITH
                                        ;       THE ADDRESS OF A HANDLER ROUTINE WHEN DEVICE
                                        ;       INTERRUPTS HAVE BEEN ENABLED.  THE ROUTINE HAS
                                        ;       TWO MODES OF OPERATION: WHEN BRFLAG IS CLEAR,
                                        ;       PROCESSOR PRIORITY IS SET TO ZERO, ALLOWING
                                        ;       DEVICE INTERRUPTS.  IF BRFLAG IS SET, PRIORITY
                                        ;       IS SET TO 7.  IF AN INTERRUPT OCCURS IN THIS
                                        ;       CASE, AN ERROR IS RETURNED BY THE HANDLER
                                        ;       ROUTINE, "INTRCV".
                                        ;
                                        ;;**************************************************************
                                        ;;**************************************************************

031212                                  VECTOR::
031212  032764  000004  000014                  BIT     #BRFLAG,LUNFLG(R4)      ;IF FLAG IS SET
031220  001014                                  BNE     5$                      ;  THEN SKIP TO SECOND HALF
031222                                          SETVEC  TUVEC(R4),#INTRCV,#PRIO0        ;ELSE LOW PRIORITY
031222  012746  000000                          MOV     #PRIO0,-(SP)
031226  012746  030664                          MOV     #INTRCV,-(SP)
031232  016446  000004                          MOV     TUVEC(R4),-(SP)
031236  012746  000003                          MOV     #3,-(SP)
031242  104437                                  TRAP    C$SVEC
031244  062706  000010                          ADD     #10,SP
031250  000413                                  BR      EXTVEC                  ;RETURN

031252                                  5$:     SETVEC  TUVEC(R4),#INTRCV,#PRIO7        ;HIGH PRIORITY
031252  012746  000340                          MOV     #PRIO7,-(SP)
031256  012746  030664                          MOV     #INTRCV,-(SP)
031262  016446  000004                          MOV     TUVEC(R4),-(SP)
031266  012746  000003                          MOV     #3,-(SP)
031272  104437                                  TRAP    C$SVEC
031274  062706  000010                          ADD     #10,SP

031300  000207                          EXTVEC: RTS     PC


```

```


                                   ;;*****************************************************************
                                   ;;*****************************************************************
                                   ;
                                   ;PDELAY
                                   ;       THIS ROUTINE IS USED THROUGHOUT THE PROGRAM TO PROVIDE
                                   ;       A VARIABLE AMOUNT OF DELAY TIME.  THE DELAY WILL BE
                                   ;       INSTRUCTION EXECUTION TIME DEPENDENT.  TWO VALUES MUST
                                   ;       BE LOADED BY MAINLINE CODE PRIOR TO CALLING PDELAY:
                                   ;       "INNER" AND "OUTER".  IF SUFFICIENT CALLS TO PDELAY ARE
                                   ;       MADE SUCH THAT THE OUTER COUNT IS EXHAUSTED, THE ROUTINE
                                   ;       RETURNS "TOUT" EQUAL TO 1, INDICATING TIMEOUT HAS OCCURRED.
                                   ;       "INNER" SHOULD BE RE-LOADED BY MAINLINE CODE, PRIOR TO
                                   ;       CALL TO PDELAY WITHIN A TIMING LOOP.
                                   ;
                                   ;;*****************************************************************
                                   ;;*****************************************************************


031302                             PDELAY::
031302  005037  002350                     CLR     TOUT            ;CLEAR TIMEOUT INDICATOR
031306  005337  002344                     DEC     INNER           ;IF COUNT NOT EXHAUSTED
031312  001373                             BNE     PDELAY          ;  THEN KEEP LOOPING
031314  005337  002346                     DEC     OUTER           ;IF MAJOR COUNT NOT 0
031320  001002                             BNE     PDLYEX          ;  THEN LEAVE WITH STATUS = OK
031322  005237  002350                     INC     TOUT            ;  ELSE SET TIMEOUT
031326  000207                     PDLYEX: RTS     PC


```

```

                                        ;;****************************************************************
                                        ;;****************************************************************
                                        ;
                                        ;STEP1
                                        ;       THIS SUBROUTINE IS RESPONSIBLE FOR PERFORMING
                                        ;       STEP 1 OF THE UQ-PORT INIT SEQUENCE.  SPECIFI-
                                        ;       CALLY, IT WILL INITIALIZE THE UUT BY WRITING
                                        ;       TO ITS IP REGISTER.  AFTER A BRIEF DELAY, IT
                                        ;       WILL READ THE SA REGISTER TO INSURE THAT THE
                                        ;       STEP 1 BIT IS SET AND THE ERROR BIT IS CLEAR.
                                        ;       IT WILL THEN WRITE THE FIRST LOCATION OF THE
                                        ;       STEP TABLE (SET UP BY MAINLINE CODE) TO THE
                                        ;       UUT'S SA REG.  IF ALL STEPS COMPLETE SUCCESS-
                                        ;       FULLY THE ROUTINE RETURNS "STEPST" CLEARED;
                                        ;       OTHERWISE "STEPST" IS RETURNED INDICATING A
                                        ;       FAILURE OCCURRED.
                                        ;
                                        ;;****************************************************************
                                        ;;****************************************************************

031330                                  STEP1::
031330  005037  002340                          CLR     STEPST           ;CLEAR THE STATUS INDICATOR
031334  012774  000000  000000                  MOV     #0,@TUIP(R4)     ;INIT THE UUT
031342  012727  000001                          MOV     #1,(PC)+
031346  000000                                  .WORD   0
031350  013727  002116                          MOV     L$DLY,(PC)+
031354  000000                                  .WORD   0
031356  005367  177772                          DEC     -6(PC)
031362  001375                                  BNE     .-4
031364  005367  177756                          DEC     -22(PC)
031370  001367                                  BNE     .-20
031372  017464  000002  000012                  MOV     @TUSA(R4),TUSASV(R4)     ;GET THE SA REG CONTENTS
031400  022764  004600  000012                  CMP     #B.S1!B.DI!B.OD,TUSASV(R4)

                                                                         ;IF ALL THE RIGHT BITS AREN'T SET
031406  001004                                  BNE     STP1ER           ;  THEN TAKE ERROR EXIT
031410  013774  002272  000002                  MOV     STPTBL,@TUSA(R4);  ELSE WRITE HOST'S STEP 1 RESPONSE
031416  000402                                  BR      STP1EX           ;     AND LEAVE SHOWING SUCCESS

031420  005237  002340                  STP1ER: INC     STEPST           ;SET ERROR INDICATOR

031424  000207                          STP1EX: RTS     PC

```

```
                                        ;;*****************************************************************
                                        ;;*****************************************************************
                                        ;
                                        ;BAKPAT
                                        ;        THIS SUBROUTINE WILL FILL THE COMMUNICATION WITH AN
                                        ;        ALL 1'S DATA PATTERN.  THE LENGTH OF THE AREA IN USE
                                        ;        BY THE CURRENT TEST IS CONTAINED IN "CMARLG".
                                        ;
                                        ;;*****************************************************************
                                        ;;*****************************************************************

031426                                  BAKPAT::
031426  012702  060000                          MOV     #COMMBF,R2              ;STARTING ADDRESS OF COMM AREA
                                                                                ;-20 WORDS
031432  012703  000024                          MOV     #20.,R3                 ;BUFFER LENGTH IN FRONT OF AREA
031436  006303                                  ASL     R3                      ;MULTIPLIED BY 2
031440  063703  002326                          ADD     CMARLG,R3               ;ADD COMM AREA LENGTH USED
031444  012722  177777                  1$:     MOV     #-1,(R2)+               ;WRITE THE DATA
031450  005303                                  DEC     R3                      ;IF NOT DONE YET
031452  001374                                  BNE     1$                      ;  THEN DO IT AGAIN

031454  000207                                  RTS     PC
```

```



                                  ;;*****************************************************************
                                  ;;*****************************************************************
                                  ;
                                  ;CHKCOM
                                  ;       THIS ROUTINE IS CALLED BY TESTS DOING THE PURGE/POLL
                                  ;       CHECK.  IT IS USED TO VERIFY THAT THE PORT LEFT THE
                                  ;       COMMUNICATIONS AREA CLEARED.  ADDITIONALLY, IT CHECKS
                                  ;       THE 20 WORDS PRECEDING AND SUCCEEDING THE COMM AREA
                                  ;       TO MAKE SURE THE PORT DIDN'T GO OUTSIDE THE COMM AREA.
                                  ;
                                  ;;*****************************************************************
                                  ;;*****************************************************************

031456                            CHKCOM::
031456  012701  177777                    MOV     #-1,R1                  ;TEST DATA
031462  012702  060000                    MOV     #COMMBF,R2              ;STARTING ADDRESS
031466  012703  000022                    MOV     #18.,R3                 ;FIRST COUNT
031472  020122                    1$:     CMP     R1,(R2)+                ;IF NOT ALL 1'S
031474  001022                            BNE     15$                     ;  THEN GO REPORT ERROR
031476  005303                            DEC     R3                      ;IF NOT ALL DONE
031500  001374                            BNE     1$                      ;  THEN GO CHECK ANOTHER

031502  005001                            CLR     R1                      ;TEST DATA FOR PRINTOUT
031504  013703  002326                    MOV     CMARLG,R3               ;SET UP COUNTER FOR COMM AREA
031510  005722                    5$:     TST     (R2)+                   ;IF NOT 0
031512  001013                            BNE     15$                     ;  THEN GO REPORT ERROR
031514  005303                            DEC     R3                      ;IF NOT ALL DONE
031516  001374                            BNE     5$                      ;  THEN GO CHECK ANOTHER

031520  012701  177777                    MOV     #-1,R1                  ;TEST DATA FOR PRINTOUT
031524  012703  000024                    MOV     #20.,R3                 ;SET UP COUNTER FOR POST COMM AREA
031530  020122                    10$:    CMP     R1,(R2)+                ;IF NOT ALL 1'S
031532  001003                            BNE     15$                     ;  THEN GO REPORT ERROR
031534  005303                            DEC     R3                      ;IF NOT ALL DONE
031536  001374                            BNE     10$                     ;  THEN GO CHECK ANOTHER
031540  000425                            BR      CKCMEX                  ;  ELSE RETURN

031542  162702  000002            15$:    SUB     #2,R2                   ;ADJUST ADDRESS FOR PRINTOUT
031546  012737  025632  002330            MOV     #LESI,FRUIS             ;LOAD FAILING FRU
031554  022737  000010  002114            CMP     #8.,L$TEST              ;IF IN TEST 8
031562  001405                            BEQ     20$                     ;  THEN DO ALTERNATE PRINTOUT
031564                                    ERRDF   1,EMSG14,PRIPAD         ;"PURGE/POLL TEST FAILED"
031564  104455                            TRAP    C$ERDF
031566  000001                            .WORD   1
031570  024503                            .WORD   EMSG14
031572  027066                            .WORD   PRIPAD
031574  000404                            BR      25$                     ;COMMON EXIT

031576                            20$:    ERRDF   2,EMSG15,PRIVAD         ;"EXTENDED ADDRESS TEST FAILED"
031576  104455                            TRAP    C$ERDF
031600  000002                            .WORD   2
031602  024532                            .WORD   EMSG15
031604  027114                            .WORD   PRIVAD

031606                            25$:    DODU    LOGUNT
```

```
        031606  013700  002332                  MOV     LOGUNT,R0
        031612  104451                          TRAP    C$DODU
   2228
   2229 031614  000207                  CKCMEX: RTS     PC
   2230
```

```



                                             ;;****************************************************************
                                             ;;****************************************************************
                                             ;
                                             ;INTMMU
                                             ;        THIS SUBROUTINE IS CALLED FROM TEST 8 TO INITIALIZE
                                             ;        MEMORY MANAGEMENT REGISTERS.  ALL PAR'S EXCEPT ONE
                                             ;        ARE SET UP TO MAP VIRTUAL ADDRESSES INTO THE LOWEST
                                             ;        32K OF PHYSICAL MEMORY.  KPAR7 IS SET UP TO MAP TO
                                             ;        THE I/O PAGE.  THE PAR REGISTER THAT CORRESPONDS TO
                                             ;        THE VIRTUAL ADDRESS OF THE COMMUNICATION AREA IS SET
                                             ;        UP TO POINT TO THE SECOND 32K OF PHYSICAL MEMORY.
                                             ;        ALL PDR'S ARE INITIALIZED TO THE SAME VALUE; NAMELY,
                                             ;        UPWARD EXPANDABLE, READ/WRITE ACCESS ENABLED, AND THE
                                             ;        FULL 8KBYTE PAGE IS ACCESSIBLE.
                                             ;
                                             ;;****************************************************************
                                             ;;****************************************************************

031616                                      INTMMU::
031616  012703  172300                               MOV     #KPDR0,R3               ;START OF PDR ADDRESS RANGE
031622  012702  172340                               MOV     #KPAR0,R2               ;START OF PAR ADDRESS RANGE
031626  005001                                       CLR     R1                      ;STARTING RELOCATION VALUE

031630  010122                              1$:      MOV     R1,(R2)+                ;LOAD RELOCATION VALUE
031632  012723  077406                               MOV     #77406,(R3)+            ;LOAD PDR
031636  062701  000200                               ADD     #200,R1                 ;ADJUST RELOCATION VALUE
031642  022701  002000                               CMP     #2000,R1                ;IF NOT AT THE END
031646  001370                                       BNE     1$                      ;  THEN DO ANOTHER ONE

031650  010137  172346                               MOV     R1,KPAR3                ;  ELSE SET THIS REG TO NEXT 32K
031654  012737  007600  172356                       MOV     #7600,KPAR7             ;18 BIT I/O PAGE
031662  032737  000002  002314                       BIT     #BIT1,KTFLAG            ;IF 22-BIT BUS NOT AVAILABLE
031670  001406                                       BEQ     2$                      ;  THEN GO TURN MMU ON
031672  012737  177600  172356                       MOV     #177600,KPAR7           ;  ELSE SET 22 BIT I/O PAGE
031700  012737  000020  172516                       MOV     #MM22ON,MMUSR3          ;  AND ENABLE 22 BIT MAPPING

031706  012737  000001  177572      2$:      MOV     #MMON,MMUSR0            ;TURN ON THE WHOLE THING
031714  000207                                       RTS     PC


031716                                      PRTINT::
031716  010174  000000                               MOV     R1,@TUIP(R4)            ;INITIALIZE THE DRIVE
031722  012703  032140                               MOV     #INTTBL,R3              ;PUT THE TABLE ADDRESS INTO R3
031726  012701  004000                               MOV     #S1,R1                  ;SET UP TO BEGIN AT STEP 1
031732  005037  002336                               CLR     INISTP                  ;CLEAR THE STEP TRACKER
031736  012737  000030  002736      LOOP:    MOV     #24.,CNTHI              ;SET UP THE TIME OUT COUNTER
031744  005002                                       CLR     R2                      ;CLEAR R2
031746  005202                              ILOOP:   INC     R2                      ;INCREMENT HI TIME OUT VALUE ?
031750  001016                                       BNE     2$                      ;IF NOT, BRANCH
031752  005337  002736                               DEC     CNTHI                   ;ELSE, DECREMENT LO TIMEOUT
031756  001013                                       BNE     2$                      ;BRANCH IF NO TIME OUT
031760  017464  000002  000012                       MOV     @TUSA(R4),TUSASV(R4)    ;SAVE THE SA FOR THE ERROR PRINTOUT
031766                                               ERRDF   51.,WRER1,WRINTO        ;PRINT PORT INIT FAILURE
031766  104455                                       TRAP    C$ERDF
031770  000063                                       .WORD   51
```

```
      031772  025250                                 .WORD   WRER1
      031774  027226                                 .WORD   WRINTO
 2293 031776                                         DODU    LOGUNT                          ;DROP THE UNIT
      031776  013700  002332                         MOV     LOGUNT,RO
      032002  104451                                 TRAP    C$DODU
 2294 032004  000454                                 BR      100$                            ;EXIT ROUTINE
 2295 032006  037401  000002           2$:           BIT     @TUSA(R4),R1                    ;TEST FOR STEP BIT FROM DRIVE
 2296 032012  001755                                 BEQ     ILOOP                           ;LOOP UNTIL SOMETHING SETS
 2297 032014  032774  100000  000002                 BIT     #ERR,@TUSA(R4)                  ;CHECK FOR ERROR
 2298 032022  001413                                 BEQ     3$                              ;NO ERROR, KEEP GOING
 2299 032024  017464  000002  000012                 MOV     @TUSA(R4),TUSASV(R4)            ;SAVE THE SA CONTENTS
 2300 032032                                         ERRDF   52.,WRER2,WRPRTE                ;PRINT ERROR
      032032  104455                                 TRAP    C$ERDF
      032034  000064                                 .WORD   52
      032036  025302                                 .WORD   WRER2
      032040  027252                                 .WORD   WRPRTE
 2301 032042                                         DODU    LOGUNT                          ;DROP THE UNIT
      032042  013700  002332                         MOV     LOGUNT,RO
      032046  104451                                 TRAP    C$DODU
 2302 032050  000432                                 BR      100$                            ;EXIT ROUTINE
 2303 032052  005237  002336           3$:           INC     INISTP                          ;INCREMENT THE STEP TRACKER
 2304 032056  012374  000002                         MOV     (R3)+,@TUSA(R4)                 ;WRITE WORD FROM TABLE TO CONTROLLER
 2305 032062  006301                                 ASL     R1                              ;SHIFT TO NEXT STEP
 2306 032064  100324                                 BPL     LOOP                            ;IF NOT AT LAST STEP LOOP
 2307 032066  012702  002716                         MOV     #RSPRNG,R2                      ;PUT THE RESPONSE DESCRIPTOR ADD IN R2
 2308 032072  012703  002506                         MOV     #RSPBUF,R3                      ;PUT THE RESPONSE BUFFER ADDRESS IN R3
 2309 032076  010322                       5$:           MOV     R3,(R2)+                        ;PUT THE BUFF ADD IN THE DESCRIPTOR
 2310 032100  012722  100000                         MOV     #OWN,(R2)+                      ;SET THE DESCRIPTOR TO THE CONTROLLER
 2311 032104  062703  000104                         ADD     #RSPSTP,R3                      ;STEP TO THE NEXT BUFFER SLOT
 2312 032110  022703  002716                         CMP     #RSPEND,R3                      ;ARE WE AT THE END OF THE BUFFER ?
 2313 032114  001370                                 BNE     5$                              ;NO, KEEP GOING
 2314 032116  012737  002716  022752                 MOV     #RSPRNG,RSPSAV                  ;SET UP TO USE FIRST RESPONSE BUFFER
 2315 032124  012737  002726  022750                 MOV     #CMDRNG,CMDSAV                  ;SET UP TO USE FIRST COMMAND BUFFER
 2316 032132  005037  002744                         CLR     CMDREF                          ;SET THE COMMAND REFERENCE # TO 0
 2317 032136  000207                   100$:         RTS     PC                              ;RETURN
 2318
 2319                                  ;INIT DATA TABLE
 2320 032140  104400                   INTTBL:               .WORD   104400
 2321 032142  002716                                         .WORD   RSPRNG
 2322 032144  000000                                         .WORD   0
 2323 032146  000001                                         .WORD   GO
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032150  005064  000014          DRVTST: CLR     LUNFLG(R4)              ;CLEAR ALL FLAGS
032154  005037  002356                  CLR     PROGRL                  ;CLEAR LOW WORD OF PROGRESS INDICATOR
032160  005037  002360                  CLR     PROGRH                  ;CLEAR HIGH WORD OF PROGRESS INDICATOR
032164  012737  025647  002330          MOV     #CTRL,FRUIS             ;DEFAULT FRU IS CONTROLLER
032172  004737  031716                  JSR     PC,PRTINT               ;GO DO A PORT INIT
032176  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
032204  001060                          BNE     100$                    ;NO, BRANCH TO EXIT
032206  012705  002410                  MOV     #EXELOC,R5              ;SET UP FOR "EXECUTE LOCAL PROGRAM"
032212  004737  032350                  JSR     PC,CLSDRV               ;GO ISSUE THE COMMAND
032216  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
032224  001050                          BNE     100$                    ;NO, BRANCH TO EXIT
032226  012705  002436                  MOV     #RCVDAT,R5              ;SET UP FOR "RECEIVE DATA"
032232  004737  032350                  JSR     PC,CLSDRV               ;GO ISSUE THE COMMAND
032236  005001                  10$:    CLR     R1                      ;CLEAR LOW DELAY COUNTER
032240  012702  000024                  MOV     #20.,R2                 ;SET UP HIGH DELAY COUNTER
032244  032737  000200  177560  30$:    BIT     #BIT7,RCSR              ;"CONTROL C" INPUT ?
032252  001021                          BNE     50$                     ;YES, BRANCH
032254  005201                          INC     R1                      ;DELAY BETWEEN "GET DUST STATUS" COMMANDS
032256  001372                          BNE     30$
032260  005302                          DEC     R2
032262  001370                          BNE     30$
032264  012705  002370                  MOV     #GDUST,R5               ;SET UP FOR "GET DUST STATUS"
032270  004737  032350                  JSR     PC,CLSDRV               ;GO ISSUE THE COMMAND
032274  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
032302  001021                          BNE     100$                    ;NO, BRANCH TO EXIT
032304  032764  000020  000014          BIT     #DONEFL,LUNFLG(R4)      ;INTERNAL TEST DONE ?
032312  001015                          BNE     100$                    ;YES, BRANCH TO EXIT
032314  000750                          BR      10$                     ;LOOP
032316  013705  177562          50$:    MOV     RBUF,R5                 ;GET DATA INPUT FROM KEYBOARD
032322  042705  000200                  BIC     #BIT7,R5                ;STRIP PARITY
032326  022705  000003                  CMP     #CNTRLC,R5              ;"CONTROL C" INPUT ?
032332  001344                          BNE     30$                     ;NO, BRANCH
032334  012705  002466          40$:    MOV     #ABORT,R5               ;SET UP FOR "ABORT"
032340  004737  032350                  JSR     PC,CLSDRV               ;GO ISSUE THE COMMAND
032344                                  BREAK
032344  104422                          TRAP    C$BRK
032346  000207                  100$:   RTS     PC                      ;RETURN




032350                          CLSDRV::
032350  004737  032456          1$:     JSR     PC,PRTDRV               ;GO SEND THE COMMAND
032354  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
032362  001034                          BNE     100$                    ;GET OUT IF NOT AVAILABLE
032364  020527  002436                  CMP     R5,#RCVDAT              ;"RECEIVE DATA" COMMAND JUST ISSUED ?
032370  001431                          BEQ     100$                    ;YES, BRANCH TO EXIT
032372  004737  032556                  JSR     PC,CDRECV               ;GO CHECK FOR ANY NEW RESPONSES
032376  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
032404  001023                          BNE     100$                    ;GET OUT IF NOT AVAILABLE
032406  004737  033042                  JSR     PC,CHKRSP               ;GO CHECK CONTENTS OF RESPONSE
032412  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
032420  001015                          BNE     100$                    ;GET OUT IF NOT AVAILABLE
032422  022705  002436                  CMP     #RCVDAT,R5              ;WAS IT A "RECEIVE DATA" COMMAND ?
032426  001012                          BNE     100$                    ;NO, BRANCH TO EXIT
032430  004737  033326                  JSR     PC,CHKMSG               ;GO CHECK MESSAGE FROM INTERNAL TEST
032434  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
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 032442  001004                                  BNE     100$                          ;GET OUT IF NOT AVAILABLE
 032444  012705  002370                          MOV     #GDUST,R5                     ;"GET DUST STAUS" PACKET ADDRESS
 032450  004737  032556                          JSR     PC,CDRECV                     ;GO GET LAST RESPONSE
 032454  000207                          100$:   RTS     PC                            ;RETURN




 032456                                  PRTDRV::
 032456  013701  022750                          MOV     CMDSAV,R1                     ;SET UP COMMAND RING POINTER
 032462  010511                                  MOV     R5,(R1)                       ;PUT THE PACKET ADDRESS INTO THE DESCRIPTOR
 032464  012761  100000  000002                  MOV     #OWN,HIADDR(R1)               ;SET THE OWNERSHIP BIT OF THE DESCRIPTOR
 032472  005774  000000                          TST     @TUIP(R4)                     ;READ THE IP REGISTER
 032476  005774  000002                          TST     @TUSA(R4)                     ;READ THE SA REGISTER
 032502  001413                                  BEQ     10$                           ;BRANCH IF NO ERRORS
 032504  017464  000002  000012                  MOV     @TUSA(R4),TUSASV(R4)          ;SAVE THE SA FOR THE ERROR PRINTOUT
 032512                                          ERRDF   53.,WRER4,WRPRTE              ;PRINT PORT DETECTED ERROR
 032512  104455                                  TRAP    C$ERDF
 032514  000065                                  .WORD   53
 032516  025351                                  .WORD   WRER4
 032520  027252                                  .WORD   WRPRTE
 032522                                          DODU    LOGUNT                        ;DROP THE UNIT
 032522  013700  002332                          MOV     LOGUNT,R0
 032526  104451                                  TRAP    C$DODU
 032530  000411                                  BR      100$                          ;GET OUT
 032532  062701  000004                  10$:    ADD     #RNGSTP,R1                    ;ADJUST RESPONCE POINTER FOR NEXT TIME
 032536  022701  002736                          CMP     #DSCEND,R1                    ;ARE WE AT THE END ?
 032542  001002                                  BNE     15$                           ;NO, GET OUT
 032544  012701  002726                          MOV     #CMDRNG,R1                    ;SET R1 TO TOP BUFFER
 032550  010137  022750                  15$:    MOV     R1,CMDSAV                     ;SAVE THE COMMAND RING LOCATION
 032554  000207                          100$:   RTS     PC                            ;RETURN




 032556                                  CDRECV::
 032556  004737  032670                  1$:     JSR     PC,PDRECV                     ;CALL PORT DRIVER RECEIVE
 032562  032764  000001  000014                  BIT     #DRPFLG,LUNFLG(R4)            ;IS THE DRIVE AVAILABLE
 032570  001036                                  BNE     100$                          ;GET OUT IF NOT AVAILABLE
 032572  032764  000020  000014                  BIT     #DONEFL,LUNFLG(R4)            ;INTERNAL TEST DONE ?
 032600  001016                                  BNE     10$                           ;YES, BRANCH
 032602  011103                                  MOV     (R1),R3                       ;SET UP RESPONCE BUFFER POINTER
 032604  026365  000000  000000                  CMP     P.CRF(R3),P.CRF(R5)           ;IS THIS THE RESPONSE THAT IS EXPECTED ?
 032612  001411                                  BEQ     10$                           ;YES, BRANCH
 032614  022705  002370                          CMP     #GDUST,R5                     ;WAS IT A "GET DUST STATUS" COMMAND ?
 032620  001022                                  BNE     100$                          ;NO, BRANCH TO EXIT
 032622  012705  002436                          MOV     #RCVDAT,R5                    ;GET START OF "RECEIVE DATA" PACKET
 032626  026365  000000  000000                  CMP     P.CRF(R3),P.CRF(R5)           ;IS IT A "RECEIVE DATA" RESPONSE ?
 032634  001014                                  BNE     100$                          ;NO, BRANCH TO EXIT
 032636  012761  100000  000002          10$:    MOV     #OWN,HIADDR(R1)               ;GIVE THE CONTROLLER THE RING BACK
 032644  062701  000004                          ADD     #RNGSTP,R1                    ;ADJUST RESPONCE POINTER FOR NEXT TIME
 032650  022701  002726                          CMP     #CMDRNG,R1                    ;ARE WE AT THE END ?
 032654  001002                                  BNE     15$                           ;NO, GET OUT
 032656  012701  002716                          MOV     #RSPRNG,R1                    ;SET R1 TO TOP BUFFER
 032662  010137  022752                  15$:    MOV     R1,RSPSAV                     ;SAVE THE POINTER FOR NEXT TIME
 032666  000207                          100$:   RTS     PC                            ;RETURN
```

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032670                          PDRECV::
032670  013701  022752                   MOV     RSPSAV,R1               ;PUT THE RESPONSE RING SAVE IN R1
032674  012737  000005  002736  1$:      MOV     #5,CNTHI                ;SET UP THE TIME OUT COUNTER
032702  005002                           CLR     R2                      ;CLEAR R2
032704  005202                  5$:      INC     R2                      ;INCREMENT HI TIME OUT VALUE ?
032706  001026                           BNE     10$                     ;NO OVERFLOW YET, BRANCH
032710  005337  002736                   DEC     CNTHI                   ;ELSE, INCREMENT HI TIMEOUT
032714  001023                           BNE     10$                     ;KEEP GOING ,NO TIME OUT YET
032716  022705  002370                   CMP     #GDUST,R5               ;WAS IT A "GET DUST STATUS" COMMAND ?
032722  001410                           BEQ     6$                      ;YES, PRINT ERROR
032724                                   ERRDF   54.,EMSG16,FRUERR       ;"EXECUTE LOCAL PROGRAM" COMMAND TIMEOUT
032724  104455                           TRAP    C$ERDF
032726  000066                           .WORD   54
032730  024567                           .WORD   EMSG16
032732  030624                           .WORD   FRUERR
032734                                   DODU    LOGUNT                  ;GO DROP THE UNIT
032734  013700  002332                   MOV     LOGUNT,R0
032740  104451                           TRAP    C$DODU
032742  000436                           BR      100$                    ;GET OUT ON ERROR
032744                          6$:      ERRDF   55.,EMSG17,FRUERR       ;"GET DUST STATUS" COMMAND TIMEOUT
032744  104455                           TRAP    C$ERDF
032746  000067                           .WORD   55
032750  024637                           .WORD   EMSG17
032752  030624                           .WORD   FRUERR
032754                                   DODU    LOGUNT                  ;GO DROP THE UNIT
032754  013700  002332                   MOV     LOGUNT,R0
032760  104451                           TRAP    C$DODU
032762  000426                           BR      100$                    ;GET OUT ON ERROR
032764  017464  000002  000012  10$:     MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
032772  032764  100000  000012           BIT     #BIT15,TUSASV(R4)       ;CHECK FOR SA ERROR
033000  001413                           BEQ     20$                     ;NO ERROR, BRANCH
033002  012737  025670  002330           MOV     #LSCT,FRUIS             ;LOAD FAILING FRU
033010                                   ERRDF   56.,EMSG9,WRPRTE        ;PRINT "SA CONTENTS IN ERROR" MESSAGE
033010  104455                           TRAP    C$ERDF
033012  000070                           .WORD   56
033014  024271                           .WORD   EMSG9
033016  027252                           .WORD   WRPRTE
033020                                   DODU    LOGUNT                  ;DROP THE UNIT
033020  013700  002332                   MOV     LOGUNT,R0
033024  104451                           TRAP    C$DODU
033026  000404                           BR      100$                    ;GET OUT ON ERROR
033030  032761  100000  000002  20$:     BIT     #OWN,HIADDR(R1)         ;IS THE SLOT SET TO US ?
033036  001322                           BNE     5$                      ;KEEP GOING TILL TIMEOUT OR SUCCESS
033040  000207                  100$:    RTS     PC                      ;RETURN




033042  026365  000000  000000  CHKRSP:  CMP     P.CRF(R3),P.CRF(R5)     ;DID COMMAND REFERENCE NUMBERS MATCH ?
033050  001003                           BNE     5$                      ;NO, BRANCH
033052  005763  000012                   TST     P.STS(R3)               ;WAS STATUS "NORMAL"?
033056  001451                           BEQ     15$                     ;YES, BRANCH
033060  022705  002410          5$:      CMP     #EXELOC,R5              ;WAS IT AN "EXEC LOC PROG" COMMAND ?
033064  001416                           BEQ     7$                      ;YES, BRANCH
033066  022705  002436                   CMP     #RCVDAT,R5              ;WAS IT A "RECEIVE DATA" COMMAND ?
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  2471 033072  001423                          BEQ     8$                              ;YES, BRANCH
  2472 033074  022705  002466                  CMP     #ABORT,R5                       ;WAS IT AN "ABORT" COMMAND ?
  2473 033100  001430                          BEQ     9$                              ;YES, BRANCH
  2474 033102                          6$:     ERRDF   57.,EMSG18,GDSERR               ;PRINT "GET DUST STATUS" COMMAND FAILURE
       033102  104455                          TRAP    C$ERDF
       033104  000071                          .WORD   57
       033106  024701                          .WORD   EMSG18
       033110  030256                          .WORD   GDSERR
  2475 033112                                  DODU    LOGUNT                          ;DROP THE UNIT
       033112  013700  002332                  MOV     LOGUNT,R0
       033116  104451                          TRAP    C$DODU
  2476 033120  000501                          BR      100$                            ;GET OUT ON ERROR
  2477 033122                          7$:     ERRDF   58.,EMSG19,ELPERR               ;PRINT "EXECUTE LOCAL PROGRAM" COMMAND FAILURE
       033122  104455                          TRAP    C$ERDF
       033124  000072                          .WORD   58
       033126  024743                          .WORD   EMSG19
       033130  027306                          .WORD   ELPERR
  2478 033132                                  DODU    LOGUNT                          ;DROP THE UNIT
       033132  013700  002332                  MOV     LOGUNT,R0
       033136  104451                          TRAP    C$DODU
  2479 033140  000471                          BR      100$                            ;GET OUT ON ERROR
  2480 033142                          8$:     ERRDF   59.,EMSG20,RCVERR               ;PRINT "RECEIVE DATA" COMMAND FAILURE
       033142  104455                          TRAP    C$ERDF
       033144  000073                          .WORD   59
       033146  025013                          .WORD   EMSG20
       033150  027726                          .WORD   RCVERR
  2481 033152                                  DODU    LOGUNT                          ;DROP THE UNIT
       033152  013700  002332                  MOV     LOGUNT,R0
       033156  104451                          TRAP    C$DODU
  2482 033160  000461                          BR      100$                            ;GET OUT ON ERROR
  2483 033162                          9$:     ERRDF   60.,EMSG21,FRUERR               ;PRINT "ABORT" COMMAND FAILURE
       033162  104455                          TRAP    C$ERDF
       033164  000074                          .WORD   60
       033166  025052                          .WORD   EMSG21
       033170  030624                          .WORD   FRUERR
  2484 033172                                  DODU    LOGUNT                          ;DROP THE UNIT
       033172  013700  002332                  MOV     LOGUNT,R0
       033176  104451                          TRAP    C$DODU
  2485 033200  000451                          BR      100$                            ;GET OUT ON ERROR
  2486 033202  022705  002370          15$:    CMP     #GDUST,R5                       ;WAS IT A GET DUST STATUS COMMAND ?
  2487 033206  001046                          BNE     100$                            ;NO, BRANCH TO EXIT
  2488 033210  032764  000010  000014          BIT     #TEST.9,LUNFLG(R4)              ;ARE WE IN TEST 9 ?
  2489 033216  001411                          BEQ     20$                             ;NO, GO CHECK PROGRESS INDICATOR
  2490 033220  126327  000010  000201          CMPB    P.ENDC(R3),#201                 ;CORRECT ENDCODE ?
  2491 033226  001325                          BNE     6$                              ;NO, ERROR
  2492 033230  126327  000017  000007          CMPB    P.FLGS(R3),#7                   ;CORRECT FLAGS ?
  2493 033236  001321                          BNE     6$                              ;NO, ERROR
  2494 033240  000431                          BR      100$                            ;SUCCESS, RETURN
  2495 033242  026337  000020  002356  20$:    CMP     P.IND1(R3),PROGRL               ;CHECK LOW WORD OF PROGRESS INDICATOR
  2496 033250  003017                          BGT     50$                             ;PROGRESS BEING MADE, BRANCH
  2497 033252  026337  000022  002360          CMP     P.IND2(R3),PROGRH               ;CHECK HIGH WORD OF PROGRESS INDICATOR
  2498 033260  003013                          BGT     50$                             ;PROGRESS BEING MADE, BRANCH
  2499 033262  012737  025716  002330  30$:    MOV     #DRVE,FRUIS                     ;LOAD FAILING FRU
  2500 033270                                  ERRDF   61.,EMSG22,FRUERR               ;PRINT "INTERNAL TEST HUNG" ERROR
       033270  104455                          TRAP    C$ERDF
       033272  000075                          .WORD   61
       033274  025104                          .WORD   EMSG22
```

```
     033276  030624                          .WORD   FRUERR
2501 033300                                  DODU    LOGUNT                   ;DROP THE UNIT
     033300  013700  002332                  MOV     LOGUNT,R0
     033304  104451                          TRAP    C$DODU
2502 033306  000406                          BR      100$                     ;GET OUT ON ERROR
2503 033310  016337  000020  002356  50$:    MOV     P.IND1(R3),PROGRL        ;UPDATE LOW WORD OF PROGRESS INDICATOR
2504 033316  016337  000022  002360          MOV     P.IND2(R3),PROGRH        ;UPDATE HIGH WORD OF PROGRESS INDICATOR
2505 033324  000207                  100$:   RTS     PC
2506
2507
2508
2509
2510 033326  012701  060000          CHKMSG: MOV     #RDBUF,R1                ;GET START ADDRESS OF MESSAGE BUFFER
2511 033332  121127  000001                  CMPB    (R1),#1                  ;NORMAL COMPLETION MESSAGE ?
2512 033336  001446                          BEQ     100$                     ;YES, BRANCH TO EXIT
2513 033340  121127  000002                  CMPB    (R1),#2                  ;ERROR COMPLETION MESSAGE ?
2514 033344  001413                          BEQ     1$                       ;YES, BRANCH
2515 033346  121127  000003                  CMPB    (R1),#3                  ;NORMAL COMPLETION WITH INFO. MESSAGE ?
2516 033352  001440                          BEQ     100$                     ;YES, BRANCH TO EXIT
2517 033354                                  ERRDF   62.,EMSG23,INVMSG        ;INVALID MESSAGE FROM INTERNAL TEST
     033354  104455                          TRAP    C$ERDF
     033356  000076                          .WORD   62
     033360  025135                          .WORD   EMSG23
     033362  030604                          .WORD   INVMSG
2518 033364                                  DODU    LOGUNT                   ;DROP THE UNIT
     033364  013700  002332                  MOV     LOGUNT,R0
     033370  104451                          TRAP    C$DODU
2519 033372  000430                          BR      100$                     ;GET OUT ON ERROR
2520 033374  012737  025716  002330  1$:     MOV     #DRVE,FRUIS              ;GET FAILING FRU
2521 033402  012702  024066                  MOV     #FAULTC,R2               ;GET ADDRESS OF ERROR MESSAGE
2522 033406  116162  000002  000020          MOVB    2(R1),20(R2)             ;1ST ASCII BYTE OF FAULT CODE INTO MESSAGE
2523 033414  116162  000003  000021          MOVB    3(R1),21(R2)             ;2ND ASCII BYTE OF FAULT CODE INTO MESSAGE
2524 033422  116162  000004  000046          MOVB    4(R1),46(R2)             ;1ST ASCII BYTE OF SUB-FAULT CODE INTO MESSAGE
2525 033430  116162  000005  000047          MOVB    5(R1),47(R2)             ;2ND ASCII BYTE OF SUB-FAULT CODE INTO MESSAGE
2526 033436                                  ERRDF   63.,EMSG24,INTMSG        ;PRINT ERROR MESSAGE
     033436  104455                          TRAP    C$ERDF
     033440  000077                          .WORD   63
     033442  025215                          .WORD   EMSG24
     033444  030540                          .WORD   INTMSG
2527 033446                                  DODU    LOGUNT                   ;DROP THE UNIT
     033446  013700  002332                  MOV     LOGUNT,R0
     033452  104451                          TRAP    C$DODU
2528 033454  052764  000020  000014  100$:   BIS     #DONEFL,LUNFLG(R4)       ;SET DONE FLAG
2529 033462  000207                          RTS     PC                       ;RETURN
2530
2531 033464                                  ENDMOD
2532
2543                                 .TITLE MISCELLANEOUS SECTIONS
2544                                 .SBTTL  REPORT CODING SECTION
2572
2573 033464                                  BGNMOD
2574                                 .SBTTL  INITIALIZE SECTION
2575
2576                                 ;++
2577                                 ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
2578                                 ; AT THE BEGINNING OF EACH PASS.
2579                                 ;--
```

```
  2580
  2581 033464                                   BGNINIT
       033464                          L$INIT::
  2582
  2583
  2584 033464                                   READEF  #EF.START                 ;IF THIS IS A FRESH START
       033464  012700  000040                   MOV     #EF.START,R0
       033470  104447                           TRAP    C$REFG
  2585 033472                                   BCOMPLETE       START             ;  THEN GO TO START
       033472  103421                           BCS     START
  2586
  2587 033474                                   READEF  #EF.RESTART               ;IF THIS IS A RESTART
       033474  012700  000037                   MOV     #EF.RESTART,R0
       033500  104447                           TRAP    C$REFG
  2588 033502                                   BCOMPLETE       START             ;  THEN GO TO START
       033502  103415                           BCS     START
  2589
  2590 033504                                   READEF  #EF.PWR                   ;IF POWER-FAIL OCCURRED
       033504  012700  000034                   MOV     #EF.PWR,R0
       033510  104447                           TRAP    C$REFG
  2591 033512                                   BCOMPLETE       START             ;  THEN START FROM THE BEGINNING
       033512  103411                           BCS     START
  2592
  2593 033514                                   READEF  #EF.NEW                   ;IF THIS IS A NEW PASS
       033514  012700  000035                   MOV     #EF.NEW,R0
       033520  104447                           TRAP    C$REFG
  2594 033522                                   BCOMPLETE       NUPASS            ;  THEN SKIP START UP CODE
       033522  103422                           BCS     NUPASS
  2595
  2596 033524                                   READEF  #EF.CONTINUE              ;IF THIS IS A CONTINUE
       033524  012700  000036                   MOV     #EF.CONTINUE,R0
       033530  104447                           TRAP    C$REFG
  2597 033532                                   BCOMPLETE       END               ;  THEN SKIP ALL INIT CODE
       033532  103465                           BCS     END
  2598
  2599 033534  000423                           BR      NEXT                      ;JUST HERE FOR NEXT UUT
  2600
  2601 033536                          START:
  2602 033536  012737  000000  002312           MOV     #0,PASCNT                 ;INITIALIZE PASS COUNT
  2603 033544  005037  002314                   CLR     KTFLAG                    ;IN CASE WE'RE STARTED > THAN ONCE
  2604 033550  012704  002234                   MOV     #LUNBLK,R4                ;R4 WILL ALWAYS POINT TO LUNBLK
  2605 033554  022737  001400  002120           CMP     #1400,L$HIME              ;IF <= 28KWORDS OF MEMORY PRESENT
  2606 033562  103002                           BHIS    NUPASS                    ;  THEN SKIP NEXT
  2607 033564  004737  030776                   JSR     PC,KTTEST                 ;  ELSE SEE IF MMU IS PRESENT
  2608
  2609 033570                          NUPASS:  BRESET                            ;CLEAR THE WORLD
       033570  104433                           TRAP    C$RESET
  2610 033572  005237  002312                   INC     PASCNT                    ;UPDATE THE PASS COUNT
  2611 033576  012737  177777  002332           MOV     #-1,LOGUNT                ;INITIALIZE LOGICAL UNIT COUNT
  2612
  2613 033604  005237  002332          NEXT:    INC     LOGUNT                    ;POINT TO NEXT UUT
  2614 033610  023737  002332  002012           CMP     LOGUNT,L$UNIT             ;IF WE'VE PASSED MAXIMUM UUT'S
  2615 033616  001433                           BEQ     END                       ;  THEN LEAVE INIT
  2616
  2617 033620                                   GPHARD  LOGUNT,R0                 ;GET P-TABLE FOR THIS UNIT
       033620  013700  002332                   MOV     LOGUNT,R0
       033624  104442                           TRAP    C$GPHRD
```

```
2618 033626                                 BNCOMPLETE      NEXT            ;TRY AGAIN
     033626  103366                         BCC     NEXT
2619
2620 033630  011064  000000                 MOV     (R0),TUIP(R4)           ;PUT IP REG ADDRESS IN LUNBLK
2621 033634  012064  000002                 MOV     (R0)+,TUSA(R4)          ; AND ANOTHER COPY IN LUNBLK
2622 033640  062764  000002  000002         ADD     #2,TUSA(R4)             ;MAKE IT THE SA REG ADDRESS
2623 033646  012064  000004                 MOV     (R0)+,TUVEC(R4)         ;GET THE VECTOR INTO THE LUNBLK
2624 033652  011064  000006                 MOV     (R0),MSCPUN(R4)         ;PUT THE T/MSCP UNIT # IN LUNBLK
2625 033656  004737  031162                 JSR     PC,RSTVEC               ;SET UUT VECTOR FOR ILLEGAL INTRPTS.
2626 033662                                 PRINTF  #IMSG,LOGUNT            ;"TESTING UNIT N"
     033662  013746  002332                 MOV     LOGUNT,-(SP)
     033666  012746  033712                 MOV     #IMSG,-(SP)
     033672  012746  000002                 MOV     #2,-(SP)
     033676  010600                         MOV     SP,R0
     033700  104417                         TRAP    C$PNTF
     033702  062706  000006                 ADD     #6,SP
2627
2628 033706                         END:
2629 033706                                 EXIT    INIT
     033706  104432                         TRAP    C$EXIT
     033710  000032                         .WORD   L10007-.
2630
2642 033712     045     116     045 IMSG:   .ASCIZ  ?%N%ATESTING UNIT %D1%N?
2643                                        .EVEN
2644
2645 033742                                 ENDINIT
     033742                         L10007:
     033742  104411                         TRAP    C$INIT
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
                                        ;--

033744                                          BGNCLN
033744                                  L$CLEAN::

033744  032764  000000G 002234                  BIT     #T9FLAG,LUNBLK(R4)      ;IF NOT HERE FROM TEST 9
033752  001400                                  BEQ     ENDCLE                  ;  THEN SKIP THE REST

                                        ;EVENTUALLY MORE CODE WILL BE PLACED HERE TO GUARANTEE THAT AN ABORT
                                        ;COMMAND IS ISSUED TO THE UUT TO STOP EXECUTION OF THE LOCAL PROGRAM.

033754  005064  000014                  ENDCLE: CLR     LUNFLG(R4)              ;CLEAR OUT THE LUN FLAGS

                                        ;NOTE: THIS LINE OF CODE MAY HAVE TO BE REMOVED TO HANDLE ↑C FOLLOWED
                                        ;BY A PROCEED COMMAND CORRECTLY.
033760                                          CLRVEC  TUVEC(R4)               ;PUT "TRAP CATCHER" INTO VECTOR
033760  016400  000004                          MOV     TUVEC(R4),R0
033764  104436                                  TRAP    C$CVEC

033766                                          EXIT    CLN
033766  104432                                  TRAP    C$EXIT
033770  000002                                  .WORD   L10010-.


                                                .EVEN

033772                                          ENDCLN
033772                                  L10010:
033772  104412                                  TRAP    C$CLEAN
```

```
                                                      .SBTTL  DROP UNIT SECTION

                                                      ;++
                                                      ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                                      ; TO NO LONGER BE TESTED.
                                                      ;--

     033774                                                   BGNDU
     033774                                           L$DU::


     033774  012764  000001  000014                           MOV     #DRPFLG,LUNFLG(R4)       ;LETS PROGRAM KNOW IT'S DEAD

     034002                                                   EXIT    DU
     034002  000167                                           .WORD   J$JMP
     034004  000000                                           .WORD   L10011-2-.


                                                              .EVEN

     034006                                                   ENDDU
     034006                                           L10011:
     034006  104453                                           TRAP    C$DU
```

```
                                                .SBTTL  ADD UNIT SECTION

                                                ;++
                                                ; THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
                                                ;   TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
                                                ;   TO THE TEST CYCLE.
                                                ;--

 034010                                                 BGNAU
 034010                                         L$AU::


 034010                                                 EXIT    AU
 034010  000167                                         .WORD   J$JMP
 034012  000000                                         .WORD   L10012-2-.


                                                        .EVEN

 034014                                                 ENDAU
 034014                                         L10012:
 034014  104452                                         TRAP    C$AU

 034016                                                 ENDMOD

                                                .TITLE HARDWARE TEST
         000000                                 HELP=0          ; CONTROL LISTING OF HELP INFORMATION
                                                                ; HELP=0   NO LIST
                                                                ; HELP=1   LIST

                                                ;ONEFILE=       ; CONTROL USE OF SOURCE FILES
                                                                ; ONEFILE IS NOT DEFINED   ASSEMBLE EACH SOURCE FILE SEPARATELY
                                                                ; ONEFILE=ANYTHING   ASSEMBLE ALL SOURCE FILES TOGETHER

                                                .SBTTL  TEST 1: EXISTENCE VERIFICATION TEST


                                                ;;*****************************************************************
                                                ;;*****************************************************************
                                                ;
                                                ;TEST 1  - EXISTENCE VERIFICATION TEST
                                                ;       THIS TEST VERIFIES THE EXISTENCE OF THE UUT BY
                                                ;       ATTEMPTING TO READ FIRST THE IP AND THEN THE SA
                                                ;       REGISTERS OF THE TU81.  VECTOR 4 IS SET UP WITH
                                                ;       A TRAP HANDLING ROUTINE IN CASE OF A NON-EXISTENT
                                                ;       MEMORY TIMEOUT.
                                                ;
                                                ;;*****************************************************************
                                                ;;*****************************************************************

 034016                                                 BGNTST
 034016                                         T1::
 034016  000240                                         NOP
 034020  012737  000001  000000G                        MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
 034026  005737  002312                                 TST     PASCNT                  ;IF PASS 0
 034032  001404                                         BEQ     T1.1                    ;   THEN START TEST
 034034  012737  000010  000000G                        MOV     #10,ITRCNT              ;   ELSE DO MULTIPLE ITERATIONS
```

```
034042  000240                          NOP
034044                                  BGNSUB
034044                          T1.1:
034044  104402                          TRAP    C$BSUB
034046  005037  002316          1$:     CLR     TRP4FG                  ;CLEAR NXM TRAP FLAG

034052                                  SETVEC  #VEC4,#TRAP4,#PRI07     ;SET UP VECTOR 4 FOR NXM TRAP
034052  012746  000340                  MOV     #PRI07,-(SP)
034056  012746  030656                  MOV     #TRAP4,-(SP)
034062  012746  000004                  MOV     #VEC4,-(SP)
034066  012746  000003                  MOV     #3,-(SP)
034072  104437                          TRAP    C$SVEC
034074  062706  000010                  ADD     #10,SP
034100  000240                          NOP
034102  005074  000000                  CLR     @TUIP(R4)               ;WRITE THE IP REGISTER
034106  000240                          NOP
034110                                  DELAY   1                       ;MAKE SURE TIMEOUT CAN OCCUR
034110  012727  000001                  MOV     #1,(PC)+
034114  000000                          .WORD   0
034116  013727  002116                  MOV     L$DLY,(PC)+
034122  000000                          .WORD   0
034124  005367  177772                  DEC     -6(PC)
034130  001375                          BNE     .-4
034132  005367  177756                  DEC     -22(PC)
034136  001367                          BNE     .-20

034140  005737  002316                  TST     TRP4FG                  ;IF NO TRAP OCCURRED
034144  001416                          BEQ     5$                      ;  THEN CONTINUE TEST
034146  000240                          NOP
034150  012737  025647  002330          MOV     #CTRL,FRUIS             ;IDENTIFY FAILING FRU FOR PRINTOUT
034156                                  ERRDF   5,EMSG5,PRIERR          ;"NXM ON READ TUIP"
034156  104455                          TRAP    C$ERDF
034160  000005                          .WORD   5
034162  024140                          .WORD   EMSG5
034164  027222                          .WORD   PRIERR
034166                                  CKLOOP                          ;LOOP ON ERROR?
034166  104406                          TRAP    C$CLP1
034170                                  DODU    LOGUNT                  ;DROP UNIT
034170  013700  002332                  MOV     LOGUNT,R0
034174  104451                          TRAP    C$DODU
034176                                  ESCAPE  SUB                     ;CAN'T CONTINUE
034176  104410                          TRAP    C$ESCAPE
034200  000002                          .WORD   L10014-.

034202                          5$:     ENDSUB
034202                          L10014:
034202  104403                          TRAP    C$ESUB
034204  000240                          NOP
034206                                  CLRVEC  #VEC4                   ;RESTORE VECTOR 4
034206  012700  000004                  MOV     #VEC4,R0
034212  104436                          TRAP    C$CVEC
034214  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IF UNIT WAS NOT DROPPED
034222  001402                          BEQ     T1.2                    ;  THEN CONTINUE TESTING
034224                                  ESCAPE  TST                     ;  ELSE LEAVE TEST
034224  104410                          TRAP    C$ESCAPE
034226  000264                          .WORD   L10013-.
```

```
 2843 034230                                      BGNSUB
      034230                             T1.2:
      034230  104402                              TRAP    C$BSUB
 2844 034232  005037  002316             10$:     CLR     TRP4FG                    ;CLEAR NXM ERROR FLAG
 2845
 2846 034236                                      SETVEC  #VEC4,#TRAP4,#PRIO7       ;SET VECTOR 4 FOR NXM TRAPS
      034236  012746  000340                      MOV     #PRIO7,-(SP)
      034242  012746  030656                      MOV     #TRAP4,-(SP)
      034246  012746  000004                      MOV     #VEC4,-(SP)
      034252  012746  000003                      MOV     #3,-(SP)
      034256  104437                              TRAP    C$SVEC
      034260  062706  000010                      ADD     #10,SP
 2847 034264  000240                              NOP
 2848 034266  005774  000002                      TST     @TUSA(R4)                 ;READ THE SA REGISTER
 2849 034272  000240                              NOP
 2850 034274                                      DELAY   25.                       ;WAIT TO ALLOW NXM TRAP
      034274  012727  000031                      MOV     #25.,(PC)+
      034300  000000                              .WORD   0
      034302  013727  002116                      MOV     L$DLY,(PC)+
      034306  000000                              .WORD   0
      034310  005367  177772                      DEC     -6(PC)
      034314  001375                              BNE     .-4
      034316  005367  177756                      DEC     -22(PC)
      034322  001367                              BNE     .-20
 2851
 2852 034324  005737  002316                      TST     TRP4FG                    ;IF NXM DID NOT OCCUR
 2853 034330  001416                              BEQ     15$                       ;  THEN CONTINUE TEST
 2854 034332  000240                              NOP
 2855 034334  012737  025647  002330              MOV     #CTRL,FRUIS               ;IDENTIFY FAILING FRU FOR PRINTOUT
 2856 034342                                      ERRDF   7,EMSG7,PRIERR            ;"NXM ON FIRST READ OF SA"
      034342  104455                              TRAP    C$ERDF
      034344  000007                              .WORD   7
      034346  024212                              .WORD   EMSG7
      034350  027222                              .WORD   PRIERR
 2857 034352                                      CKLOOP                            ;LOOP ON ERROR?
      034352  104406                              TRAP    C$CLP1
 2858 034354                                      DODU    LOGUNT                    ;DROP UNIT IF NOT
      034354  013700  002332                      MOV     LOGUNT,R0
      034360  104451                              TRAP    C$DODU
 2859 034362                                      ESCAPE  SUB                       ;LEAVE TEST
      034362  104410                              TRAP    C$ESCAPE
      034364  000062                              .WORD   L10015-.
 2860
 2861 034366  017464  000002  000012     15$:     MOV     @TUSA(R4),TUSASV(R4)      ;GET A COPY OF SA IN MEMORY
 2862 034374  032764  004000  000012              BIT     #B.S1,TUSASV(R4)          ;IF STEP 1 BIT IS SET
 2863 034402  001021                              BNE     16$                       ;  THEN TEST 1 IS COMPLETE
 2864 034404  000240                              NOP
 2865 034406  012737  004000  002334              MOV     #B.S1,SAEXP               ;LOAD "EXPECTED FOR PRINTOUT
 2866 034414  012737  025670  002330              MOV     #LSCT,FRUIS               ;IDENTIFY FAILING FRU FOR PRINTOUT
 2867 034422                                      ERRDF   8.,EMSG8,PRISA            ;"SA REG IN ERROR ON FIRST READ"
      034422  104455                              TRAP    C$ERDF
      034424  000010                              .WORD   8
      034426  024233                              .WORD   EMSG8
      034430  027026                              .WORD   PRISA
 2868 034432                                      CKLOOP                            ;LOOP ON ERROR?
      034432  104406                              TRAP    C$CLP1
 2869 034434                                      DODU    LOGUNT                    ;DROP UNIT IF NOT
```

```
     034434  013700  002332                   MOV     LOGUNT,R0
     034440  104451                           TRAP    C$DODU
     034442                                   ESCAPE  SUB                    ;LEAVE TEST
     034442  104410                           TRAP    C$ESCAPE
     034444  000002                           .WORD   L10015-.
     034446                          16$:     ENDSUB
     034446                          L10015:
     034446  104403                           TRAP    C$ESUB

     034450  005037  002334          20$:     CLR     SAEXP                  ;CLEAR ERROR INDICATOR
     034454                                   CLRVEC  #VEC4                  ;RESTORE VECTOR 4
     034454  012700  000004                   MOV     #VEC4,R0
     034460  104436                           TRAP    C$CVEC
     034462  032764  000001  000014           BIT     #DRPFLG,LUNFLG(R4)     ;IF UNIT DROPPED
     034470  001006                           BNE     25$                    ;   THEN LEAVE NOW
     034472  005337  000000G                  DEC     ITRCNT                 ;IF ITERATIONS EQUAL 0
     034476  000240                           NOP
     034500  001402                           BEQ     25$                    ;   THEN LEAVE TEST
     034502  000137  034044                   JMP     T1.1                   ;   ELSE GO BACK FOR MORE

     034506                          25$:     EXIT    TST
     034506  104432                           TRAP    C$EXIT
     034510  000002                           .WORD   L10013-.


                                              .EVEN

     034512                                   ENDTST
     034512                          L10013:
     034512  104401                           TRAP    C$ETST
```

```
                                 .SBTTL TEST 2: INITIALIZATION TEST (POWER UP MICRODIAGNOSTICS)


                                 ;;*************************************************************
                                 ;;*************************************************************
                                 ;
                                 ;TEST 2 - INITIALIZATION TEST (POWER UP MICRODIAGNOSTICS)
                                 ;       THIS TEST COMMENCES STEP 1 OF THE UQ-PORT INITIALIZATION
                                 ;       SEQUENCE WITH INTERRUPTS DISABLED.  AS A RESULT, THE ROM
                                 ;       RESIDENT MICRODIAGNOSTICS WILL BE RUN TO COMPLETION AND
                                 ;       CHECKED FOR ANY ERRORS.
                                 ;
                                 ;;*************************************************************
                                 ;;*************************************************************

034514                                  BGNTST
034514                           T2::

034514  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
034522  001402                          BEQ     1$                      ;  THEN DO TEST
034524                                  EXIT    TST                     ;  ELSE GET OUT
034524  104432                          TRAP    C$EXIT
034526  000214                          .WORD   L10016-.
034530  012737  025632  002330   1$:    MOV     #LESI,FRUIS             ;FAILING FRU IN CASE OF ERROR
034536  012737  000001  000000G         MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
034544  022737  000001  002312          CMP     #1,PASCNT               ;IF FIRST PASS
034552  001403                          BEQ     2$                      ;  THEN START TEST
034554  012737  000012  000000G         MOV     #10.,ITRCNT             ;  ELSE DO 10 ITERATIONS

034562  012705  000000           2$:    MOV     #0,R5                   ;SET UP R5 AS INDEX TO STEP TABLES
034566  012737  000001  002336          MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
034574  016437  000004  002272          MOV     TUVEC(R4),STPTBL        ;PUT VECTOR IN STEP 1
034602  006237  002272                  ASR     STPTBL                  ;DIVIDE BY TWO
034606  006237  002272                  ASR     STPTBL                  ;DIVIDE BY FOUR
034612  013737  002272  002306          MOV     STPTBL,CMPTBL+4         ;PUT VECTOR IN STEP 3 COMPARE
034620  052737  104400  002272          BIS     #104400,STPTBL          ;REST OF STEP ONE
034626  012737  005700  002302          MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
                                                                        ;STEP 1 COMPARE VALUE
034634  012737  060050  002274          MOV     #COMMAR,STPTBL+2        ;STEP 2 - COMM AREA ADDRESS
034642  012737  010211  002304          MOV     #010211,CMPTBL+2        ;STEP 2 COMPARE
034650  012737  000000  002276          MOV     #0,STPTBL+4             ;STEP 3 - HIGH ADDRESS
034656  112737  000040  002307          MOVB    #40,CMPTBL+5            ;REST OF STEP 3 COMPARE
034664  012737  000000  002300          MOV     #0,STPTBL+6             ;STEP 4
034672  012737  040000  002310          MOV     #040000,CMPTBL+6        ;STEP 4 COMPARE

034700  004737  031330                  JSR     PC,STEP1                ;GO DO IT
034704  005737  002340                  TST     STEPST                  ;IF STATUS OKAY
034710  001412                          BEQ     T2EXT                   ;  THEN DO NEXT TEST

034712                                  ERRDF   9.,EMSG9,PRIINI         ;"SA CONTENTS IN ERROR"
034712  104455                          TRAP    C$ERDF
034714  000011                          .WORD   9
034716  024271                          .WORD   EMSG9
034720  027002                          .WORD   PRIINI
034722                                  CKLOOP                          ;LOOP ON ERROR?
034722  104406                          TRAP    C$CLP1
034724                                  DODU    LOGUNT                  ;DROP UUT
```

```
      034724  013700  002332                  MOV     LOGUNT,R0
      034730  104451                          TRAP    C$DODU
 2946 034732                                  ESCAPE  TST                              ;LEAVE TST
      034732  104410                          TRAP    C$ESCAPE
      034734  000006                          .WORD   L10016-.
 2947
 2948 034736                         T2EXT:   EXIT    TST
      034736  104432                          TRAP    C$EXIT
      034740  000002                          .WORD   L10016-.
 2949
 2950 034742                                  ENDTST
      034742                         L10016:
      034742  104401                          TRAP    C$ETST
 2951
```

```
   2954                                               .SBTTL TEST 3: INITIALIZATION TEST
   2958
   2959
   2960                                               ;;*************************************************************
   2961                                               ;;*************************************************************
   2962                                               ;
   2963                                               ;TEST 3 - INITIALIZATION TEST
   2964                                               ;       THIS TEST COMMENCES THE UQ-PORT INITIALIZATION SEQUENCE
   2965                                               ;       WITH INTERRUPTS DISABLED.  IT VERIFIES THAT ALL STEP
   2966                                               ;       TRANSITIONS OCCUR WITHIN THE ALLOTED TIME, AND THAT ALL
   2967                                               ;       HOST SUPPLIED INFORMATION IS ECHOED BY THE UUT.  THE
   2968                                               ;       PROGRAM FURTHER VERIFIES THAT NO INTERRUPTS OCCUR AS A
   2969                                               ;       RESULT OF THE STEP TRANSITIONS.
   2970                                               ;
   2971                                               ;;*************************************************************
   2972                                               ;;*************************************************************
   2976
   2977 034744                                                BGNTST
        034744                                        T3::
   2978
   2979 034744  032764  000001  000014                        BIT     #DRPFLG,LUNFLG(R4)     ;IF UUT NOT DROPPED
   2980 034752  001402                                        BEQ     1$                     ;  THEN DO TEST
   2981 034754                                                EXIT    TST                    ;  ELSE GET OUT
        034754  104432                                        TRAP    C$EXIT
        034756  000402                                        .WORD   L10017-.
   2982 034760  012737  000001  000000G 1$:                   MOV     #1,ITRCNT              ;SET UP FOR ONE TEST ITERATION
   2983 034766  022737  000001  002312                        CMP     #1,PASCNT              ;IF FIRST PASS
   2984 034774  001403                                        BEQ     2$                     ;  THEN START TEST
   2985 034776  012737  000012  000000G                       MOV     #10.,ITRCNT            ;  ELSE DO 10 ITERATIONS
   2986
   2987 035004  012705  000000          2$:                   MOV     #0,R5                  ;SET UP R5 AS INDEX TO STEP TABLES
   2988 035010  012737  000001  002336                        MOV     #1,INISTP              ;STEP 1 FOR ERROR PRINTOUT
   2989 035016  016437  000004  002272                        MOV     TUVEC(R4),STPTBL       ;PUT VECTOR IN STEP 1
   2990 035024  006237  002272                                ASR     STPTBL                 ;DIVIDE BY TWO
   2991 035030  006237  002272                                ASR     STPTBL                 ;DIVIDE BY FOUR
   2992 035034  013737  002272  002306                        MOV     STPTBL,CMPTBL+4        ;PUT VECTOR IN STEP 3 COMPARE
   2993 035042  052737  104400  002272                        BIS     #104400,STPTBL         ;REST OF STEP ONE
   2994 035050  012737  005700  002302                        MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
   2995                                                                                       ;STEP 1 COMPARE VALUE
   2996 035056  012737  060050  002274                        MOV     #COMMAR,STPTBL+2       ;STEP 2 - COMM AREA ADDRESS
   2997 035064  012737  010211  002304                        MOV     #010211,CMPTBL+2       ;STEP 2 COMPARE
   2998 035072  012737  000000  002276                        MOV     #0,STPTBL+4            ;STEP 3 - HIGH ADDRESS
   2999 035100  112737  000040  002307                        MOVB    #40,CMPTBL+5           ;REST OF STEP 3 COMPARE
   3000 035106  012737  000000  002300                        MOV     #0,STPTBL+6            ;STEP 4
   3001 035114  012737  040000  002310                        MOV     #040000,CMPTBL+6       ;STEP 4 COMPARE
   3002
   3003 035122  004737  031330                                JSR     PC,STEP1               ;GO DO IT
   3004 035126  005737  002340                                TST     STEPST                 ;IF STATUS OKAY
   3005 035132  001415                                        BEQ     5$                     ;  THEN CONTINUE TEST
   3006
   3007 035134  012737  025632  002330                        MOV     #LESI,FRUIS            ;FAILING FRU IN CASE OF ERROR
   3008 035142                                                ERRDF   9.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
        035142  104455                                        TRAP    C$ERDF
        035144  000011                                        .WORD   9
        035146  024271                                        .WORD   EMSG9
        035150  027002                                        .WORD   PRIINI
   3009 035152                                                CKLOOP                         ;LOOP ON ERROR?
```

```
      035152  104406                          TRAP    C$CLP1
3010  035154                                  DODU    LOGUNT                  ;DROP UUT
      035154  013700  002332                  MOV     LOGUNT,R0
      035160  104451                          TRAP    C$DODU
3011  035162                                  ESCAPE  TST                     ;LEAVE TST
      035162  104410                          TRAP    C$ESCAPE
      035164  000174                          .WORD   L10017-.
3012
3013  035166  005237  002336          5$:     INC     INISTP                  ;ADJUST STEP COUNTER
3014  035172  062705  000002                  ADD     #2,R5                   ;ADJUST TABLE INDEX
3015  035176  012737  000100  002346  6$:     MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
3016  035204  016537  002302  002334          MOV     CMPTBL(R5),SAEXP        ;SET UP FOR COMPARE
3017  035212  012737  037200  002344  7$:     MOV     #16000.,INNER           ;SET UP INNER
3018  035220  017464  000002  000012          MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
3019  035226  022705  000006                  CMP     #6,R5                   ;ARE WE IN STEP 4?
3020  035232  001005                          BNE     8$                      ;BRANCH IF NOT
3021  035234  033764  002334  000012          BIT     SAEXP,TUSASV(R4)        ;JUST LOOK FOR STEP 4 BIT
3022  035242  001027                          BNE     10$                     ;IT'S SET SO LET'S GO
3023  035244  000404                          BR      9$                      ;STAY IN LOOP OTHERWISE
3024  035246  023764  002334  000012  8$:     CMP     SAEXP,TUSASV(R4)        ;IF SA IS WHAT WE EXPECT
3025  035254  001422                          BEQ     10$                     ;  THEN MOVE ALONG
3026  035256  004737  031302          9$:     JSR     PC,PDELAY               ;  ELSE GIVE UUT SOME TIME
3027  035262  005737  002350                  TST     TOUT                    ;IF NO TIMEOUT YET
3028  035266  001751                          BEQ     7$                      ;  THEN GO TAKE ANOTHER LOOK
3029
3030  035270  012737  025670  002330          MOV     #LSCT,FRUIS             ;FAILING FRU IN CASE OF ERROR
3031  035276                                  ERRDF   13.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
      035276  104455                          TRAP    C$ERDF
      035300  000015                          .WORD   13
      035302  024271                          .WORD   EMSG9
      035304  027002                          .WORD   PRIINI
3032  035306                                  CKLOOP
      035306  104406                          TRAP    C$CLP1
3033  035310                                  DODU    LOGUNT
      035310  013700  002332                  MOV     LOGUNT,R0
      035314  104451                          TRAP    C$DODU
3034  035316                                  ESCAPE  TST
      035316  104410                          TRAP    C$ESCAPE
      035320  000040                          .WORD   L10017-.
3035
3036  035322  016574  002272  000002  10$:    MOV     STPTBL(R5),@TUSA(R4)    ;WRITE NEXT STEP TO UUT
3037  035330  022705  000006                  CMP     #6,R5                   ;IF NOT IN STEP 4
3038  035334  001314                          BNE     5$                      ;GO BACK TO MAIN LOOP
3039
3040  035336  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;HAS UUT BEEN DROPPED
3041  035344  001003                          BNE     T3EXT                   ;LEAVE NOW IF SO
3042  035346  005337  000000G                 DEC     ITRCNT                  ;IF MORE ITERATIONS LEFT
3043  035352  001214                          BNE     2$                      ;  THEN GO DO IT AGAIN
3044
3045  035354                          T3EXT:  EXIT    TST
      035354  104432                          TRAP    C$EXIT
      035356  000002                          .WORD   L10017-.
3046
3047  035360                                  ENDTST
      035360                          L10017:
      035360  104401                          TRAP    C$ETST
```

```
                                .SBTTL TEST 4: SA REGISTER WRAP TEST

                                ;;*******************************************************************
                                ;;*******************************************************************
                                ;
                                ;TEST 4 - SA REGISTER WRAP TEST
                                ;       THIS TEST WILL INITIALIZE THE UUT BY WRITING TO ITS
                                ;       IP REGISTER.  IT WILL FORCE THE UUT INTO DIAGNOSTIC
                                ;       WRAP MODE, AND WRITE FIRST A FLOATING 0 DATA PATTERN,
                                ;       FOLLOWED BY A FLOATING 1 DATA PATTERN TO THE SA REG.
                                ;       EACH WRITE WILL BE FOLLOWED BY A READ AND COMPARE
                                ;       OPERATION.
                                ;
                                ;;*******************************************************************
                                ;;*******************************************************************
035362                                  BGNTST
035362                          T4::

035362  004737  030704                  JSR     PC,CHKCAC
035366  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
035374  001402                          BEQ     1$                      ;  THEN DO TEST
035376                                  EXIT    TST                     ;  ELSE GET OUT
035376  104432                          TRAP    C$EXIT
035400  000522                          .WORD   L10020-.
035402  012737  000001  002336  1$:     MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
035410  012737  000001  000000G         MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
035416  022737  000001  002312          CMP     #1,PASCNT               ;IF FIRST PASS
035424  001403                          BEQ     2$                      ;  THEN START TEST
035426  012737  000002  000000G         MOV     #2,ITRCNT               ;  ELSE DO 2 ITERATIONS

035434  012737  140000  002334  2$:     MOV     #BIT15!B.WR,SAEXP       ;SET UP STEP 1 FOR DIAG. WRAP MODE
035442  013737  002334  002272          MOV     SAEXP,STPTBL            ;PUT IT IN STEP 1 OF TABLE
035450  004737  031330                  JSR     PC,STEP1                ;GO DO IT

035454  005737  002340                  TST     STEPST                  ;IF STATUS OKAY
035460  001415                          BEQ     5$                      ;  THEN CONTINUE TEST

035462  012737  025647  002330          MOV     #CTRL,FRUIS             ;FAILING FRU FOR PRINTOUT
035470                                  ERRDF   9.,EMSG9,PRIINI         ;"SA CONTENTS IN ERROR"
035470  104455                          TRAP    C$ERDF
035472  000011                          .WORD   9
035474  024271                          .WORD   EMSG9
035476  027002                          .WORD   PRIINI
035500                                  CKLOOP                          ;LOOP ON ERROR?
035500  104406                          TRAP    C$CLP1
035502                                  DODU    LOGUNT                  ;DROP UUT
035502  013700  002332                  MOV     LOGUNT,R0
035506  104451                          TRAP    C$DODU
035510                                  ESCAPE  TST                     ;LEAVE TST
035510  104410                          TRAP    C$ESCAPE
035512  000410                          .WORD   L10020-.

035514  012737  000100  002346  5$:     MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
035522  012737  006000  002344  6$:     MOV     #6000,INNER             ;SET UP INNER
035530  017464  000002  000012          MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
035536  023764  002334  000012          CMP     SAEXP,TUSASV(R4)        ;IF SA IS WHAT WE EXPECT
035544  001422                          BEQ     10$                     ;  THEN MOVE ALONG
```

```
 3101 035546  004737  031302                 JSR     PC,PDELAY               ;  ELSE GIVE UUT SOME TIME
 3102 035552  005737  002350                 TST     TOUT                    ;IF NO TIMEOUT YET
 3103 035556  001761                         BEQ     6$                      ;  THEN GO TAKE ANOTHER LOOK
 3104
 3105 035560  012737  025647  002330         MOV     #CTRL,FRUIS             ;FAILING FRU FOR PRINTOUT
 3106 035566                                 ERRDF   10.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
      035566  104455                         TRAP    C$ERDF
      035570  000012                         .WORD   10
      035572  024271                         .WORD   EMSG9
      035574  027002                         .WORD   PRIINI
 3107 035576                                 CKLOOP
      035576  104406                         TRAP    C$CLP1
 3108 035600                                 DODU    LOGUNT
      035600  013700  002332                 MOV     LOGUNT,R0
      035604  104451                         TRAP    C$DODU
 3109 035606                                 ESCAPE  TST
      035606  104410                         TRAP    C$ESCAPE
      035610  000312                         .WORD   L10020-.
 3110
 3111 035612  000261                 10$:    SEC                             ;SET CARRY BIT
 3112 035614  012737  177776  002342         MOV     #177776,WRDATA          ;SET UP FLOATING "0" PATTERN
 3113 035622  013774  002342  000002 11$:    MOV     WRDATA,@TUSA(R4)        ;SEND DATA TO UUT
 3114 035630  013737  002342  002334         MOV     WRDATA,SAEXP            ;SAVE A COPY FOR COMPARE
 3115 035636  012737  000100  002346         MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
 3116
 3117 035644  012737  006000  002344 15$:    MOV     #6000,INNER             ;INNER TOO
 3118 035652  017464  000002  000012         MOV     @TUSA(R4),TUSASV(R4)    ;READ SA
 3119 035660  023764  002334  000012         CMP     SAEXP,TUSASV(R4)        ;IF DATA MATCHES
 3120 035666  001422                         BEQ     20$                     ;  THEN CHANGE DATA
 3121 035670  004737  031302                 JSR     PC,PDELAY               ;  ELSE GIVE UUT SOME TIME
 3122 035674  005737  002350                 TST     TOUT                    ;IF NO TIMEOUT YET
 3123 035700  001761                         BEQ     15$                     ;  THEN GO TAKE ANOTHER LOOK
 3124
 3125 035702  012737  025647  002330         MOV     #CTRL,FRUIS             ;FAILING FRU FOR PRINTOUT
 3126 035710                                 ERRDF   11.,EMSG10,PRIINI       ;"SA WRONG IN DATA WRAP"
      035710  104455                         TRAP    C$ERDF
      035712  000013                         .WORD   11
      035714  024316                         .WORD   EMSG10
      035716  027002                         .WORD   PRIINI
 3127 035720                                 CKLOOP
      035720  104406                         TRAP    C$CLP1
 3128 035722                                 DODU    LOGUNT
      035722  013700  002332                 MOV     LOGUNT,R0
      035726  104451                         TRAP    C$DODU
 3129 035730                                 ESCAPE TST                      ;GET OUT IF NOT LOOPING
      035730  104410                         TRAP    C$ESCAPE
      035732  000170                         .WORD   L10020-.
 3130
 3131 035734  006137  002342         20$:    ROL     WRDATA                  ;SHIFT TEST PATTERN
 3132 035740  103730                         BCS     11$                     ;WE'RE NOT DONE YET
 3133
 3134 035742  012737  000001  002342         MOV     #1,WRDATA               ;SET UP FOR FLOATING 1 PATTERN
 3135 035750  013774  002342  000002 24$:    MOV     WRDATA,@TUSA(R4)        ;SEND DATA TO UUT
 3136 035756  013737  002342  002334         MOV     WRDATA,SAEXP            ;KEEP A COPY FOR COMPARE
 3137 035764  012737  000100  002346         MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
 3138
 3139 035772  012737  006000  002344 25$:    MOV     #6000,INNER             ;DELAY ROUTINE TOO
```

```
  3140 036000  017464  000002  000012           MOV     @TUSA(R4),TUSASV(R4)     ;READ THE SA
  3141 036006  023764  002334  000012           CMP     SAEXP,TUSASV(R4)         ;IF IT MATCHES
  3142 036014  001422                           BEQ     30$                      ;  THEN SEE IF WE'RE DONE
  3143 036016  004737  031302                   JSR     PC,PDELAY                ;  ELSE GIVE UUT SOME MORE TIME
  3144 036022  005737  002350                   TST     TOUT                     ;IF NO TIMEOUT YET
  3145 036026  001761                           BEQ     25$                      ;  THEN TAKE ANOTHER LOOK
  3146
  3147 036030  012737  025647  002330           MOV     #CTRL,FRUIS              ;FAILING FRU FOR PRINTOUT
  3148 036036                                   ERRDF   12.,EMSG10,PRIINI        ;"SA WRONG IN DATA WRAP"
       036036  104455                           TRAP    C$ERDF
       036040  000014                           .WORD   12
       036042  024316                           .WORD   EMSG10
       036044  027002                           .WORD   PRIINI
  3149 036046                                   CKLOOP
       036046  104406                           TRAP    C$CLP1
  3150 036050                                   DODU    LOGUNT
       036050  013700  002332                   MOV     LOGUNT,R0
       036054  104451                           TRAP    C$DODU
  3151 036056                                   ESCAPE  TST                      ;LEAVE TEST IF NOT LOOPING
       036056  104410                           TRAP    C$ESCAPE
       036060  000042                           .WORD   L10020-.
  3152
  3153 036062  006137  002342           30$:    ROL     WRDATA                   ;SHIFT DATA PATTERN
  3154 036066  103330                           BCC     24$                      ;WE'RE NOT DONE YET
  3155 036070  005337  000000G                  DEC     ITRCNT                   ;IF ITERATIONS  = 0
  3156 036074  001402                           BEQ     T4EXT                    ;  THEN LEAVE TEST
  3157 036076  000137  035434                   JMP     2$                       ;  ELSE DO ANOTHER ONE
  3158
  3159 036102  005737  000000G          T4EXT:  TST     CPFLG                    ;CHECK IF CACHE WAS DISABLED
  3160 036106  001403                           BEQ     EXT                      ;NO, BRANCH
  3161 036110  042737  000014  177746           BIC     #DISCAC,CCR              ;RE-ENABLE CACHE
  3162 036116                           EXT:    EXIT    TST                      ;GET OUTTA HERE
       036116  104432                           TRAP    C$EXIT
       036120  000002                           .WORD   L10020-.
  3163
  3164 036122                                   ENDTST
       036122                           L10020:
       036122  104401                           TRAP    C$ETST
```

```
3167                                  .SBTTL  TEST 5:
3168                                  .SBTTL  SUBTEST 1: VECTOR AND INTERRUPT TEST
3172
3173                                  ;;****************************************************************
3174                                  ;;****************************************************************
3175                                  ;
3176                                  ;TEST 5
3177                                  ;SUBTEST 1 -
3178                                  ;       VECTOR AND INTERRUPT TEST
3179                                  ;       TEST 3 IS REPEATED, BUT WITH INTERRUPTS ENABLED.
3180                                  ;       THE PROGRAM VERIFIES THAT AN INTERRUPT OCCURS AT
3181                                  ;       THE END OF STEPS 1 - 3.
3182                                  ;
3183                                  ;;****************************************************************
3184                                  ;;****************************************************************
3188
3189 036124                                   BGNTST
     036124                           T5::
3190 036124                                   BGNSUB
     036124                           T5.1:
     036124  104402                           TRAP    C$BSUB
3191
3192 036126  032764  000001  000014           BIT     #DRPFLG,LUNFLG(R4)        ;IF UUT NOT DROPPED
3193 036134  001402                           BEQ     1$                        ;  THEN DO TEST
3194 036136                                   EXIT    TST                       ;  ELSE GET OUT
     036136  104432                           TRAP    C$EXIT
     036140  001114                           .WORD   L10021-.
3195 036142  042764  000004  000014   1$:     BIC     #BRFLAG,LUNFLG(R4)        ;DO TEST WITH PRIORITY SET TO 0
3196 036150  012737  025647  002330           MOV     #CTRL,FRUIS               ;FAILING FRU IN CASE OF ERROR
3197 036156  012737  000001  000000G          MOV     #1,ITRCNT                 ;SET UP FOR ONE TEST ITERATION
3198 036164  022737  000001  002312           CMP     #1,PASCNT                 ;IF FIRST PASS
3199 036172  001403                           BEQ     2$                        ;  THEN START TEST
3200 036174  012737  000012  000000G          MOV     #10.,ITRCNT               ;  ELSE DO 10 ITERATIONS
3201
3202 036202  004737  031212           2$:     JSR     PC,VECTOR                 ;SET UP VECTOR WITH INTERRUPT HANDLER
3203 036206  012705  000000                   MOV     #0,R5                     ;SET UP R5 AS INDEX TO STEP TABLES
3204 036212  012737  000001  002336           MOV     #1,INISTP                 ;STEP 1 FOR ERROR PRINTOUT
3205 036220  016437  000004  002272           MOV     TUVEC(R4),STPTBL          ;PUT VECTOR IN STEP 1
3206 036226  006237  002272                   ASR     STPTBL                    ;DIVIDE BY TWO
3207 036232  006237  002272                   ASR     STPTBL                    ;DIVIDE BY FOUR
3208 036236  013737  002272  002306           MOV     STPTBL,CMPTBL+4           ;PUT VECTOR IN STEP 3 COMPARE
3209 036244  052737  104600  002272           BIS     #104600,STPTBL            ;REST OF STEP ONE
3210 036252  012737  005700  002302           MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
3211                                                                            ;STEP 1 COMPARE VALUE
3212 036260  012737  060050  002274           MOV     #COMMAR,STPTBL+2          ;STEP 2 - COMM AREA ADDRESS
3213 036266  012737  010211  002304           MOV     #010211,CMPTBL+2          ;STEP 2 COMPARE
3214 036274  012737  000000  002276           MOV     #0,STPTBL+4               ;STEP 3 - HIGH ADDRESS
3215 036302  052737  000200  002306           BIS     #B.IE,CMPTBL+4            ;SET THE INTERRUPT ENABLE BIT
3216 036310  112737  000040  002307           MOVB    #40,CMPTBL+5              ;REST OF STEP 3 COMPARE
3217 036316  012737  000000  002300           MOV     #0,STPTBL+6               ;STEP 4
3218 036324  012737  040000  002310           MOV     #040000,CMPTBL+6          ;STEP 4 COMPARE
3219
3220 036332  004737  031330                   JSR     PC,STEP1                  ;GO DO IT
3221 036336  005737  002340                   TST     STEPST                    ;IF STATUS OKAY
3222 036342  001412                           BEQ     5$                        ;  THEN CONTINUE TEST
3223
3224 036344                                   ERRDF   14.,EMSG9,PRIINI          ;"SA CONTENTS IN ERROR"
```

```
        036344  104455                                  TRAP    C$ERDF
        036346  000016                                  .WORD   14
        036350  024271                                  .WORD   EMSG9
        036352  027002                                  .WORD   PRIINI
   3225 036354                                          CKLOOP                          ;LOOP ON ERROR?
        036354  104406                                  TRAP    C$CLP1
   3226 036356                                          DODU    LOGUNT                  ;DROP UUT
        036356  013700  002332                          MOV     LOGUNT,R0
        036362  104451                                  TRAP    C$DODU
   3227 036364                                          ESCAPE  TST                     ;LEAVE TST
        036364  104410                                  TRAP    C$ESCAPE
        036366  000666                                  .WORD   L10021-.
   3228
   3229 036370  012737  000100  002346  5$:             MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
   3230 036376  016537  002302  002334                  MOV     CMPTBL(R5),SAEXP        ;SET UP FOR COMPARE
   3231 036404  012737  037200  002344  7$:             MOV     #16000.,INNER           ;SET UP INNER
   3232 036412  032764  000002  000014                  BIT     #INTFLG,LUNFLG(R4)      ;IF INTERRUPT OCCURRED
   3233 036420  001022                                  BNE     10$                     ;  THEN SEE IF SA IS CORRECT
   3234 036422  004737  031302          9$:             JSR     PC,PDELAY               ;  ELSE GIVE UUT SOME TIME
   3235 036426  005737  002350                          TST     TOUT                    ;IF NO TIMEOUT YET
   3236 036432  001764                                  BEQ     7$                      ;  THEN GO TAKE ANOTHER LOOK
   3237
   3238 036434  012737  025632  002330                  MOV     #LESI,FRUIS             ;FAILING FRU
   3239 036442                                  -       ERRDF   15.,EMSG11,PRIERR       ;"EXPECTED INTERRUPT DID NOT OCCUR"
        036442  104455                                  TRAP    C$ERDF
        036444  000017                                  .WORD   15
        036446  024344                                  .WORD   EMSG11
        036450  027222                                  .WORD   PRIERR
   3240 036452                                          CKLOOP
        036452  104406                                  TRAP    C$CLP1
   3241 036454                                          DODU    LOGUNT
        036454  013700  002332                          MOV     LOGUNT,R0
        036460  104451                                  TRAP    C$DODU
   3242 036462                                          ESCAPE  TST
        036462  104410                                  TRAP    C$ESCAPE
        036464  000570                                  .WORD   L10021-.
   3243
   3244 036466  042764  000002  000014  10$:            BIC     #INTFLG,LUNFLG(R4)      ;CLEAR THE INTERRUPT FLAG
   3245 036474  005237  002336                          INC     INISTP                  ;ADJUST THE STEP COUNTER
   3246 036500  062705  000002                          ADD     #2,R5                   ;ADJUST TABLE INDEX
   3247 036504  016537  002302  002334                  MOV     CMPTBL(R5),SAEXP        ;GET THE COMPARISON VALUE
   3248 036512  017464  000002  000012                  MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
   3249 036520  022705  000006                          CMP     #6,R5                   ;ARE WE IN STEP 4?
   3250 036524  001005                                  BNE     15$                     ;BRANCH IF NOT
   3251 036526  033764  002334  000012                  BIT     SAEXP,TUSASV(R4)        ;JUST LOOK FOR STEP 4 BIT
   3252 036534  001022                                  BNE     20$                     ;IT'S SET SO LET'S GO
   3253 036536  000407                                  BR      16$                     ;ERROR
   3254 036540  023764  002334  000012  15$:            CMP     SAEXP,TUSASV(R4)        ;IF SA IS WHAT WE EXPECT
   3255 036546  001415                                  BEQ     20$                     ;  THEN MOVE ALONG
   3256
   3257 036550  012737  025632  002330                  MOV     #LESI,FRUIS             ;FAILING FRU
   3258 036556                          16$:            ERRDF   16.,EMSG9,PRIINI                ;"SA CONTENTS IN ERROR"
        036556  104455                                  TRAP    C$ERDF
        036560  000020                                  .WORD   16
        036562  024271                                  .WORD   EMSG9
        036564  027002                                  .WORD   PRIINI
   3259 036566                                          CKLOOP
```

```
036566  104406                                   TRAP    C$CLP1
036570                                           DODU    LOGUNT
036570  013700  002332                           MOV     LOGUNT,R0
036574  104451                                   TRAP    C$DODU
036576                                           ESCAPE  TST
036576  104410                                   TRAP    C$ESCAPE
036600  000454                                   .WORD   L10021-.

036602  016574  002272  000002  20$:             MOV     STPTBL(R5),@TUSA(R4)    ;WRITE NEXT STEP TO UUT
036610  022705  000006                           CMP     #6,R5                   ;IF NOT IN STEP 4
036614  001265                                   BNE     5$                      ;GO BACK TO MAIN LOOP

036616  032764  000001  000014                   BIT     #DRPFLG,LUNFLG(R4)      ;HAS UUT BEEN DROPPED
036624  001005                                   BNE     T5EXT                   ;LEAVE NOW IF SO
036626  005337  000000G                          DEC     ITRCNT                  ;IF NO MORE ITERATIONS LEFT
036632  001402                                   BEQ     T5EXT                   ;  THEN EXIT
036634  000137  036202                           JMP     2$                      ;  ELSE DO IT AGAIN

036640  004737  031162          T5EXT:           JSR     PC,RSTVEC               ;CATCH ILLEGAL INTERRUPTS
036644                                           EXIT    TST
036644  104432                                   TRAP    C$EXIT
036646  000406                                   .WORD   L10021-.
036650                                           ENDSUB
036650                          L10022:
036650  104403                                   TRAP    C$ESUB
```

```
                                        .SBTTL SUBTEST 2: BR LEVEL TEST

                                        ;;***********************************************************
                                        ;;***********************************************************
                                        ;
                                        ;SUBTEST 2 -
                                        ;       BR LEVEL TEST
                                        ;       THIS TEST INSURES THAT THE TU81 CAN NOT INTERRUPT
                                        ;       WHEN THE CPU PRIORITY IS SET TO 7.  THE TEST GOES
                                        ;       ONLY THROUGH THE FIRST STEP OF THE INIT SEQUENCE
                                        ;       SINCE THE CONTROLLER WILL "HANG" WAITING FOR THE
                                        ;       INTERRUPT ACKNOWLEDGE.
                                        ;
                                        ;;***********************************************************
                                        ;;***********************************************************

036652                                          BGNSUB
036652                                  T5.2:
036652  104402                                  TRAP    C$BSUB

036654  032764  000001  000014                  BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
036662  001402                                  BEQ     1$                      ;  THEN DO TEST
036664                                          EXIT    TST                     ;  ELSE GET OUT
036664  104432                                  TRAP    C$EXIT
036666  000366                                  .WORD   L10021-.
036670                                  1$:
036670  052764  000004  000014                  BIS     #BRFLAG,LUNFLG(R4)      ;DO TEST WITH HIGH PRIORITY
036676  012737  025647  002330                  MOV     #CTRL,FRUIS             ;FAILING FRU IN CASE OF ERROR
036704  012737  000001  000000G                 MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
036712  022737  000001  002312                  CMP     #1,PASCNT               ;IF FIRST PASS
036720  001403                                  BEQ     2$                      ;  THEN START TEST
036722  012737  000002  000000G                 MOV     #2,ITRCNT               ;  ELSE DO 10 ITERATIONS

036730  106427  000340                  2$:     MTPS    #PRI07                  ;CPU PRIORITY = 7
036734  004737  031212                          JSR     PC,VECTOR               ;SET UP VECTOR WITH INTERRUPT HANDLER
036740  012705  000000                          MOV     #0,R5                   ;SET UP R5 AS INDEX TO STEP TABLES
036744  012737  000001  002336                  MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
036752  016437  000004  002272                  MOV     TUVEC(R4),STPTBL        ;PUT VECTOR IN STEP 1
036760  006237  002272                          ASR     STPTBL                  ;DIVIDE BY TWO
036764  006237  002272                          ASR     STPTBL                  ;DIVIDE BY FOUR
036770  052737  104600  002272                  BIS     #104600,STPTBL          ;REST OF STEP ONE
036776  016437  000004  002302                  MOV     TUVEC(R4),CMPTBL        ;STEP 1 COMPARE VALUE

037004  004737  031330                          JSR     PC,STEP1                ;GO DO IT
037010  005737  002340                          TST     STEPST                  ;IF STATUS OKAY
037014  001412                                  BEQ     5$                      ;  THEN CONTINUE TEST

037016                                          ERRDF   14.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
037016  104455                                  TRAP    C$ERDF
037020  000016                                  .WORD   14
037022  024271                                  .WORD   EMSG9
037024  027002                                  .WORD   PRIINI
037026                                          CKLOOP                          ;LOOP ON ERROR?
037026  104406                                  TRAP    C$CLP1
037030                                          DODU    LOGUNT                  ;DROP UUT
037030  013700  002332                          MOV     LOGUNT,R0
037034  104451                                  TRAP    C$DODU
```

```
  3330 037036                                  ESCAPE  TST                         ;LEAVE TST
       037036  104410                          TRAP    C$ESCAPE
       037040  000214                          .WORD   L10021-.
  3331
  3332 037042  012737  000100  002346  5$:     MOV     #100,OUTER                  ;SET UP FOR DELAY ROUTINE
  3333 037050  016537  002302  002334          MOV     CMPTBL(R5),SAEXP            ;SET UP FOR COMPARE
  3334 037056  012737  037200  002344  7$:     MOV     #16000.,INNER               ;SET UP INNER
  3335 037064  004737  031302          9$:     JSR     PC,PDELAY                   ;  ELSE GIVE UUT SOME TIME
  3336 037070  005737  002350                  TST     TOUT                        ;IF NO TIMEOUT YET
  3337 037074  001770                          BEQ     7$                          ;  THEN GO TAKE ANOTHER LOOK
  3338
  3339 037076  017464  000002  000012          MOV     @TUSA(R4),TUSASV(R4)        ;GET SA CONTENTS
  3340 037104  023764  002334  000012          CMP     SAEXP,TUSASV(R4)            ;IF CONTENTS OKAY
  3341 037112  001412                          BEQ     10$                         ;  THEN CHECK FOR INTERRUPT
  3342
  3343 037114                                  ERRDF   17.,EMSG9,PRIINI            ;"SA CONTENTS IN ERROR"
       037114  104455                          TRAP    C$ERDF
       037116  000021                          .WORD   17
       037120  024271                          .WORD   EMSG9
       037122  027002                          .WORD   PRIINI
  3344 037124                                  CKLOOP
       037124  104406                          TRAP    C$CLP1
  3345 037126                                  DODU    LOGUNT
       037126  013700  002332                  MOV     LOGUNT,R0
       037132  104451                          TRAP    C$DODU
  3346 037134                                  ESCAPE  TST
       037134  104410                          TRAP    C$ESCAPE
       037136  000116                          .WORD   L10021-.
  3347
  3348 037140  032764  000002  000014  10$:    BIT     #INTFLG,LUNFLG(R4)          ;IF NO INTERRUPT OCCURRED
  3349 037146  001415                          BEQ     20$                         ;  THEN CARRY ON WITH TEST
  3350 037150  042764  000002  000014          BIC     #INTFLG,LUNFLG(R4)          ;CLEAR FLAG IN CASE WE'RE LOOPING
  3351 037156                                  ERRDF   18.,EMSG12,PRIINI           ;"INTRRPT WITH CPU PRIORITY =7"
       037156  104455                          TRAP    C$ERDF
       037160  000022                          .WORD   18
       037162  024405                          .WORD   EMSG12
       037164  027002                          .WORD   PRIINI
  3352 037166                                  CKLOOP
       037166  104406                          TRAP    C$CLP1
  3353 037170                                  DODU    LOGUNT
       037170  013700  002332                  MOV     LOGUNT,R0
       037174  104451                          TRAP    C$DODU
  3354 037176                                  ESCAPE  TST
       037176  104410                          TRAP    C$ESCAPE
       037200  000054                          .WORD   L10021-.
  3355
  3356 037202  106427  000000          20$:    MTPS    #PRI00                      ;CPU PRIORITY = 0
  3357 037206  000240                          NOP
  3358 037210  000240                          NOP                                 ;DELAY FOR PENDING INTERRUPT
  3359 037212  042764  000002  000014          BIC     #INTFLG,LUNFLG(R4)          ;CLEAR THE FLAG NOW
  3360
  3361 037220  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)          ;HAS UUT BEEN DROPPED
  3362 037226  001005                          BNE     ST5EXT                      ;LEAVE NOW IF SO
  3363 037230  005337  000000G                 DEC     ITRCNT                      ;IF NO MORE ITERATIONS LEFT
  3364 037234  001402                          BEQ     ST5EXT                      ;  THEN EXIT
  3365 037236  000137  036730                  JMP     2$                          ;  ELSE DO IT AGAIN
  3366
```

```
    3367 037242  004737  031162          ST5EXT: JSR     PC,RSTVEC               ;CATCH ILLEGAL INTERRUPTS
    3368 037246                                  EXIT    TST
         037246  104432                          TRAP    C$EXIT
         037250  000004                          .WORD   L10021-.
    3369
    3370 037252                                  ENDSUB
         037252                          L10023:
         037252  104403                          TRAP    C$ESUB
    3371
    3372 037254                                  ENDTST
         037254                          L10021:
         037254  104401                          TRAP    C$ETST
```

```
                                                   .SBTTL TEST 6:
                                                   .SBTTL SUBTEST 1: PURGE AND POLL TEST

                                                   ;;*************************************************************
                                                   ;;*************************************************************
                                                   ;
                                                   ;SUBTEST 6 - PURGE AND POLL TEST
                                                   ;       THIS TEST WILL AGAIN RUN THROUGH THE INIT SEQUENCE, THIS
                                                   ;       TIME SETTING THE "PURGE AND POLL" BIT IN STEP 3.  THIS
                                                   ;       SHOULD CAUSE THE PORT TO DMA VARIOUS DATA PATTERNS TO
                                                   ;       AND FROM THE COMMUNICATIONS AREA AND FINALLY LEAVE IT
                                                   ;       CLEARED BEFORE TRANSITIONING TO STEP 4.  THE PROGRAM WILL
                                                   ;       HAVE FILLED THIS AREA WITH A BACKGROUND PATTERN OF ALL
                                                   ;       1'S DATA PRIOR TO STARTING THE INIT.  WHNE STEP 4 IS
                                                   ;       REACHED, THE PROGRAM WILL VERIFY THAT THE COMM AREA IS
                                                   ;       ALL 0'S, AND THAT THE 20 WORDS PRECEDING AND SUCCEEDING
                                                   ;       THE COMM AREA ARE UNTOUCHED.
                                                   ;
                                                   ;;*************************************************************
                                                   ;;*************************************************************

037256                                                     BGNTST
037256                                             T6::
037256                                                     BGNSUB
037256                                             T6.1:
037256  104402                                             TRAP    C$BSUB

037260  032764  000001  000014                             BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
037266  001402                                             BEQ     1$                      ;  THEN DO TEST
037270                                                     EXIT    TST                     ;  ELSE GET OUT
037270  104432                                             TRAP    C$EXIT
037272  001406                                             .WORD   L10024-.
037274  012737  025647  002330     1$:                     MOV     #CTRL,FRUIS             ;FAILING FRU IN CASE OF ERROR
037302  012737  000001  000000G                            MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
037310  022737  000001  002312                             CMP     #1,PASCNT               ;IF FIRST PASS
037316  001403                                             BEQ     2$                      ;  THEN START TEST
037320  012737  000012  000000G                            MOV     #10.,ITRCNT             ;  ELSE DO 10 ITERATIONS

037326  012705  000000             2$:                     MOV     #0,R5                   ;SET UP R5 AS INDEX TO STEP TABLES
037332  012737  000001  002336                             MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
037340  016437  000004  002272                             MOV     TUVEC(R4),STPTBL        ;PUT VECTOR IN STEP 1
037346  006237  002272                                     ASR     STPTBL                  ;DIVIDE BY TWO
037352  006237  002272                                     ASR     STPTBL                  ;DIVIDE BY FOUR
037356  013737  002272  002306                             MOV     STPTBL,CMPTBL+4         ;PUT VECTOR IN STEP 3 COMPARE
037364  052737  111000  002272                             BIS     #111000,STPTBL          ;REST OF STEP ONE
037372  012737  005700  002302                             MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
                                                                                           ;STEP 1 COMPARE VALUE
037400  012737  060050  002274                             MOV     #COMMAR,STPTBL+2        ;STEP 2 - COMM AREA ADDRESS
037406  012737  010222  002304                             MOV     #010222,CMPTBL+2        ;STEP 2 COMPARE
037414  012737  100000  002276                             MOV     #B.PP,STPTBL+4          ;STEP 3 - HIGH ADDRESS AND PRGE/POLL
037422  112737  000040  002307                             MOVB    #40,CMPTBL+5            ;REST OF STEP 3 COMPARE
037430  012737  000000  002300                             MOV     #0,STPTBL+6             ;STEP 4
037436  012737  040000  002310                             MOV     #040000,CMPTBL+6        ;STEP 4 COMPARE

037444  012737  000022  002326                             MOV     #18.,CMARLG             ;LENGTH OF COMM AREA FOR THIS TEST
037452  004737  031426                                     JSR     PC,BAKPAT               ;FILL COMM AREA WITH ALL 1'S DATA
```

```
037456  004737  031330                  JSR     PC,STEP1                ;GO DO IT
037462  005737  002340                  TST     STEPST                  ;IF STATUS OKAY
037466  001412                          BEQ     5$                      ;  THEN CONTINUE TEST

037470                                  ERRDF   19.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
037470  104455                          TRAP    C$ERDF
037472  000023                          .WORD   19
037474  024271                          .WORD   EMSG9
037476  027002                          .WORD   PRIINI
037500                                  CKLOOP                          ;LOOP ON ERROR?
037500  104406                          TRAP    C$CLP1
037502                                  DODU    LOGUNT                  ;DROP UUT
037502  013700  002332                  MOV     LOGUNT,R0
037506  104451                          TRAP    C$DODU
037510                                  ESCAPE  TST                     ;LEAVE TST
037510  104410                          TRAP    C$ESCAPE
037512  001166                          .WORD   L10024-.

037514  005237  002336          5$:     INC     INISTP                  ;ADJUST STEP COUNTER
037520  062705  000002                  ADD     #2,R5                   ;ADJUST TABLE INDEX
037524  012737  000100  002346  6$:     MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
037532  016537  002302  002334          MOV     CMPTBL(R5),SAEXP        ;SET UP FOR COMPARE
037540  012737  037200  002344  7$:     MOV     #16000.,INNER           ;SET UP INNER
037546  017464  000002  000012          MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
037554  022705  000006                  CMP     #6,R5                   ;ARE WE IN STEP 4?
037560  001005                          BNE     8$                      ;BRANCH IF NOT
037562  033764  002334  000012          BIT     SAEXP,TUSASV(R4)        ;JUST LOOK FOR STEP 4 BIT
037570  001027                          BNE     10$                     ;IT'S SET SO LET'S GO
037572  000404                          BR      9$                      ;STAY IN LOOP OTHERWISE
037574  023764  002334  000012  8$:     CMP     SAEXP,TUSASV(R4)        ;IF SA IS WHAT WE EXPECT
037602  001422                          BEQ     10$                     ;  THEN MOVE ALONG
037604  004737  031302          9$:     JSR     PC,PDELAY               ;  ELSE GIVE UUT SOME TIME
037610  005737  002350                  TST     TOUT                    ;IF NO TIMEOUT YET
037614  001751                          BEQ     7$                      ;  THEN GO TAKE ANOTHER LOOK

037616  012737  025632  002330          MOV     #LESI,FRUIS             ;FAILING FRU
037624                                  ERRDF   20.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
037624  104455                          TRAP    C$ERDF
037626  000024                          .WORD   20
037630  024271                          .WORD   EMSG9
037632  027002                          .WORD   PRIINI
037634                                  CKLOOP
037634  104406                          TRAP    C$CLP1
037636                                  DODU    LOGUNT
037636  013700  002332                  MOV     LOGUNT,R0
037642  104451                          TRAP    C$DODU
037644                                  ESCAPE  TST
037644  104410                          TRAP    C$ESCAPE
037646  001032                          .WORD   L10024-.

037650  016574  002272  000002  10$:    MOV     STPTBL(R5),@TUSA(R4)    ;WRITE NEXT STEP TO UUT
037656  022705  000004                  CMP     #4,R5                   ;IF STEP 3
037662  001404                          BEQ     15$                     ;  THEN DO PURGE/POLL STUFF
037664  022705  000006                  CMP     #6,R5                   ;IF NOT IN STEP 4
037670  001311                          BNE     5$                      ;  THEN GO BACK TO MAIN LOOP
037672  000440                          BR      20$                     ;  ELSE GO CHECK RESULTS
```

```
3472 037674                                 15$:    DELAY   1                       ;GIVE PORT SOME TIME
     037674  012727  000001                         MOV     #1,(PC)+
     037700  000000                                 .WORD   0
     037702  013727  002116                         MOV     L$DLY,(PC)+
     037706  000000                                 .WORD   0
     037710  005367  177772                         DEC     -6(PC)
     037714  001375                                 BNE     .-4
     037716  005367  177756                         DEC     -22(PC)
     037722  001367                                 BNE     .-20
3473 037724  017464  000002  000012                 MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
3474 037732  001412                                 BEQ     16$                     ;BRANCH IF OKAY
3475
3476 037734                                         ERRDF   21.,EMSG13,PRIINI       ;SA NOT 0 IN PURGE/POLL
     037734  104455                                 TRAP    C$ERDF
     037736  000025                                 .WORD   21
     037740  024454                                 .WORD   EMSG13
     037742  027002                                 .WORD   PRIINI
3477 037744                                         CKLOOP
     037744  104406                                 TRAP    C$CLP1
3478 037746                                         DODU    LOGUNT
     037746  013700  002332                         MOV     LOGUNT,R0
     037752  104451                                 TRAP    C$DODU
3479 037754                                         ESCAPE  TST
     037754  104410                                 TRAP    C$ESCAPE
     037756  000722                                 .WORD   L10024-.
3480
3481 037760  012774  000000  000002         16$:    MOV     #0,@TUSA(R4)            ;WRITE 0'S TO SA
3482 037766  005774  000000                         TST     @TUIP(R4)               ;AND READ IP
3483 037772  000650                                 BR      5$                      ;GO WAIT FOR NEXT TRANSITION
3484
3485 037774  004737  031456                 20$:    JSR     PC,CHKCOM               ;GO CHECK COMM AREA
3486 040000  032764  000001  000014                 BIT     #DRPFLG,LUNFLG(R4)      ;HAS UUT BEEN DROPPED
3487 040006  001005                                 BNE     T6EXT                   ;LEAVE NOW IF SO
3488 040010  005337  000000G                        DEC     ITRCNT                  ;IF NO MORE ITERATIONS LEFT
3489 040014  001402                                 BEQ     T6EXT                   ;  THEN LEAVE TEST
3490 040016  000137  037326                         JMP     2$                      ;  ELSE DO IT AGAIN
3491
3492 040022                                 T6EXT:  EXIT    TST
     040022  104432                                 TRAP    C$EXIT
     040024  000654                                 .WORD   L10024-.
3493 040026                                         ENDSUB
     040026                                 L10025:
     040026  104403                                 TRAP    C$ESUB
```

```
                                .SBTTL  SUBTEST 2: EXTENDED ADDRESS TEST

040030                                  BGNSUB
040030                          T6.2:
040030  104402                          TRAP    C$BSUB

040032  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
040040  001407                          BEQ     1$                      ;  THEN DO TEST
040042                                  EXIT    TST                     ;  ELSE GET OUT
040042  104432                          TRAP    C$EXIT
040044  000634                          .WORD   L10024-.
040046  005737  002314                  TST     KTFLAG                  ;IF MEMORY MANAGEMENT AVAILABLE
040052  001002                          BNE     1$                      ;  THEN DO TEST
040054                                  EXIT    TST                     ;  ELSE GET OUT
040054  104432                          TRAP    C$EXIT
040056  000622                          .WORD   L10024-.
040060  012737  025647  002330  1$:     MOV     #CTRL,FRUIS             ;FAILING FRU IN CASE OF ERROR
040066  012737  000001  000000G         MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
040074  022737  000001  002312          CMP     #1,PASCNT               ;IF FIRST PASS
040102  001403                          BEQ     2$                      ;  THEN START TEST
040104  012737  000012  000000G         MOV     #10.,ITRCNT             ;  ELSE DO 10 ITERATIONS

040112  004737  031616          2$:     JSR     PC,INTMMU               ;INITIALIZE MMU REGISTERS
040116  012705  000000          3$:     MOV     #0,R5                   ;SET UP R5 AS INDEX TO STEP TABLES
040122  012737  000001  002336          MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
040130  016437  000004  002272          MOV     TUVEC(R4),STPTBL        ;PUT VECTOR IN STEP 1
040136  006237  002272                  ASR     STPTBL                  ;DIVIDE BY TWO
040142  006237  002272                  ASR     STPTBL                  ;DIVIDE BY FOUR
040146  013737  002272  002306          MOV     STPTBL,CMPTBL+4         ;PUT VECTOR IN STEP 3 COMPARE
040154  052737  111000  002272          BIS     #111000,STPTBL          ;REST OF STEP ONE
040162  012737  005700  002302          MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
                                                                        ;STEP 1 COMPARE VALUE
040170  012737  060050  002274          MOV     #COMMAR,STPTBL+2        ;STEP 2 - COMM AREA ADDRESS
040176  042737  160000  002274          BIC     #BIT15!BIT14!BIT13,STPTBL+2
                                                                        ;CLEAR THE ACTIVE PAGE FIELD
040204  012737  010222  002304          MOV     #010222,CMPTBL+2        ;STEP 2 COMPARE
040212  013737  172346  002352          MOV     KPAR3,TEMP              ;GET RELOCATION VALUE
040220  113737  002353  002276          MOVB    TEMP+1,STPTBL+4         ;JUST THE HGH BYTE
040226  006237  002276                  ASR     STPTBL+4                ;MAKE IT THE EXTENDED
040232  006237  002276                  ASR     STPTBL+4                ;  ADDRESS OF THE COMM AREA
040236  052737  100000  002276          BIS     #B.PP,STPTBL+4          ;NOW SET PURGE/POLL BIT
040244  112737  000040  002307          MOVB    #40,CMPTBL+5            ;REST OF STEP 3 COMPARE
040252  012737  000000  002300          MOV     #0,STPTBL+6             ;STEP 4
040260  012737  040000  002310          MOV     #040000,CMPTBL+6        ;STEP 4 COMPARE

040266  012737  000022  002326          MOV     #18.,CMARLG             ;LENGTH OF COMM AREA FOR THIS TEST
040274  004737  031426                  JSR     PC,BAKPAT               ;FILL COMM AREA WITH ALL 1'S DATA

040300  004737  031330                  JSR     PC,STEP1                ;GO DO IT
040304  005737  002340                  TST     STEPST                  ;IF STATUS OKAY
040310  001412                          BEQ     5$                      ;  THEN CONTINUE TEST

040312                                  ERRDF   25.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
040312  104455                          TRAP    C$ERDF
040314  000031                          .WORD   25
040316  024271                          .WORD   EMSG9
040320  027002                          .WORD   PRIINI
```

```
 3543 040322                                    CKLOOP                                  ;LOOP ON ERROR?
      040322  104406                            TRAP    C$CLP1
 3544 040324                                    DODU    LOGUNT                          ;DROP UUT
      040324  013700  002332                    MOV     LOGUNT,R0
      040330  104451                            TRAP    C$DODU
 3545 040332                                    ESCAPE  TST                             ;LEAVE TST
      040332  104410                            TRAP    C$ESCAPE
      040334  000344                            .WORD   L10024-.
 3546
 3547 040336  005237  002336          5$:       INC     INISTP                          ;ADJUST STEP COUNTER
 3548 040342  062705  000002                    ADD     #2,R5                           ;ADJUST TABLE INDEX
 3549 040346  012737  000100  002346  6$:       MOV     #100,OUTER                      ;SET UP FOR DELAY ROUTINE
 3550 040354  016537  002302  002334            MOV     CMPTBL(R5),SAEXP                ;SET UP FOR COMPARE
 3551 040362  012737  037200  002344  7$:       MOV     #16000.,INNER                   ;SET UP INNER
 3552 040370  017464  000002  000012            MOV     @TUSA(R4),TUSASV(R4)            ;GET SA CONTENTS
 3553 040376  022705  000006                    CMP     #6,R5                           ;ARE WE IN STEP 4?
 3554 040402  001005                            BNE     8$                              ;BRANCH IF NOT
 3555 040404  033764  002334  000012            BIT     SAEXP,TUSASV(R4)                ;JUST LOOK FOR STEP 4 BIT
 3556 040412  001024                            BNE     10$                             ;IT'S SET SO LET'S GO
 3557 040414  000404                            BR      9$                              ;STAY IN LOOP OTHERWISE
 3558 040416  023764  002334  000012  8$:       CMP     SAEXP,TUSASV(R4)                ;IF SA IS WHAT WE EXPECT
 3559 040424  001417                            BEQ     10$                             ;  THEN MOVE ALONG
 3560 040426  004737  031302          9$:       JSR     PC,PDELAY                       ;  ELSE GIVE UUT SOME TIME
 3561 040432  005737  002350                    TST     TOUT                            ;IF NO TIMEOUT YET
 3562 040436  001751                            BEQ     7$                              ;  THEN GO TAKE ANOTHER LOOK
 3563
 3564 040440                                    ERRDF   26.,EMSG9,PRIINI                ;"SA CONTENTS IN ERROR"
      040440  104455                            TRAP    C$ERDF
      040442  000032                            .WORD   26
      040444  024271                            .WORD   EMSG9
      040446  027002                            .WORD   PRIINI
 3565 040450                                    CKLOOP
      040450  104406                            TRAP    C$CLP1
 3566 040452                                    DODU    LOGUNT
      040452  013700  002332                    MOV     LOGUNT,R0
      040456  104451                            TRAP    C$DODU
 3567 040460                                    ESCAPE  TST
      040460  104410                            TRAP    C$ESCAPE
      040462  000216                            .WORD   L10024-.
 3568
 3569 040464  016574  002272  000002  10$:      MOV     STPTBL(R5),@TUSA(R4)            ;WRITE NEXT STEP TO UUT
 3570 040472  022705  000004                    CMP     #4,R5                           ;IF STEP 3
 3571 040476  001404                            BEQ     15$                             ;  THEN DO PURGE/POLL STUFF
 3572 040500  022705  000006                    CMP     #6,R5                           ;IF NOT IN STEP 4
 3573 040504  001314                            BNE     5$                              ;  THEN GO BACK TO MAIN LOOP
 3574 040506  000440                            BR      20$                             ;  ELSE GO CHECK RESULTS
 3575
 3576 040510                          15$:      DELAY   1                               ;GIVE PORT SOME TIME
      040510  012727  000001                    MOV     #1,(PC)+
      040514  000000                            .WORD   0
      040516  013727  002116                    MOV     L$DLY,(PC)+
      040522  000000                            .WORD   0
      040524  005367  177772                    DEC     -6(PC)
      040530  001375                            BNE     .-4
      040532  005367  177756                    DEC     -22(PC)
      040536  001367                            BNE     .-20
 3577 040540  017464  000002  000012            MOV     @TUSA(R4),TUSASV(R4)            ;GET SA CONTENTS
```

```
040546  001412                            BEQ     16$                     ;BRANCH IF OKAY

040550                                    ERRDF   27.,EMSG13,PRIINI       ;SA NOT 0 IN PURGE/POLL
040550  104455                            TRAP    C$ERDF
040552  000033                            .WORD   27
040554  024454                            .WORD   EMSG13
040556  027002                            .WORD   PRIINI
040560                                    CKLOOP
040560  104406                            TRAP    C$CLP1
040562                                    DODU    LOGUNT
040562  013700  002332                    MOV     LOGUNT,R0
040566  104451                            TRAP    C$DODU
040570                                    ESCAPE  TST
040570  104410                            TRAP    C$ESCAPE
040572  000106                            .WORD   L10024-.

040574  012774  000000  000002  16$:      MOV     #0,@TUSA(R4)            ;WRITE 0'S TO SA
040602  005774  000000                    TST     @TUIP(R4)               ;AND READ IP
040606  000653                            BR      5$                      ;GO WAIT FOR NEXT TRANSITION

040610  004737  031456          20$:      JSR     PC,CHKCOM               ;GO CHECK COMM AREA
040614  032764  000001  000014            BIT     #DRPFLG,LUNFLG(R4)      ;HAS UUT BEEN DROPPED
040622  001021                            BNE     ST6EXT                  ;LEAVE NOW IF SO

040624  062737  002000  172346            ADD     #2000,KPAR3             ;POINT TO NEXT 32KWORDS
040632  103406                            BCS     25$                     ;DON'T ALLOW OVERFLOW IF 4 MBYTES
040634  023737  002120  172346            CMP     L$HIME,KPAR3            ;IF THERE'S NO MORE MEMORY AVAILABLE
040642  103402                            BLO     25$                     ;  THEN CHECK FOR MORE ITERATIONS
040644  000137  040116                    JMP     3$                      ;  ELSE DO IT AGAIN

040650  005037  177572          25$:      CLR     MMUSR0                  ;SHUT DOWN MEMORY MANAGEMENT
040654  005337  000000G                   DEC     ITRCNT                  ;IF NO MORE ITERATIONS LEFT
040660  001402                            BEQ     ST6EXT                  ;  THEN LEAVE TEST
040662  000137  040112                    JMP     2$                      ;  ELSE DO IT AGAIN

040666  005037  177572          ST6EXT:   CLR     MMUSR0                  ;MAKE SURE IT'S OFF
040672                                    EXIT    TST
040672  104432                            TRAP    C$EXIT
040674  000004                            .WORD   L10024-.

040676                                    ENDSUB
040676                          L10026:
040676  104403                            TRAP    C$ESUB

040700                                    ENDTST
040700                          L10024:
040700  104401                            TRAP    C$ETST
```

```
                                                .SBTTL TEST 7: SMALL RING TEST


                                                ;;*************************************************************
                                                ;;*************************************************************
                                                ;
                                                ;TEST 7 - SMALL RING TEST
                                                ;       THIS TEST IS SIMILAR TO TEST 6, HOWEVER, RING DEPTH
                                                ;       USED IN THIS TEST IS THE MINIMUM.
                                                ;
                                                ;;*************************************************************
                                                ;;*************************************************************

040702                                                  BGNTST
040702                                          T7::

040702  032764  000001  000014                          BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
040710  001402                                          BEQ     1$                      ;  THEN DO TEST
040712                                                  EXIT    TST                     ;  ELSE GET OUT
040712  104432                                          TRAP    C$EXIT
040714  000526                                          .WORD   L10027-.
040716  012737  025647  002330  1$:                     MOV     #CTRL,FRUIS             ;FAILING FRU IN CASE OF ERROR
040724  012737  000001  000000G                         MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
040732  022737  000001  002312                          CMP     #1,PASCNT               ;IF FIRST PASS
040740  001403                                          BEQ     2$                      ;  THEN START TEST
040742  012737  000012  000000G                         MOV     #10.,ITRCNT             ;  ELSE DO 10 ITERATIONS

040750  012705  000000          2$:                     MOV     #0,R5                   ;SET UP R5 AS INDEX TO STEP TABLES
040754  012737  000001  002336                          MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
040762  016437  000004  002272                          MOV     TUVEC(R4),STPTBL        ;PUT VECTOR IN STEP 1
040770  006237  002272                                  ASR     STPTBL                  ;DIVIDE BY TWO
040774  006237  002272                                  ASR     STPTBL                  ;DIVIDE BY FOUR
041000  013737  002272  002306                          MOV     STPTBL,CMPTBL+4         ;PUT VECTOR IN STEP 3 COMPARE
041006  052737  104400  002272                          BIS     #104400,STPTBL          ;REST OF STEP ONE
041014  012737  005700  002302                          MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
                                                                                        ;STEP 1 COMPARE VALUE
041022  012737  060050  002274                          MOV     #COMMAR,STPTBL+2        ;STEP 2 - COMM AREA ADDRESS
041030  012737  010211  002304                          MOV     #010211,CMPTBL+2        ;STEP 2 COMPARE
041036  012737  100000  002276                          MOV     #B.PP,STPTBL+4          ;STEP 3 - HIGH ADDRESS AND PRGE/POLL
041044  112737  000040  002307                          MOVB    #40,CMPTBL+5            ;REST OF STEP 3 COMPARE
041052  012737  000000  002300                          MOV     #0,STPTBL+6             ;STEP 4
041060  012737  040000  002310                          MOV     #040000,CMPTBL+6        ;STEP 4 COMPARE

041066  012737  000012  002326                          MOV     #10.,CMARLG             ;LENGTH OF COMM AREA FOR THIS TEST
041074  004737  031426                                  JSR     PC,BAKPAT               ;FILL COMM AREA WITH ALL 1'S DATA

041100  004737  031330                                  JSR     PC,STEP1                ;GO DO IT
041104  005737  002340                                  TST     STEPST                  ;IF STATUS OKAY
041110  001412                                          BEQ     5$                      ;  THEN CONTINUE TEST

041112                                                  ERRDF   19.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
041112  104455                                          TRAP    C$ERDF
041114  000023                                          .WORD   19
041116  024271                                          .WORD   EMSG9
041120  027002                                          .WORD   PRIINI
041122                                                  CKLOOP                          ;LOOP ON ERROR?
041122  104406                                          TRAP    C$CLP1
041124                                                  DODU    LOGUNT                  ;DROP UUT
```

```
     041124  013700  002332                    MOV     LOGUNT,R0
     041130  104451                            TRAP    C$DODU
3667 041132                                    ESCAPE  TST                        ;LEAVE TST
     041132  104410                            TRAP    C$ESCAPE
     041134  000306                            .WORD   L10027-.
3668
3669 041136  005237  002336            5$:     INC     INISTP                     ;ADJUST STEP COUNTER
3670 041142  062705  000002                    ADD     #2,R5                      ;ADJUST TABLE INDEX
3671 041146  012737  000100  002346    6$:     MOV     #100,OUTER                 ;SET UP FOR DELAY ROUTINE
3672 041154  016537  002302  002334            MOV     CMPTBL(R5),SAEXP           ;SET UP FOR COMPARE
3673 041162  012737  037200  002344    7$:     MOV     #16000.,INNER              ;SET UP INNER
3674 041170  017464  000002  000012            MOV     @TUSA(R4),TUSASV(R4)       ;GET SA CONTENTS
3675 041176  022705  000006                    CMP     #6,R5                      ;ARE WE IN STEP 4?
3676 041202  001005                            BNE     8$                         ;BRANCH IF NOT
3677 041204  033764  002334  000012            BIT     SAEXP,TUSASV(R4)           ;JUST LOOK FOR STEP 4 BIT
3678 041212  001024                            BNE     10$                        ;IT'S SET SO LET'S GO
3679 041214  000404                            BR      9$                         ;STAY IN LOOP OTHERWISE
3680 041216  023764  002334  000012    8$:     CMP     SAEXP,TUSASV(R4)           ;IF SA IS WHAT WE EXPECT
3681 041224  001417                            BEQ     10$                        ;  THEN MOVE ALONG
3682 041226  004737  031302            9$:     JSR     PC,PDELAY                  ;  ELSE GIVE UUT SOME TIME
3683 041232  005737  002350                    TST     TOUT                       ;IF NO TIMEOUT YET
3684 041236  001751                            BEQ     7$                         ;  THEN GO TAKE ANOTHER LOOK
3685
3686 041240                                    ERRDF   20.,EMSG9,PRIINI           ;"SA CONTENTS IN ERROR"
     041240  104455                            TRAP    C$ERDF
     041242  000024                            .WORD   20
     041244  024271                            .WORD   EMSG9
     041246  027002                            .WORD   PRIINI
3687 041250                                    CKLOOP
     041250  104406                            TRAP    C$CLP1
3688 041252                                    DODU    LOGUNT
     041252  013700  002332                    MOV     LOGUNT,R0
     041256  104451                            TRAP    C$DODU
3689 041260                                    ESCAPE  TST
     041260  104410                            TRAP    C$ESCAPE
     041262  000160                            .WORD   L10027-.
3690
3691 041264  016574  002272  000002    10$:    MOV     STPTBL(R5),@TUSA(R4)       ;WRITE NEXT STEP TO UUT
3692 041272  022705  000004                    CMP     #4,R5                      ;IF STEP 3
3693 041276  001404                            BEQ     15$                        ;  THEN DO PURGE/POLL STUFF
3694 041300  022705  000006                    CMP     #6,R5                      ;IF NOT IN STEP 4
3695 041304  001314                            BNE     5$                         ;  THEN GO BACK TO MAIN LOOP
3696 041306  000440                            BR      20$                        ;  ELSE GO CHECK RESULTS
3697
3698 041310                            15$:    DELAY   1                          ;GIVE PORT SOME TIME
     041310  012727  000001                    MOV     #1,(PC)+
     041314  000000                            .WORD   0
     041316  013727  002116                    MOV     L$DLY,(PC)+
     041322  000000                            .WORD   0
     041324  005367  177772                    DEC     -6(PC)
     041330  001375                            BNE     .-4
     041332  005367  177756                    DEC     -22(PC)
     041336  001367                            BNE     .-20
3699 041340  017464  000002  000012            MOV     @TUSA(R4),TUSASV(R4)       ;GET SA CONTENTS
3700 041346  001412                            BEQ     16$                        ;BRANCH IF OKAY
3701
3702 041350                                    ERRDF   21.,EMSG13,PRIINI          ;SA NOT 0 IN PURGE/POLL
```

```
        041350  104455                          TRAP    C$ERDF
        041352  000025                          .WORD   21
        041354  024454                          .WORD   EMSG13
        041356  027002                          .WORD   PRIINI
   3703 041360                                  CKLOOP
        041360  104406                          TRAP    C$CLP1
   3704 041362                                  DODU    LOGUNT
        041362  013700  002332                  MOV     LOGUNT,R0
        041366  104451                          TRAP    C$DODU
   3705 041370                                  ESCAPE  TST
        041370  104410                          TRAP    C$ESCAPE
        041372  000050                          .WORD   L10027-.
   3706
   3707 041374  012774  000000  000002  16$:    MOV     #0,@TUSA(R4)            ;WRITE 0'S TO SA
   3708 041402  005774  000000                  TST     @TUIP(R4)               ;AND READ IP
   3709 041406  000653                          BR      5$                      ;GO WAIT FOR NEXT TRANSITION
   3710
   3711 041410  004737  031456          20$:    JSR     PC,CHKCOM               ;GO CHECK COMM AREA
   3712 041414  032764  000001  000014          BIT     #DRPFLG,LUNFLG(R4)      ;HAS UUT BEEN DROPPED
   3713 041422  001005                          BNE     T7EXT                   ;LEAVE NOW IF SO
   3714 041424  005337  000000G                 DEC     ITRCNT                  ;IF NO MORE ITERATIONS LEFT
   3715 041430  001402                          BEQ     T7EXT                   ;  THEN LEAVE TEST
   3716 041432  000137  040750                  JMP     2$                      ;  ELSE DO IT AGAIN
   3717
   3718 041436                          T7EXT:  EXIT    TST
        041436  104432                          TRAP    C$EXIT
        041440  000002                          .WORD   L10027-.
   3719
   3720 041442                                  ENDTST
        041442                          L10027:
        041442  104401                          TRAP    C$ETST
```

```
                                               .SBTTL TEST 8: MAXIMUM RING BUFFER TEST

     041444                                            BGNTST
     041444                                    T8::

     041444  032764  000001  000014                    BIT     #DRPFLG,LUNFLG(R4)      ;IF UUT NOT DROPPED
     041452  001402                                    BEQ     1$                      ;  THEN DO TEST
     041454                                            EXIT    TST                     ;  ELSE GET OUT
     041454  104432                                    TRAP    C$EXIT
     041456  000526                                    .WORD   L10030-.
     041460  012737  025647  002330    1$:             MOV     #CTRL,FRUIS             ;FAILING FRU IN CASE OF ERROR
     041466  012737  000001  000000G                   MOV     #1,ITRCNT               ;SET UP FOR ONE TEST ITERATION
     041474  022737  000001  002312                    CMP     #1,PASCNT               ;IF FIRST PASS
     041502  001403                                    BEQ     2$                      ;  THEN START TEST
     041504  012737  000012  000000G                   MOV     #10.,ITRCNT             ;  ELSE DO 10 ITERATIONS

     041512  012705  000000            2$:             MOV     #0,R5                   ;SET UP R5 AS INDEX TO STEP TABLES
     041516  012737  000001  002336                    MOV     #1,INISTP               ;STEP 1 FOR ERROR PRINTOUT
     041524  016437  000004  002272                    MOV     TUVEC(R4),STPTBL        ;PUT VECTOR IN STEP 1
     041532  006237  002272                            ASR     STPTBL                  ;DIVIDE BY TWO
     041536  006237  002272                            ASR     STPTBL                  ;DIVIDE BY FOUR
     041542  013737  002272  002306                    MOV     STPTBL,CMPTBL+4         ;PUT VECTOR IN STEP 3 COMPARE
     041550  052737  137400  002272                    BIS     #137400,STPTBL          ;REST OF STEP ONE
     041556  012737  005700  002302                    MOV     #B.S1!B.QB!B.DI!B.OD!B.MP,CMPTBL
                                                                                       ;STEP 1 COMPARE VALUE
     041564  012737  060050  002274                    MOV     #COMMAR,STPTBL+2        ;STEP 2 - COMM AREA ADDRESS
     041572  012737  010277  002304                    MOV     #010277,CMPTBL+2        ;STEP 2 COMPARE
     041600  012737  100000  002276                    MOV     #B.PP,STPTBL+4          ;STEP 3 - HIGH ADDRESS AND PRGE/POLL
     041606  112737  000040  002307                    MOVB    #40,CMPTBL+5            ;REST OF STEP 3 COMPARE
     041614  012737  000000  002300                    MOV     #0,STPTBL+6             ;STEP 4
     041622  012737  040000  002310                    MOV     #040000,CMPTBL+6        ;STEP 4 COMPARE

     041630  012737  001002  002326                    MOV     #514.,CMARLG            ;LENGTH OF COMM AREA FOR THIS TEST
     041636  004737  031426                            JSR     PC,BAKPAT               ;FILL COMM AREA WITH ALL 1'S DATA

     041642  004737  031330                            JSR     PC,STEP1                ;GO DO IT
     041646  005737  002340                            TST     STEPST                  ;IF STATUS OKAY
     041652  001412                                    BEQ     5$                      ;  THEN CONTINUE TEST

     041654                                            ERRDF   22.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
     041654  104455                                    TRAP    C$ERDF
     041656  000026                                    .WORD   22
     041660  024271                                    .WORD   EMSG9
     041662  027002                                    .WORD   PRIINI
     041664                                            CKLOOP                          ;LOOP ON ERROR?
     041664  104406                                    TRAP    C$CLP1
     041666                                            DODU    LOGUNT                  ;DROP UUT
     041666  013700  002332                            MOV     LOGUNT,R0
     041672  104451                                    TRAP    C$DODU
     041674                                            ESCAPE  TST                     ;LEAVE TST
     041674  104410                                    TRAP    C$ESCAPE
     041676  000306                                    .WORD   L10030-.

     041700  005237  002336            5$:             INC     INISTP                  ;ADJUST STEP COUNTER
     041704  062705  000002                            ADD     #2,R5                   ;ADJUST TABLE INDEX
     041710  012737  000100  002346    6$:             MOV     #100,OUTER              ;SET UP FOR DELAY ROUTINE
     041716  016537  002302  002334                    MOV     CMPTBL(R5),SAEXP        ;SET UP FOR COMPARE
```

```
  3768 041724  012737  037200  002344  7$:     MOV     #16000.,INNER           ;SET UP INNER
  3769 041732  017464  000002  000012          MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
  3770 041740  022705  000006                  CMP     #6,R5                   ;ARE WE IN STEP 4?
  3771 041744  001005                          BNE     8$                      ;BRANCH IF NOT
  3772 041746  033764  002334  000012          BIT     SAEXP,TUSASV(R4)        ;JUST LOOK FOR STEP 4 BIT
  3773 041754  001024                          BNE     10$                     ;IT'S SET SO LET'S GO
  3774 041756  000404                          BR      9$                      ;STAY IN LOOP OTHERWISE
  3775 041760  023764  002334  000012  8$:     CMP     SAEXP,TUSASV(R4)        ;IF SA IS WHAT WE EXPECT
  3776 041766  001417                          BEQ     10$                     ;  THEN MOVE ALONG
  3777 041770  004737  031302          9$:     JSR     PC,PDELAY               ;  ELSE GIVE UUT SOME TIME
  3778 041774  005737  002350                  TST     TOUT                    ;IF NO TIMEOUT YET
  3779 042000  001751                          BEQ     7$                      ;  THEN GO TAKE ANOTHER LOOK
  3780
  3781 042002                                  ERRDF   23.,EMSG9,PRIINI        ;"SA CONTENTS IN ERROR"
       042002  104455                          TRAP    C$ERDF
       042004  000027                          .WORD   23
       042006  024271                          .WORD   EMSG9
       042010  027002                          .WORD   PRIINI
  3782 042012                                  CKLOOP
       042012  104406                          TRAP    C$CLP1
  3783 042014                                  DODU    LOGUNT
       042014  013700  002332                  MOV     LOGUNT,R0
       042020  104451                          TRAP    C$DODU
  3784 042022                                  ESCAPE  TST
       042022  104410                          TRAP    C$ESCAPE
       042024  000160                          .WORD   L10030-.
  3785
  3786 042026  016574  002272  000002  10$:    MOV     STPTBL(R5),@TUSA(R4)    ;WRITE NEXT STEP TO UUT
  3787 042034  022705  000004                  CMP     #4,R5                   ;IF STEP 3
  3788 042040  001404                          BEQ     15$                     ;  THEN DO PURGE/POLL STUFF
  3789 042042  022705  000006                  CMP     #6,R5                   ;IF NOT IN STEP 4
  3790 042046  001314                          BNE     5$                      ;  THEN GO BACK TO MAIN LOOP
  3791 042050  000440                          BR      20$                     ;  ELSE GO CHECK RESULTS
  3792
  3793 042052                          15$:    DELAY   1                       ;GIVE PORT SOME TIME
       042052  012727  000001                  MOV     #1,(PC)+
       042056  000000                          .WORD   0
       042060  013727  002116                  MOV     L$DLY,(PC)+
       042064  000000                          .WORD   0
       042066  005367  177772                  DEC     -6(PC)
       042072  001375                          BNE     .-4
       042074  005367  177756                  DEC     -22(PC)
       042100  001367                          BNE     .-20
  3794 042102  017464  000002  000012          MOV     @TUSA(R4),TUSASV(R4)    ;GET SA CONTENTS
  3795 042110  001412                          BEQ     16$                     ;BRANCH IF OKAY .
  3796
  3797 042112                                  ERRDF   24.,EMSG13,PRIINI       ;SA NOT 0 IN PURGE/POLL
       042112  104455                          TRAP    C$ERDF
       042114  000030                          .WORD   24
       042116  024454                          .WORD   EMSG13
       042120  027002                          .WORD   PRIINI
  3798 042122                                  CKLOOP
       042122  104406                          TRAP    C$CLP1
  3799 042124                                  DODU    LOGUNT
       042124  013700  002332                  MOV     LOGUNT,R0
       042130  104451                          TRAP    C$DODU
  3800 042132                                  ESCAPE  TST
```

```
      042132  104410                            TRAP    C$ESCAPE
      042134  000050                            .WORD   L10030-.
 3801
 3802 042136  012774  000000  000002  16$:      MOV     #0,@TUSA(R4)            ;WRITE 0'S TO SA
 3803 042144  005774  000000                    TST     @TUIP(R4)               ;AND READ IP
 3804 042150  000653                            BR      5$                      ;GO WAIT FOR NEXT TRANSITION
 3805
 3806 042152  004737  031456          20$:      JSR     PC,CHKCOM               ;GO CHECK COMM AREA
 3807 042156  032764  000001  000014            BIT     #DRPFLG,LUNFLG(R4)      ;HAS UUT BEEN DROPPED
 3808 042164  001005                            BNE     T8EXT                   ;LEAVE NOW IF SO
 3809 042166  005337  000000G                   DEC     ITRCNT                  ;IF NO MORE ITERATIONS LEFT
 3810 042172  001402                            BEQ     T8EXT                   ;  THEN LEAVE TEST
 3811 042174  000137  041512                    JMP     2$                      ;  ELSE DO IT AGAIN
 3812
 3813 042200                         T8EXT:     EXIT    TST
      042200  104432                            TRAP    C$EXIT
      042202  000002                            .WORD   L10030-.
 3814
 3815 042204                                    ENDTST
      042204                         L10030:
      042204  104401                            TRAP    C$ETST
```

```
  3819                                          .SBTTL  TEST 9:GET DUST STATUS
  3820
  3821 042206                                          BGNTST
       042206                                   T9::
  3822 042206  032764  000001  000014                  BIT     #DRPFLG,LUNFLG(R4)        ;IS THE DRIVE AVAILABLE
  3823 042214  001022                                  BNE     T9EXT                     ;GET OUT IF NOT AVAILABLE
  3824 042216  012737  025647  002330                  MOV     #CTRL,FRUIS               ;DEFAULT FRU IS CONTROLLER
  3825 042224  005064  000014                          CLR     LUNFLG(R4)                ;CLEAR ALL FLAGS
  3826 042230  004737  031716                          JSR     PC,PRTINT                 ;GO DO A PORT INITIALIZE
  3827 042234  032764  000001  000014                  BIT     #DRPFLG,LUNFLG(R4)        ;IS THE DRIVE AVAILABLE
  3828 042242  001007                                  BNE     T9EXT                     ;NO, BRANCH TO EXIT
  3829 042244  052764  000010  000014                  BIS     #TEST.9,LUNFLG(R4)        ;SET TEST 9 FLAG
  3830 042252  012705  002370                          MOV     #GDUST,R5                 ;SET UP TO DO GET DUST STATUS COMMAND
  3831 042256  004737  032350                          JSR     PC,CLSDRV                 ;GO ISSUE THE COMMAND
  3832 042262                                   T9EXT: EXIT    TST
       042262  104432                                  TRAP    C$EXIT
       042264  000002                                  .WORD   L10031-.
  3833 042266                                          ENDTST
       042266                                   L10031:
       042266  104401                                  TRAP    C$ETST
```

```
3835                                              .SBTTL  TEST 10: FUNCTIONAL FAULT DETECTION TEST (Internal Drive Test 1)
3836
3837 042270                                               BGNTST
     042270                                       T10::
3838 042270  032764  000001  000014                       BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
3839 042276  001062                                       BNE     T10EXT                  ;NO, BRANCH TO EXIT
3840 042300                                               MANUAL                          ;MANUAL INTERVENTION ALLOWED ?
     042300  104450                                       TRAP    C$MANI
3841 042302                                               BNCOMPLETE      T10EXT          ;NO, BRANCH TO EXIT
     042302  103060                                       BCC     T10EXT
3842 042304                                       1$:     PRINTF  #T10MS1                 ;PRINT TEST 10 MESSAGE
     042304  012746  025724                               MOV     #T10MS1,-(SP)
     042310  012746  000001                               MOV     #1,-(SP)
     042314  010600                                       MOV     SP,R0
     042316  104417                                       TRAP    C$PNTF
     042320  062706  000004                               ADD     #4,SP
3843 042324                                               PRINTF  #T10MS2                 ;PRINT TEST 10 MESSAGE
     042324  012746  026032                               MOV     #T10MS2,-(SP)
     042330  012746  000001                               MOV     #1,-(SP)
     042334  010600                                       MOV     SP,R0
     042336  104417                                       TRAP    C$PNTF
     042340  062706  000004                               ADD     #4,SP
3844 042344                                               PRINTF  #T10MS3                 ;PRINT TEST 10 MESSAGE
     042344  012746  026057                               MOV     #T10MS3,-(SP)
     042350  012746  000001                               MOV     #1,-(SP)
     042354  010600                                       MOV     SP,R0
     042356  104417                                       TRAP    C$PNTF
     042360  062706  000004                               ADD     #4,SP
3845 042364                                               PRINTF  #T10MS4                 ;PRINT TEST 10 MESSAGE
     042364  012746  026134                               MOV     #T10MS4,-(SP)
     042370  012746  000001                               MOV     #1,-(SP)
     042374  010600                                       MOV     SP,R0
     042376  104417                                       TRAP    C$PNTF
     042400  062706  000004                               ADD     #4,SP
3846 042404                                               GMANIL  QUESTN,ANSWER,1,YES     ;GET OPERATOR INPUT
     042404  104443                                       TRAP    C$GMAN
     042406  000404                                       BR      10000$
     042410  002354                                       .WORD   ANSWER
     042412  000130                                       .WORD   T$CODE
     042414  026716                                       .WORD   QUESTN
     042416  000001                                       .WORD   1
     042420                                       10000$:
3847 042420  005737  002354                               TST     ANSWER                  ;DID OPERATOR ANSWER YES ?
3848 042424  001407                                       BEQ     T10EXT                  ;NO, BRANCH TO EXIT
3849 042426  005037  002354                               CLR     ANSWER                  ;CLEAR OPERATOR ANSWER
3850 042432  112737  000061  002424                       MOVB    #61,TSTNAM              ;LOAD DRIVE TEST NAME (ASCII 1)
3851 042440  004737  032150                               JSR     PC,DRVTST               ;GO RUN THE INTERNAL DRIVE TEST
3852 042444                                       T10EXT: EXIT    TST
     042444  104432                                       TRAP    C$EXIT
     042446  000002                                       .WORD   L10032-.
3853 042450                                               ENDTST
     042450                                       L10032:
     042450  104401                                       TRAP    C$ETST
```

```
3855                                        .SBTTL  TEST 11: TENSION FAULT ISOLATION TEST (Internal Drive Test 2)
3856
3857 042452                                         BGNTST
     042452                                 T11::
3858 042452  032764  000001  000014                 BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
3859 042460  001042                                 BNE     T11EXT                  ;NO, BRANCH TO EXIT
3860 042462                                         MANUAL                          ;MANUAL INTERVENTION ALLOWED ?
     042462  104450                                 TRAP    C$MANI
3861 042464                                         BNCOMPLETE      T11EXT          ;NO, BRANCH TO EXIT
     042464  103040                                 BCC     T11EXT
3862 042466                                 1$:     PRINTF  #T11MS1                 ;PRINT TEST 11 MESSAGE
     042466  012746  026221                         MOV     #T11MS1,-(SP)
     042472  012746  000001                         MOV     #1,-(SP)
     042476  010600                                 MOV     SP,R0
     042500  104417                                 TRAP    C$PNTF
     042502  062706  000004                         ADD     #4,SP
3863 042506                                         PRINTF  #MMSG                   ;PRINT REQUIREMENT MESSAGE
     042506  012746  026536                         MOV     #MMSG,-(SP)
     042512  012746  000001                         MOV     #1,-(SP)
     042516  010600                                 MOV     SP,R0
     042520  104417                                 TRAP    C$PNTF
     042522  062706  000004                         ADD     #4,SP
3864 042526                                         GMANIL  QUESTN,ANSWER,1,YES     ;GET OPERATOR INPUT
     042526  104443                                 TRAP    C$GMAN
     042530  000404                                 BR      10000$
     042532  002354                                 .WORD   ANSWER
     042534  000130                                 .WORD   T$CODE
     042536  026716                                 .WORD   QUESTN
     042540  000001                                 .WORD   1
     042542                                 10000$:
3865 042542  005737  002354                         TST     ANSWER                  ;DID OPERATOR ANSWER YES ?
3866 042546  001407                                 BEQ     T11EXT                  ;NO, BRANCH TO EXIT
3867 042550  005037  002354                         CLR     ANSWER                  ;CLEAR OPERATOR ANSWER
3868 042554  112737  000062  002424                 MOVB    #62,TSTNAM              ;LOAD PROGRAM NAME (ASCII 2)
3869 042562  004737  032150                         JSR     PC,DRVTST               ;GO RUN THE INTERNAL DRIVE TEST
3870 042566                                 T11EXT: EXIT    TST
     042566  104432                                 TRAP    C$EXIT
     042570  000002                                 .WORD   L10033-.
3871 042572                                         ENDTST
     042572                                 L10033:
     042572  104401                                 TRAP    C$ETST
```

```
 3873                                       .SBTTL  TEST 12: VELOCITY FAULT ISOLATION TEST (Internal Drive Test 3)
 3874
 3875 042574                                        BGNTST
      042574                                T12::
 3876 042574  032764  000001  000014                BIT     #DRPFLG,LUNFLG(R4)         ;IS THE DRIVE AVAILABLE
 3877 042602  001042                                BNE     T12EXT                     ;NO, BRANCH TO EXIT
 3878 042604                                        MANUAL                             ;MANUAL INTERVENTION ALLOWED ?
      042604  104450                                TRAP    C$MANI
 3879 042606                                        BNCOMPLETE      T12EXT             ;NO, BRANCH TO EXIT
      042606  103040                                BCC     T12EXT
 3880 042610                                1$:     PRINTF  #T12MS1                    ;PRINT TEST 12 MESSAGE
      042610  012746  026324                        MOV     #T12MS1,-(SP)
      042614  012746  000001                        MOV     #1,-(SP)
      042620  010600                                MOV     SP,R0
      042622  104417                                TRAP    C$PNTF
      042624  062706  000004                        ADD     #4,SP
 3881 042630                                        PRINTF  #MMSG                      ;PRINT TEST REQUIREMENT MESSAGE
      042630  012746  026536                        MOV     #MMSG,-(SP)
      042634  012746  000001                        MOV     #1,-(SP)
      042640  010600                                MOV     SP,R0
      042642  104417                                TRAP    C$PNTF
      042644  062706  000004                        ADD     #4,SP
 3882 042650                                        GMANIL  QUESTN,ANSWER,1,YES        ;GET OPERATOR INPUT
      042650  104443                                TRAP    C$GMAN
      042652  000404                                BR      10000$
      042654  002354                                .WORD   ANSWER
      042656  000130                                .WORD   T$CODE
      042660  026716                                .WORD   QUESTN
      042662  000001                                .WORD   1
      042664                                10000$:
 3883 042664  005737  002354                        TST     ANSWER                     ;DID OPERATOR ANSWER YES ?
 3884 042670  001407                                BEQ     T12EXT                     ;NO, BRANCH TO EXIT
 3885 042672  005037  002354                        CLR     ANSWER                     ;CLEAR OPERATOR ANSWER
 3886 042676  112737  000063  002424                MOVB    #63,TSTNAM                 ;LOAD PROGRAM NAME (ASCII 3)
 3887 042704  004737  032150                        JSR     PC,DRVTST                  ;GO RUN THE INTERNAL DRIVE TEST
 3888 042710                                T12EXT: EXIT    TST
      042710  104432                                TRAP    C$EXIT
      042712  000002                                .WORD   L10034-.
 3889 042714                                        ENDTST
      042714                                L10034:
      042714  104401                                TRAP    C$ETST
```

```
3891                                      .SBTTL  TEST 13: SELECT A DRIVE RESIDENT TEST (Internal Drive Tests 1-99)
3892
3893 042716                                       BGNTST
     042716                               T13::
3894 042716  032764  000001  000014               BIT     #DRPFLG,LUNFLG(R4)      ;IS THE DRIVE AVAILABLE
3895 042724  001065                               BNE     T13EXT                  ;NO, BRANCH TO EXIT
3896 042726                                       MANUAL                          ;MANUAL INTERVENTION ALLOWED ?
     042726  104450                               TRAP    C$MANI
3897 042730                                       BNCOMPLETE      T13EXT          ;NO, BRANCH TO EXIT
     042730  103063                               BCC     T13EXT
3898 042732                               1$:     PRINTF  #T13MS1                 ;PRINT TEST 13 MESSAGE
     042732  012746  026430                       MOV     #T13MS1,-(SP)
     042736  012746  000001                       MOV     #1,-(SP)
     042742  010600                               MOV     SP,R0
     042744  104417                               TRAP    C$PNTF
     042746  062706  000004                       ADD     #4,SP
3899 042752                                       PRINTF  #MMSG                   ;PRINT TEST REQUIREMENT MESSAGE
     042752  012746  026536                       MOV     #MMSG,-(SP)
     042756  012746  000001                       MOV     #1,-(SP)
     042762  010600                               MOV     SP,R0
     042764  104417                               TRAP    C$PNTF
     042766  062706  000004                       ADD     #4,SP
3900 042772                                       GMANID  SELTST,MANTBL,A,,1,2,NO ;ASK OPERATOR FOR TEST NUMBER
     042772  104443                               TRAP    C$GMAN
     042774  000406                               BR      10000$
     042776  022754                               .WORD   MANTBL
     043000  000142                               .WORD   T$CODE
     043002  026646                               .WORD   SELTST
     043004  000000                               .WORD
     043006  000001                               .WORD   T$LOLIM
     043010  000002                               .WORD   T$HILIM
     043012                               10000$:
3901 043012  012702  002424                       MOV     #TSTNAM,R2              ;GET ADDRESS OF DRIVE TEST NAME
3902 043016  012703  022754                       MOV     #MANTBL,R3              ;GET ADDRESS OF OPERATOR INPUT DATA
3903 043022  112322                               MOVB    (R3)+,(R2)+             ;LOAD 1ST DIGIT OF TEST NAME
3904 043024  105713                               TSTB    (R3)                    ;CHECK FOR A 2ND DIGIT
3905 043026  001401                               BEQ     10$                     ;BRANCH IF NONE
3906 043030  111312                               MOVB    (R3),(R2)               ;LOAD 2ND DIGIT OF TEST NAME
3907 043032                               10$:    GMANIL  QUESTN,ANSWER,1,YES     ;ASK OPERATOR IF READY
     043032  104443                               TRAP    C$GMAN
     043034  000404                               BR      10001$
     043036  002354                               .WORD   ANSWER
     043040  000130                               .WORD   T$CODE
     043042  026716                               .WORD   QUESTN
     043044  000001                               .WORD   1
     043046                               10001$:
3908 043046  005737  002354                       TST     ANSWER                  ;DID OPERATOR ANSWER YES ?
3909 043052  001412                               BEQ     T13EXT                  ;NO, BRANCH TO EXIT
3910 043054  005037  002354                       CLR     ANSWER                  ;CLEAR OPERATOR ANSWER
3911 043060  004737  032150                       JSR     PC,DRVTST               ;GO RUN THE INTERNAL DRIVE TEST
3912 043064  012702  002424                       MOV     #TSTNAM,R2              ;GET ADDRESS OF DRIVE TEST NAME
3913 043070  112722  000040                       MOVB    #40,(R2)+               ;RETURN DRIVE TEST NAME TO ASCII SPACES
3914 043074  112712  000040                       MOVB    #40,(R2)
3915 043100                               T13EXT: EXIT    TST
     043100  104432                               TRAP    C$EXIT
     043102  000002                               .WORD   L10035-.
3916 043104                                       ENDTST
```

```
043104                                  L10035:
043104  104401                                  TRAP    C$ETST
043106                                          ENDMOD


                                        .TITLE PARAMETER CODING

                                        .SBTTL  HARDWARE PARAMETER CODING SECTION

043106                                          BGNMOD

                                        ;++
                                        ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                        ; WITH THE OPERATOR.
                                        ;--

043106                                          BGNHRD
043106  000044                                  .WORD L10036-L$HARD/2
043110                                  L$HARD::


043110                                          GPRMA   TUIPAD,0,0,160002,177564,YES
043110  000031                                  .WORD   T$CODE
043112  043146                                  .WORD   TUIPAD
043114  160002                                  .WORD   T$LOLIM
043116  177564                                  .WORD   T$HILIM
043120                                          GPRMD   TUVECT,2,0,777,60,776,YES
043120  001032                                  .WORD   T$CODE
043122  043163                                  .WORD   TUVECT
043124  000777                                  .WORD   777
043126  000060                                  .WORD   T$LOLIM
043130  000776                                  .WORD   T$HILIM
043132                                          GPRMD   TUUNT,4,0,777,0,251,YES
043132  002032                                  .WORD   T$CODE
043134  043175                                  .WORD   TUUNT
043136  000777                                  .WORD   777
043140  000000                                  .WORD   T$LOLIM
043142  000251                                  .WORD   T$HILIM

043144                                          EXIT HRD
043144  026004                                  .WORD   T$CODE

043146     124      125      111        TUIPAD: .ASCIZ  ?TUIP ADDRESS?
043163     124      125      040        TUVECT: .ASCIZ  ?TU VECTOR?
043175     124      057      115        TUUNT:  .ASCIZ  ?T/MSCP UNIT NUMBER?
                                                .EVEN



043220                                          ENDHRD
                                                .EVEN
043220                                  L10036:


```

```
4002                                    .SBTTL  SOFTWARE PARAMETER CODING SECTION
4003
4004                                    ;++
4005                                    ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
4006                                    ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
4007                                    ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
4008                                    ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
4009                                    ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
4010                                    ; WITH THE OPERATOR.
4011                                    ;--
4012
4013 043220                                     BGNSFT
     043220  000000                             .WORD L10037-L$SOFT/2
     043222                             L$SOFT::
4014
4021
4022                                            .EVEN
4023
4024 043222                                     ENDSFT
                                                .EVEN
     043222                             L10037:
4025
4026
4036                                    ;;*****************************************************************
4037                                    ;;*****************************************************************
4038                                    ;
4039                                    ;COMMUNICATIONS AREA
4040                                    ;       THIS IS THE COMMUNICATIONS AREA THAT IS USED
4041                                    ;       THROUGHOUT THE PROGRAM IN TESTING THE PERMUTATIONS
4042                                    ;       OF THE UQ-PORT INIT SEQUENCE.  IT IS ESSENTIAL THAT
4043                                    ;       THIS AREA RESIDE IN AN 8KBYTE AREA OF MEMORY FREE
4044                                    ;       OF DIAGNOSTIC CODE SO THAT IT MAY BE SUCCESSFULLY
4045                                    ;       RELOCATED THROUGHOUT UPPER MEMORY VIA MEMORY MAN-
4046                                    ;       AGEMENT.
4047                                    ;
4048                                    ;;*****************************************************************
4049                                    ;;*****************************************************************
4050
4051         060000                             .=60000         ;START OF THE THIRD 8KBYTE BLOCK
4052                                                            ;OF VIRTUAL MEMORY SPACE.  ACCESIBLE
4053                                                            ;VIA PAR/PDR 2.
4054 060000                             RDBUF::
4055 060000                             COMMBF::
4056 060000                                     .BLKW   20.     ;BUFFER SPACE PRECEDING COMM AREA
4057 060050                             COMMAR::
4058 060050                                     .BLKW   514.    ;MAXIMUM COMM AREA LENGTH
4059 062054                             LASTBF::
4060 062054                                     .BLKW   20.     ;BUFFER SPACE SUCCEEDING COMM AREA
4064
4065 062124                                     LASTAD
                                                .EVEN
     062124  000000                             .WORD   0
     062126  000000                             .WORD   0
     062130                             L$LAST::
4066 062130                                     ENDMOD
4067         000001                     .END
```

```
ABORT   002466      CKCMEX  031614      C$INLP= 000020      EMSG5   024140 G    G$RADA= 000140
ADR   = 000020 G    CLSDRV  032350 G    C$MANI= 000050      EMSG6   024161 G    G$RADB= 000000
ANSWER  002354 G    CMARLG  002326 G    C$MAP = 000102      EMSG7   024212 G    G$RADD= 000040
ASSEMB= 000010      CMDCNT  002746 G    C$MEM = 000031      EMSG8   024233 G    G$RADL= 000120
BAKPAT  031426 G    CMDREF  002744 G    C$MMU = 000103      EMSG9   024271 G    G$RADO= 000020
BIT0  = 000001 G    CMDRNG  002726 G    C$MSG = 000023      ENCODE  023734 G    G$XFER= 000004
BIT00 = 000001 G    CMDSAV  022750 G    C$OPNR= 000034      END     033706      G$YES = 000010
BIT01 = 000002 G    CMMERR  002322 G    C$OPNW= 000104      ENDCLE  033754      HELP  = 000000
BIT02 = 000004 G    CMPTBL  002302 G    C$PNTB= 000014      ERR   = 100000 G    HIADDR= 000002 G
BIT03 = 000010 G    CMTBLG  002324 G    C$PNTF= 000017      EVL   = 000004 G    HOE   = 100000 G
BIT04 = 000020 G    CNTER = 000000 G    C$PNTS= 000016      EXELOC  002410      HSTIMO= 000000 G
BIT05 = 000040 G    CNTFLG  002740 G    C$PNTX= 000015      EXT     036116      IBE   = 010000 G
BIT06 = 000100 G    CNTHI   002736 G    C$PUTB= 000072      EXTINT  030672      IDU   = 000040 G
BIT07 = 000200 G    CNTRLC= 000003 G    C$PUTW= 000073      EXTVEC  031300      IER   = 020000 G
BIT08 = 000400 G    COMMAR  060050 G    C$QIO = 000377      E$END = 002100      ILLINT  030674 G
BIT09 = 001000 G    COMMBF  060000 G    C$RDBU= 000007      E$LOAD= 000035      ILOOP   031746
BIT1  = 000002 G    CONID = 177777 G    C$REFG= 000047      FAULTC  024066 G    IMM   = 000200 G
BIT10 = 002000 G    CPFLAG  002362 G    C$REL = 000077      FLAG  = 040000 G    IMSG    033712
BIT11 = 004000 G    CPFLG = ****** GX   C$RESE= 000033      FLAGS   024047 G    INISTP  002336 G
BIT12 = 010000 G    CRD   = 177776 G    C$REVI= 000004      FRUERR  030624 G    INNER   002344 G
BIT13 = 020000 G    CREFNO  023436 G    C$RFLA= 000021      FRUIS   002330 G    INTFLG= 000002 G
BIT14 = 040000 G    CTRL    025647 G    C$RPT = 000025      F$AU  = 000015      INTMMU  031616 G
BIT15 = 100000 G    C$AU  = 000052      C$SEFG= 000046      F$AUTO= 000020      INTMSG  030540 G
BIT2  = 000004 G    C$AUTO= 000061      C$SPRI= 000041      F$BGN = 000040      INTRCV  030664 G
BIT3  = 000010 G    C$BRK = 000022      C$SVEC= 000037      F$CLEA= 000007      INTTBL  032140
BIT4  = 000020 G    C$BSEG= 000004      C$TOME= 000076      F$DU  = 000016      INVMSG  030604 G
BIT5  = 000040 G    C$BSUB= 000002      DFPTBL  002224 G    F$END = 000041      ISR   = 000100 G
BIT6  = 000100 G    C$CLCK= 000062      DIAGMC= 000000      F$HARD= 000004      ITRCNT= ****** GX
BIT7  = 000200 G    C$CLEA= 000012      DISCAC= 000014 G    F$HW  = 000013      IXE   = 004000 G
BIT8  = 000400 G    C$CLOS= 000035      DONEFL= 000020 G    F$INIT= 000006      I$AU  = 000041
BIT9  = 001000 G    C$CLP1= 000006      DRPFLG= 000001 G    F$JMP = 000050      I$AUTO= 000041
BOE   = 000400 G    C$CPBF= 000074      DRVE    025716 G    F$MOD = 000000      I$CLN = 000041
BRFLAG= 000004 G    C$CPME= 000075      DRVER = 000011 G    F$MSG = 000011      I$DU  = 000041
BUFDES  023653 G    C$CVEC= 000036      DRVTST  032150      F$PROT= 000021      I$HRD = 000041
BYTCNT  023627 G    C$DCLN= 000044      DSCEND  002736 G    F$PWR = 000017      I$INIT= 000041
B.DI  = 000400 G    C$DODU= 000051      DSCRNG  002712 G    F$RPT = 000012      I$MOD = 000041
B.ER  = 100000 G    C$DRPT= 000024      EF.CON= 000036 G    F$SEG = 000003      I$MSG = 000041
B.GO  = 000001 G    C$DU  = 000053      EF.NEW= 000035 G    F$SOFT= 000005      I$PROT= 000040
B.IE  = 000200 G    C$EDIT= 000000      EF.PWR= 000034 G    F$SRV = 000010      I$PTAB= 000041
B.LF  = 000002 G    C$ERDF= 000055      EF.RES= 000037 G    F$SUB = 000002      I$PWR = 000041
B.MP  = 000100 G    C$ERHR= 000056      EF.STA= 000040 G    F$SW  = 000014      I$RPT = 000041
B.NV  = 002000 G    C$ERRO= 000060      ELPERR  027306 G    F$TEST= 000001      I$SEG = 000041
B.OD  = 000200 G    C$ERSF= 000054      EMSG10  024316 G    GDSERR  030256 G    I$SETU= 000041
B.PI  = 000001 G    C$ERSO= 000057      EMSG11  024344 G    GDUST   002370      I$SFT = 000041
B.PP  = 100000 G    C$ESCA= 000010      EMSG12  024405 G    GO    = 000001 G    I$SRV = 000041
B.QB  = 001000 G    C$ESEG= 000005      EMSG13  024454 G    G$CNTO= 000200      I$SUB = 000041
B.S1  = 004000 G    C$ESUB= 000003      EMSG14  024503 G    G$DELM= 000372      I$TST = 000041
B.S2  = 010000 G    C$ETST= 000001      EMSG15  024532 G    G$DISP= 000003      J$JMP = 000167
B.S3  = 020000 G    C$EXIT= 000032      EMSG16  024567 G    G$EXCP= 000400      KPAR0 = 172340 G
B.S4  = 040000 G    C$FREQ= 000101      EMSG17  024637 G    G$HILI= 000002      KPAR1 = 172342 G
B.WR  = 040000 G    C$FRME= 000100      EMSG18  024701 G    G$LOLI= 000001      KPAR2 = 172344 G
CCR   = 177746 G    C$GETB= 000026      EMSG19  024743 G    G$NO  = 000000      KPAR3 = 172346 G
CDRECV  032556 G    C$GETW= 000027      EMSG20  025013 G    G$OFFS= 000400      KPAR4 = 172350 G
CHKCAC  030704 G    C$GMAN= 000043      EMSG21  025052 G    G$OFSI= 000376      KPAR5 = 172352 G
CHKCOM  031456 G    C$GPHR= 000042      EMSG22  025104 G    G$PRMA= 000001      KPAR6 = 172354 G
CHKMSG  033326      C$GPRI= 000040      EMSG23  025135 G    G$PRMD= 000002      KPAR7 = 172356 G
CHKRSP  033042      C$INIT= 000011      EMSG24  025215 G    G$PRML= 000000      KPDR0 = 172300 G
```

Symbol table

```
KPDR1 = 172302 G      L$ICP   002104 G      MMUSR0= 177572 G      PRI06 = 000300 G      TSTNAM  002424
KPDR2 = 172304 G      L$INIT  033464 G      MMUSR1= 177574 G      PRI07 = 000340 G      TUIP  = 000000 G
KPDR3 = 172306 G      L$LADP  002026 G      MMUSR2= 177576 G      PROGRH  002360 G      TUIPAD  043146
KPDR4 = 172310 G      L$LAST  062130 G      MMUSR3= 172516 G      PROGRL  002356 G      TUIPSV= 000010 G
KPDR5 = 172312 G      L$LOAD  002100 G      MM22ON= 000020 G      PRTDRV  032456 G      TUSA  = 000002 G
KPDR6 = 172314 G      L$LUN   002074 G      MODIFY  023520 G      PRTINT  031716 G      TUSASV= 000012 G
KPDR7 = 172316 G      L$MREV  002050 G      MSCPUN= 000006 G      P.BCNT= 000014 G      TUUNT   043175
KTEXT   031146        L$NAME  002000 G      MSCPVR= 000000 G      P.BUFF= 000020 G      TUVEC = 000004 G
KTFLAG  002314 G      L$PRIO  002042 G      MSGLEN= 177774 G      P.CRF = 000000 G      TUVECT  043163
KTTEST  030776 G      L$PROT  022760 G      NEXT    033604        P.ENDC= 000010 G      TXFER = 000005 G
LASTBF  062054 G      L$PRT   002112 G      NOKT    031142        P.FLGS= 000017 G      T$ARGC= 000001
LESI    025632 G      L$REPP  002062 G      NUPASS  033570        P.IND1= 000020 G      T$CODE= 026004
LINE1   022774 G      L$REV   002010 G      ONEFIL= 000001        P.IND2= 000022 G      T$ERRN= 000030
LINE2   023030 G      L$RPT = ****** GX     OPCODE  023500 G      P.MOD = 000012 G      T$EXCP= 000000
LINE3   023110 G      L$SOFT  043222 G      OP.ABT= 000006 G      P.OPCD= 000010 G      T$FLAG= 000041
LINE4   023140 G      L$SPC   002056 G      OP.ELP= 000003 G      P.STS = 000012 G      T$GMAN= 000000
LINE5   023203 G      L$SPCP  002020 G      OP.END= 000200 G      P.TIMO= 000024 G      T$HILI= 000251
LINE6   023260 G      L$SPTP  002024 G      OP.GDS= 000001 G      QUESTN  026716 G      T$LAST= 000001
LINE7   023323 G      L$STA   002030 G      OP.REC= 000005 G      RBUF  = 177562 G      T$LOLI= 000000
LOE   = 040000 G      L$SW    002234 G      OUTER   002346 G      RCSR  = 177560 G      T$LSYM= 010000
LOGUNT  002332 G      L$TEST  002114 G      OWN   = 100000 G      RCVDAT  002436        T$LTNO= 000015
LOOP    031736        L$TIML  002014 G      O$APTS= 000000        RCVERR  027726 G      T$NEST= 177777
LOT   = 000010 G      L$UNIT  002012 G      O$AU  = 000000        RDBUF   060000 G      T$NS0 = 000000
LSCT    025670 G      L10000  002232        O$BGNR= 000001        RESPBF  002502 G      T$NS1 = 000005
LUNBLK  0C2234 G      L10001  002234        O$BGNS= 000000        RNGSTP= 000004 G      T$NS2 = 000002
LUNFLG= 000014 G      L10003  030654        O$DU  = 000001        RSPBUF  002506 G      T$PTNU= 000000
L$ACP   002110 G      L10004  030662        O$ERRT= 000001        RSPEND  002716 G      T$SAVL= 177777
L$APT   002036 G      L10005  030672        O$GNSW= 000000        RSPRNG  002716 G      T$SEGL= 177777
L$AU    034010 G      L10006  030702        O$POIN= 000001        RSPSAV  022752 G      T$SUBN= 000000
L$AUT   002070 G      L10007  033742        O$SETU= 000000        RSPSTP= 000104 G      T$TAGL= 177777
L$AUTO= ****** GX     L10010  033772        PAROFF  002320 G      RSTVEC  031162 G      T$TAGN= 010040
L$CCP   002106 G      L10011  034006        PASCNT  002312 G      SAEXP   002334 G      T$TEMP= 000000
L$CLEA  033744 G      L10012  034014        PCKSIZ  002742 G      SELTST  026646 G      T$TEST= 000015
L$CO    002032 G      L10013  034512        PDELAY  031302 G      SFPTBL  002234 G      T$TSTM= 177777
L$DEPO  002011 G      L10014  034202        PDLYEX  031326        START   033536        T$TSTS= 000001
L$DESC  002156 G      L10015  034446        PDRECV  032670 G      STATUS  023755 G      T$$AU = 010012
L$DESP  002076 G      L10016  034742        PKRECV  023706 G      STEPST  002340 G      T$$CLE= 010010
L$DEVP  002060 G      L10017  035360        PKSENT  023414 G      STEP1   031330 G      T$$DU = 010011
L$DISP  002124 G      L10020  036122        PNT   = 001000 G      STPTBL  002272 G      T$$HAR= 010036
L$DLY   002116 G      L10021  037254        PRGNAM  023543 G      STP1ER  031420        T$$HW = 010000
L$DTP   002040 G      L10022  036650        PRGVER  023775 G      STP1EX  031424        T$$INI= 010007
L$DTYP  002034 G      L10023  037252        PRI   = 002000 G      ST5EXT  037242        T$$MSG= 010003
L$DU    033774 G      L10024  040700        PRIDAT  027142 G      ST6EXT  040666        T$$PRO= 010002
L$DUT   002072 G      L10025  040026        PRIERR  027222 G      SVCGBL= 000000        T$$SOF= 010037
L$DVTY  022766 G      L10026  040676        PRIEX   030650        SVCINS= 000000        T$$SRV= 010006
L$EF    002052 G      L10027  041442        PRIINI  027002 G      SVCSUB= 000000        T$$SUB= 010026
L$ENVI  002044 G      L10030  042204        PRIIP   027172 G      SVCTAG= 000000        T$$SW = 010001
L$ERRT= ****** GX     L10031  042266        PRI07 = ****** GX     SVCTST= 000000        T$$TES= 010035
L$ETP   002102 G      L10032  042450        PRIPAD  027066 G      S$LSYM= 010000        T1      034016 G
L$EXP1  002046 G      L10033  042572        PRISA   027026 G      S1    = 004000 G      T1.1    034044
L$EXP4  002064 G      L10034  042714        PRIVAD  027114 G      TEMP    002352 G      T1.2    034230
L$EXP5  002066 G      L10035  043104        PRI00 = 000000 G      TEST.9= 000010 G      T10     042270 G
L$HARD  043110 G      L10036  043220        PRI01 = 000040 G      TF.BLK= 000010 G      T10EXT  042444
L$HIME  002120 G      L10037  043222        PRI02 = 000100 G      TIMOUT  024026 G      T10MS1  025724 G
L$HPCP  002016 G      MANTBL  022754 G      PRI03 = 000140 G      TOUT    002350 G      T10MS2  026032 G
L$HPTP  002022 G      MMON  = 000001 G      PRI04 = 000200 G      TRAP4   030656 G      T10MS3  026057 G
L$HW    002224 G      MMSG    026536 G      PRI05 = 000240 G      TRP4FG  002316 G      T10MS4  026134 G
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T11      042452 G      T2EXT    034736         T6EXT    040022         UAM    = 000200 G      WRER6    025452 G
T11EXT   042566        T3       034744 G       T6.1     037256         VECTOR   031212 G      WRER7    025534 G
T11MS1   026221 G      T3EXT    035354         T6.2     040030         VEC4   = 000004 G      WRINTO   027226 G
T12      042574 G      T4       035362 G       T7       040702 G       WRBUF    002750 G      WRPRTE   027252 G
T12EXT   042710        T4EXT    036102         T7EXT    041436         WRDATA   002342 G      WR1      023350 G
T12MS1   026324 G      T5       036124 G       T8       041444 G       WRER1    025250 G      X$ALWA=  000000
T13      042716 G      T5EXT    036640         T8EXT    042200         WRER2    025302 G      X$FALS=  000040
T13EXT   043100        T5.1     036124         T9       042206 G       WRER3    025323 G      X$OFFS=  000400
T13MS1   026430 G      T5.2     036652         T9EXT    042262         WRER4    025351 G      X$TRUE=  000020
T2       034514 G      T6       037256 G       T9FLAG=  ****** GX      WRER5    025375 G

. ABS.   062130     000    (RW,I,GBL,ABS,OVR)
         000000     001    (RW,I,LCL,REL,CON)
Errors detected:  0

*** Assembler statistics


Work  file  reads: 291
Work  file writes: 299
Size of work file: 34376 Words  ( 135 Pages)
Size of core pool: 19714 Words  ( 75 Pages)
Operating  system: RSX-11M/PLUS (Under VAX/VMS)

Elapsed time: 00:07:39.61
CZTU2A.BIN,CZTU2A/-SP=SVC40R.MLB/ML,CZTU2A
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