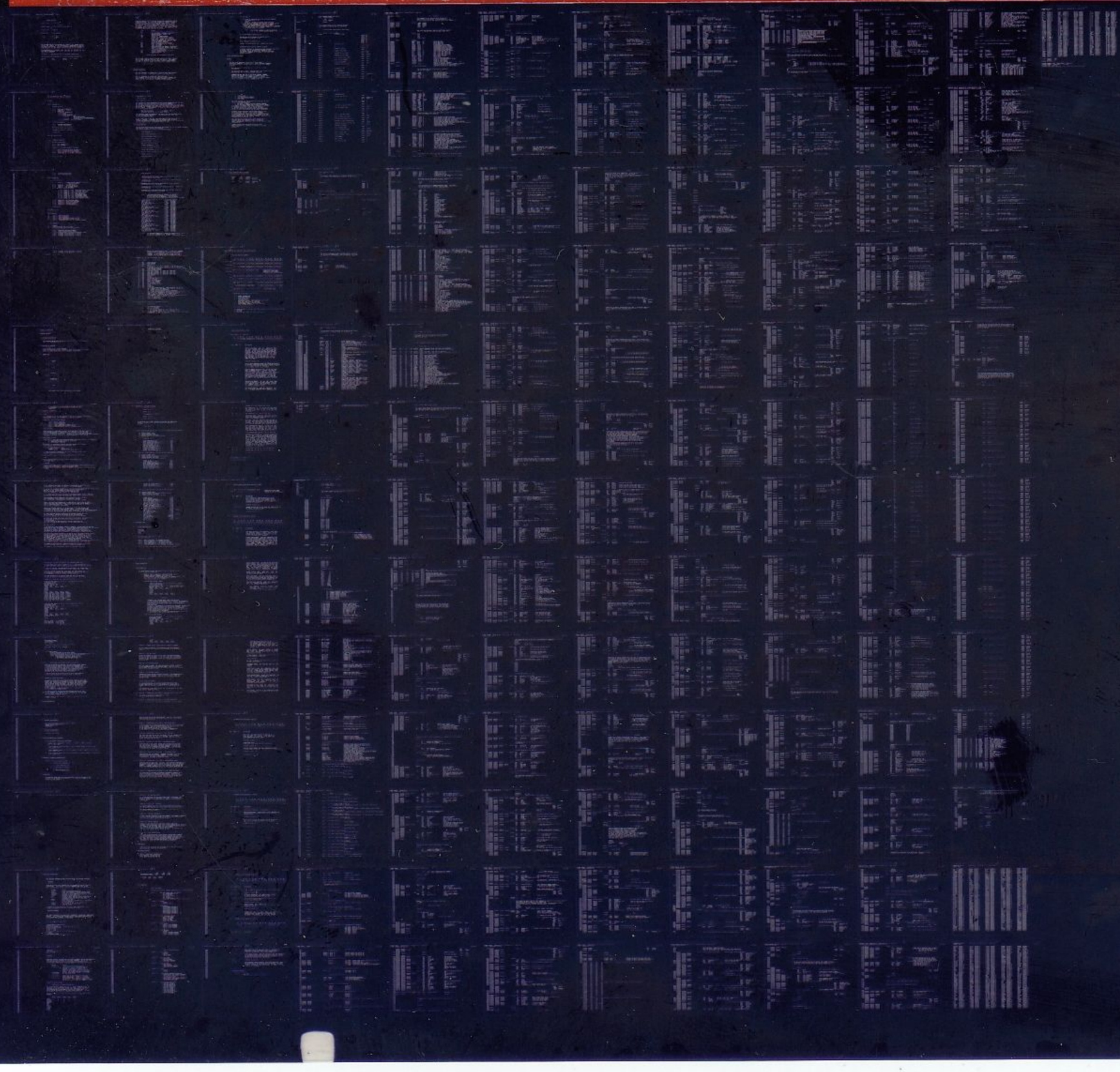
TSV05

TSV05 DATA REL
CVTSEA0

AH-T179A-MC
FICHE 1 OF 1

SEP 1982

MADE IN USA



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.REM_
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IDENTIFICATION

PRODUCT CODE: AC-T178A-MC

PRODUCT NAME: CVTSEA0 TSV05 DATA RELIABILITY

PRODUCT DATE: 08-MAR-82

MAINTAINER: SCOTT SNOWDON

AUTHOR: DICK GORDON

USER DOCUMENTATION TABLE OF CONTENTS

7.0 DIAGNOSTIC HISTORY

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

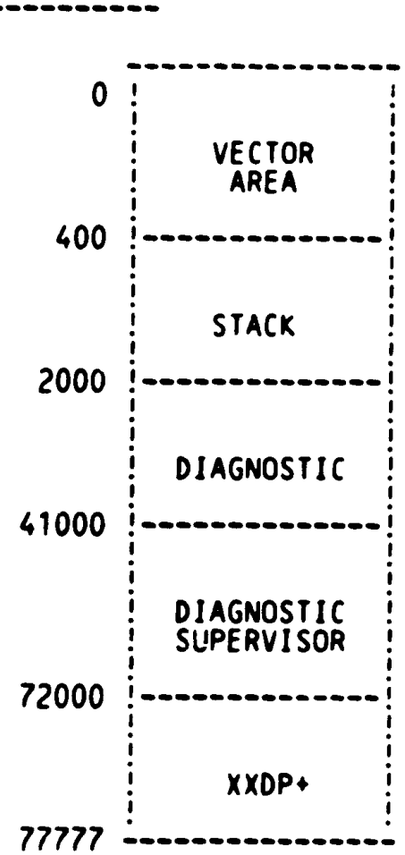
1.1.1 FUNCTIONAL DESCRIPTION

THIS PROGRAM CAN BE USED AS A BASIC FUNCTION TEST, A DATA RELIABILITY TEST, OR A COMPATABILITY TEST.

1.1.2 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT IT CONTAINS A CONTROL MODULE RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

1.1.3 MEMORY MAP



FREE MEMORY SPACE FOR WR/RD BFRS OR OTHER PUROSES

IS ALLOCATED BY THE SUPERVISOR ON REQUEST OR CHOOSEN
BY PROGRAMMER TO RESIDE BETWEEN THE DIAG AND THE
SUPERVISOR.

1.1.4 DIAGNOSTIC INFORMATION

1.1.4.1 SCOPE

THIS DIAGNOSTIC CAN TEST ONE CONTROLLER AND UP TO 2 DRIVES. THE 2 DRIVES
ARE ASSIGNED LOGICAL DRIVE NUMBERS 0 - 1 BY THE DIAGNOSTIC.

THERE ARE 5 TESTS IN THIS PROGRAM:

TEST 1 - BASIC FUNCTIONS.
TEST 2 - DATA RELIABILITY.
TEST 3 - WRITE COMPATABILITY/WRITE UTILITY.
TEST 4 - READ COMPATABILITY/READ UTILITY.
TEST 5 - RANDOM/OPERATOR SELECTED SEQUENCE UTILITY.

1.1.4.2 ERROR RECOVERY

ERROR RECOVERY IS PERFORMED ON READ, WRITE AND WRITE TAPE MARK FUNCTIONS
UNLESS ERROR RECOVERY IS INHIBITED BY THE OPERATOR AT START UP TIME.
THE READ FORWARD/READ REVERSE RETRY LIMIT IS 16 (8 IN THE SAME DIRECTION
AND 8 IN THE OPPOSITE DIRECTION). FOR MORE DETAILED INFORMATION ON ERROR RECOVERY
PROCEDURES, REFER TO SECTION 3.0 (ERROR REPORTING) OF THIS LISTING.

1.1.4.3 WRITE ERROR RECOVERY

THERE ARE 2 , SELECTABLE WRITE-ERROR-RECOVERY ALGORITHMS USED BY THIS DIAGNOSTIC:
1. MEDIA/OPERATIONAL SELECTIVE ALGORITHM
2. OPERATIONAL ALGORITHM

BY DEFAULT THE DIAGNOSTIC SELECTS THE FIRST ALGORITHM TO IDENTIFY
MEDIA RELATED WRITE ERRORS FROM OPERATIONAL ONES.

TO SELECT THE SECOND ALGORITHM:
ANSWER 'Y' TO CHANGE SW (L) ?
ANSWER 'N' TO BAD TAPE SPOT DETECTION (L) Y ?

IF ERROR RECOVERY IS INHIBITED, THE LATTER QUESTION IS NOT ASKED
AND BOTH ALGORITHMS ARE BYPASSED.

1.1.4.3.1 MEDIA/OPERATIONAL SELECTIVE WRITE-ERROR-RECOVERY ALGORITHM

SCOPE

THIS ALGORITHM IDENTIFIES MEDIA RELATED WRITE ERRORS FROM
OPERATIONAL ONES.

ALGORITHM

A WRITE RETRY SUBROUTINE IS CALLED BY THE RECOVERABLE ERROR SUBROUTINE WHICH IS
ENTERED UPON DETECTIION OF A WRITE RECOVERABLE ERROR.
THE WRITE RETRY SUBROUTINE ATTEMPTS TO REWRITE THE RECORD IN SAME SPOT ON TAPE
4 TIMES.

```
                        IF ALL 4 REPEATS ARE GOOD, THE RECORD IS CONSIDERED AS RECOVERED AND
                        A RECOVERABLE WRITE ERROR IS LOGGED AT THAT RECORD NUMBER.

                        IF ANY OF THE 4 REWRITE ATTEMPTS FAIL, THE ROUTINE WILL ERASE THE BAD RECORD, AND LO
                        BAD SPOT AT THAT RECORD NUMBER,THE ROUTINE WILL THEN ATTEMPT TO
                        WRITE THE RECORD AGAIN 3 INCHES FURTHER DOWN TAPE AND
                        RETRY THIS SEQUENCE 4 TIMES, FOR UP TO 4 REPEATS EACH.

                        IF A RECORD CANNOT BE WRITTEN WITHOUT RECOVERABLE ERRORS  AFTER 4 RETRIES,
                        THEN THE ROUTINE WILL ERASE THE RECORD AND  REPORT RETRY FAILED ON BAD SPOT.

                        THE RECOVERABLE ERROR SUBROUTINE THEN CONTINUES TO CALL THE WRITE
                        RETRY SUBROUTINE, WHICH REISSUES THE GROUP OF 4 RETRIES,
                        UNTIL THE RECORD IS RECOVERED OR 20 BAD SPOTS HAVE BEEN  LOGGED .

                        TWENTY (20) BAD SPOTS MAXIMUM ARE ALLOWED PER BOT TO EOT PASS OF TAPE.
                        WHEN 20 BAD SPOTS HAVE BEEN LOGGED, WETHER ON THE SAME RECORD NUMBER OR NOT,
                        TAPE IS CONSIDERED DEFECTIVE:  A BAD TAPE OVERFLOW MESSAGE IS PRINTED
                        AND THE UNIT IS REWOUND, THEN DROPPED.

                        DURING THE RECOVERY PROCESS, IT IS NECESSARY TO PERFORM SEVERAL TAPE
                        POSITIONING  OPERATIONS: SPACE REVERSE, ERASE.  IF A POSITION ERROR
                        IS DETECTED IN THE STATUS WORD DURING THOSE OPERATIONS, THEN THE RECOVERY ATTEMPT IS
                        AN APPROPRIATE UNRECOVERABLE ERROR MESSAGE IS PRINTED AND THE UNIT IS DROPPED.

                        ALL BADLY WRITTEN RECORDS LOGGED WITH RECOVERABLE ERRORS ARE ERASED
                        UNTIL RECOVERED, INCLUDING THE RECORD AT THE 20TH BAD SPOT,
                        SO THAT ALL RECORDS LEFT ON TAPE ARE KNOWN GOOD WRITTEN RECORDS.

                        BAD SPOTS ARE ERASED WITH ERASE GAPS FROM 3 TO 12 INCHES  PER RETRY GROUP.
                        UP TO 20 FEET OF ERASE GAP COULD RESULT WHEN RETRYING TO RECOVER
                        A SINGLE RECORD.
                        THAT LONG STRETCH OF BAD TAPE WOULD THEN BE LOGGED WITH 20
                        BAD SPOTS AT SAME RECORD NUMBER AND THE TAPE CONSIDERED DEFECTIVE.

                        BAD SPOTS REPORTS

                        IF THE PRINTING OF RECOVERABLE ERRORS IS ENABLED, THE BAD SPOTS ON TAPE ARE
                        IDENTIFIED AS THEY ARE DETECTED.  SINCE THE BAD RECORDS ARE ERASED UNTIL RECOVERED,
                        THE BAD SPOT ACTUALLY PRECEDES THE RECORD NUMBER THAT IDENTIFIES IT.
                        THE NUMBER OF REPEATS AND RETRIES ATTEMPTED IS PRINTED, FROM WHICH THE
                        LENGTH OF ERASE GAPS CAN BE DETERMINED:  APPROXIMATELY 3 INCHES PER RETRY.

                        THE STATISTICAL REPORT PRINTED AT THE END OF TEST 2 OR UPON A "PRINT" REQUEST,
                        CONTAINS A SUMMARY OF THE BAD SPOTS LOGGED ON THE CURRENT PASS OF TAPE.
                        IN THAT REPORT, ALL COUNTS ARE CUMULATIVE FROM PASS TO PASS, EXCEPT FOR
                        THE NUMBER OF BAD SPOTS: IT RELATES TO A "BOT TO EOT TAPE PASS" ONLY.
                        FOR THIS PURPOSE, A "TAPE PASS" IS A WRITE PASS FROM BOT TO EOT, OR FROM
                        BOT TO WHERE THE DIAGNOSTIC IS HALTED BEFORE REACHING EOT.
                        DON'T CONFUSE THIS WITH A PASS BY THE SUPERVISOR WHICH IS DEFINED AS A RUN THROUGH A
                        ON ALL UNITS SELECTED. THOSE PASSES ARE IDENTIFIED AS "PASS" AND "EOP".

                        THE NUMBER OF WRITE RETRIES, CUMULATIVE FROM PASS TO PASS, IS A GLOBAL
                        COUNT OF HOW MANY TIMES THE GROUP OF 4 RETRIES HAS BEEN CALLED.

                        THE NUMBER OF WRITE RECOVERABLE ERRORS EXCLUDES BAD TAPE SPOTS
```

```
                        AND REFLECTS THE SPECIFICATIONS OF THE HARDWARE UNDER TEST.

                        TO CLEAR CUMULATIVE COUNTS, ANSWER 'Y' TO:   CLEAR COUNTERS (L) Y ?.
                        THE BAD TAPE SPOTS COUNT IS THEN CLEARED WHEN WRITING THE TAPE FROM BOT.

                        IF TEST 2 IS HALTED, THEN RESTARTED OR CONTINUED, THE RECORD COUNT
                        IS RESET TO ZERO AND THE BAD SPOT ID SHALL FOLLOW THAT  RESET COUNT.

                        SINCE ALL WRITTEN RECORDS ARE KNOWN GOOD, THE READ ERRORS CAN
                        BE ATTRIBUTED TO TRANSIENT NOISE, TRANSIENT ELECTRICAL MALFUNCTIONS,
                        OR CONTAMINANTS ON TAPE AS OPPOSED TO TAPE DEFECTS.

                        THE SAME RECORDS MUST BE WRITTEN FROM TAPE PASS TO TAPE PASS
                        FOR THE BAD SPOTS ID TO REMAIN CONSISTENT IN THOSE TAPE PASSES.

                        EXAMPLE OF A PRINT OUT FOR A BAD SPOT ON TAPE:

                        CVTSE SFT ERR  00009 ON UNIT 00 TST 002 SUB 000 PC: 012100
                        RECOVERABLE ERROR
                        WRT CMD FAILED - UNIT 0   PASS:    1   RECORD:    6
                        PREVIOUS CMD WAS  WRT
                        CMDPKT  TSBA    RFC     TSSR   TCC
                        100205  002406  000000  100210  4
                        026600
                        000000
                        003107
                        XST0    XST1    XST2    XST3    XST4
                        000350  000002  100400  000000  000000
                        SUSPECT BAD SPOT AFTER 1 RETRY, 2 REPEAT
                        SUSPECT BAD SPOT AFTER 2 RETRY, 1 REPEAT
                        SUSPECT BAD SPOT AFTER 3 RETRY, 1 REPEAT
                        SUSPECT BAD SPOT AFTER 4 RETRY, 3 REPEAT
                        RETRY FAILED ON BAD SPOT...ERASED!
                        SUSPECT BAD SPOT AFTER 1 RETRY, 1 REPEAT
                        SUSPECT BAD SPOT AFTER 2 RETRY, 1 REPEAT


                        CVTSE SFT ERR  00009 ON UNIT 00 TST 002 SUB 000 PC: 012100
                        RECOVERABLE ERROR
                        WRT CMD FAILED - UNIT 0   PASS:    1   RECORD:10210
                        PREVIOUS CMD WAS  WRT
                        CMDPKT  TSBA    RFC     TSSR   TCC
                        100205  002406  000000  100210  4
                        026600
                        000000
                        004000
                        XST0    XST1    XST2    XST3    XST4
                        000350  000002  100010  000000  000000
                        RECOVERED ON RETRY # 1
                        ^C
                        DR>PRI

                        UNIT 0   PASS:    1   RECORD:10210
                        BYTES WRITTEN    0,272,279,691
                        BYTES READ REV   0,301,123,654
                        BYTES READ REV   0,301,120,381
                                              WRT    RDR    RDF
```

```
                RECOVERABLE ERRORS      1       0       0
                UNRECOVERABLE ERRORS    0       0       0
                WRITE RETRIES           3

                 2 BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:
                          5     6
                SPEC COND   HARD   FATAL   COMPARE
                       2       0       0        0
                DR>

                THIS EXAMPLE SHOWS:
                        RECORD 6 RECOVERED ON 2ND RETRY GROUP
                        THE 2 BAD SPOTS RESIDE IN A 18 INCH ERASE GAP BETWEEN RECORDS 5 AND 6
                        RECORD 10210 RECOVERED ON 1ST RETRY OF 4 GOOD REPEATS
                        3 WRITE GROUP RETRIES ATTEMPTED, RESULTING IN:
                                1 RECOVERABLE  WRT ERR FROM RECORD 10210
                                2 BAD SPOTS BETWEEN RECORDS 5 AND 6



        1.1.4.3.2       OPERATIONAL WRITE-ERROR-RECOVERY ALGORITHM

                WHEN THIS ALGORITHM IS SELECTED, THE TSV05 WRITE RETRY COMMAND
                IS ISSUED UP TO 16 TIMES OR UNTIL RECORD IS RECOVERED, ON
                A WRITE RECOVERABLE ERROR.  THE WRITE  RETRY COMMAND CONSISTS
                OF A SPACE REVERSE OVER THE BAD RECORD, THEN AN ERASE OF 3 INCHES
                OF TAPE AND REWRITE OF THE RECORD.  THAT COMPOSITE COMMAND
                DOES NOT ALLOW THE DETECTECTION OF BAD SPOTS ON TAPE.
                THEREFORE NO BAD TAPE SPOTS STATUS IS PRINTED.

                IF RECORD CANNOT BE RECOVERED AFTER 16 WRITE RETRY COMMANDS,
                A RETRY LIMIT EXCEEDED IS FLAGGED AND UNIT IS DROPPED.


        1.1.4.4 DIAGNOSTIC TIMING ADJUSTMENT

                A NUMBER OF SUPERVISOR TIMING DELAY MACROS, KNOWN AS WATCH DOG
                DELAYS, ARE CALLED BY THE DIAGNOSTIC TO WAIT FOR VARIOUS COMMANDS
                COMPLETION.  THESE DELAYS ARE NOT CALIBRATED AND SIMPLY EXPANDS
                INTO AN INLINE NESTED LOOP PAIR.  THE COUNT FOR THE OUTER LOOP
                COMES FROM THE VARIABLE ARGUMENT SUPPLIED BY THE DELAY CALLS.
                THE COUNT FOR THE INNER LOOP COMES FROM THE FIXED ''HEADER''
                ELEMENT ''L$DLY''.
                AS THE DIAGNOSTIC IS RUN ON DIFFERENT CPU'S, THESE DELAYS WILL
                VARY IN LENGTH WITH MEMORY SPEED.

                IF TIME-OUT OCCURS WHEN NO APPARENT MALFUNCTIONS IN THE TAPE
                UNIT IS EVIDENT, ALL TIMINGS OF THE DIAGNOSTIC MAY BE ADJUSTED
                TO MATCH MEMORY SPEED AND NOT RESULT IN TIME-OUTS, BY PATCHING
                THAT FIXED DELAY ELEMENT ''L$DLY''.

                A PRESET COUNT OF 500 RESIDES AT ''L$DLY'' IN LOCATION 2116 OF THE
                ''HEADER'' SECTION.


        1.2 SYSTEM REQUIREMENTS
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```

1.2.1 HARDWARE REQUIREMENTS

PDP-11/23 PROCESSOR WITH 32K OR MORE OF MEMORY
CONSOLE DEVICE (VT52,LA36,ETC.)
PROGRAM LOAD DEVICE
TSV05/TS05

1.2.2 SOFTWARE REQUIREMENTS

DIAGNOSTIC SUPERVISOR

1.3 RELATED DOCUMENTS AND STANDARDS

DIGITAL EQUIPMENT CORPORATION DOCUMENTS:

1. CIQPMA0 XXDP+ PROGRAMMER'S MANUAL; DOCUMENT NUMBER AC-S296A-AC
   DATE: 14 JULY 1980.

2. TSV05 TRANSPORT SUBSYSTEM USER'S GUIDE; DOCUMENT NUMBER EK-TSV05-UG-001
   DATE: AUGUST 1982

3. TSV05 TRANSPORT SUBSYSTEM TECHNICAL MANUAL; DOCUMENT NUMBER EK-TSV05-TM-001
   DATE: AUGUST 1982

4. TSV05 TRANSPORT SUBSYSTEM INSTALLATION MANUAL; DOCUMENT NUMBER EK-TSV05-IN-001
   DATE: AUGUST 1982

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ORDER OF HOST CPU DIAGNOSTIC USAGE:

1) CONTROL LOGIC PROGRAM - ALL TESTS.

   (VTSA,VTSB,VTSC,VTSD)

2) DATA RELIABILITY PROGRAM:

   A) BASIC FUNCTION TEST.
   B) DATA RELIABILITY TEST.

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE SUBSYSTEM BEING TESTED IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, MEMORY, ETC., DO NOT FUNCTION PROPERLY.

```
                                VTSA,VTSB,VTSC, AND VTSD HAVE ALL SUCESSFULLY RUN WITHOUT ERRORS.
```

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES.
FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES
(SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY
BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS
ZFLAGS	CLEAR ALL FLAGS

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO
YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

OPERATOR COMMANDS

THE TSV05 DIAGNOSTIC IS A PDP-11/23 DIAGNOSTIC SUPERVISOR COMPATIBLE
PROGRAM. ALL LOADING AND RUNTIME INSTRUCTIONS CAN BE REFERENCED IN THE
PDP-11 PROGRAMMER'S MANUAL "CIQPMA0 XXDP+ PROGRAMMERS MANUAL, NUMBER
AC-S296A-AC. THE USER ENTRY IS IN QUOTES.

BOOT THE DIAGNOSTIC XXDP MEDIA

```
(HMDLB0 XXDP+ DL MONITOR 28K
BOOTED VIA UNIT 0
ENTER DATE (DD-MMM-YR):  " ENTER DATE OR JUST <CR> "
RESTART ADDRESS: 153726
50 HZ? N " <CR> "
CSI? N  " Y<CR> "
THIS IS XXDP+. TYPE "H" OR "H/L" FOR DETAILS
R VTSEA0
VTSEA0BINDRS LOADED
DIAG. RUN-TIME SERVICES REV D. APR 79
```

```
                                CVTSE-A-0
                                TSV05 DATA RE 'ABILITY
                                UNIT IS TSV05


                                SWITCHES
                                --------

                                THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION.
                                THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS.  ALL OF THE LEGAL
                                SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH.
                                IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

                                        SWITCH          EFFECT
                                        ------          ----------------------------------
                                        /TESTS:LIST     EXECUTE ONLY THOSE TESTS SPECIFIED IN
                                                        THE LIST.  LIST IS A STRING OF TEST
                                                        NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10.
                                                        THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO
                                                        BE RUN.  ALL OTHER TESTS WILL NOT BE RUN.
                                        /PASS:DDDDD     EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
                                        /FLAGS:FLGS     SET SPECIFIED FLAGS.

                                        /EOP:DDDDD      REPORT END OF PASS MESSAGE AFTER EVERY
                                                        DDDDD PASSES ONLY.  (DDDDD = 1 TO 64000)
                                        /UNITS:LIST     TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED
                                                        IN THE LIST.  LIST EXAMPLE - /UNITS:0:5:10-12
                                                        USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)

                                EXAMPLE OF SWITCH USAGE:

                                        START/TESTS:1-5/PASS:1000/EOP:100

                                THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE
                                EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF
                                PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY.  A
                                SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS.  YOU MAY,
                                FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

                                BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH
                                COMMAND.

                                        TESTS   PASS    FLAGS   EOP     UNITS
                                        -----   ----    -----   ---     -----
                                START     X       X       X       X       X
                                RESTART   X       X       X       X       X
                                CONTINUE          X       X       X
                                PROCEED                   X
                                DROP                                      X
                                ADD                                       X
                                PRINT
                                DISPLAY                                   X
                                FLAGS
                                ZFLAG
                                EXIT
```

FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXE*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
/FLAGS:LOE:IER:BOE
```

2.1 HARDWARE PARAMETERS

ON A "N" RESPONSE TO "CHANGE HW?", THE DIAG SHALL RUN ASSUMING ONE UNIT AT TSDB = 172520 WITH A VECTOR = 224 AND DRIVE=0.

ON A "Y" RESPONSE TO "CHANGE HW?" QUESTION, THEN THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONCE.

```
687
688                                     TSDB ADDRESS (0) 172520 ?
689
690                                     VECTOR (0) 224 ?
691
692                                     SELECT DRIVE 0-1 (0) ?
693
694                                     THE VALIDITY OF THESE PARAMETERS CAN BE CHECKED BEFORE RUNNING THE TESTS
695                                     BY  SETTING THE FLAG "ADR" ON A STA, RES OR CON COMMAND.
696                                     THE SO CALLED AUTO DROP CODE SHALL THEN BE EXECUTED AFTER THE INIT CODE
697                                     AND BEFORE THE HARDWARE TESTS ARE RUN.  THAT CODE FIRST TESTS THE ADRRESS
698                                     OF THE TSDB(S).  IF NO RESPONSE, IT DROPS THE UNIT(S) IMMEDIATELY
699                                     WITH THE FOLLOWING MESSAGE:
700
701                                             BUS TRAP AT XXXXXX              ( XXXXXX = TSDB AD )
702                                             INTERFACE BAD OR NOT SET TO ABOVE ADDRESS.
703
704                                     ON A RESPONSE FROM THE INTERFACE, THE UNITS THAT ARE NOT READY OR NOT
705                                     ON-LINE ARE DROPPED IMMEDIATELY.  THE HARDWARE TESTS SHALL THEN
706                                     BE RUN ON RESPONDING UNITS.
707
708                                     IF THE "ADR" FLAG IS NOT SET, THE READY AND OFF-LINE STATUS OF THE
709                                     DRIVE IS  CHECKED.  A MESSAGE SHALL BE PRINTED EVERY SO OFTEN
710                                     TO WARN THE OPERATOR OF DRIVES BEING NOT READY OR OFF-LINE. THESE DRIVES
711                                     SHALL BE DROPPED AFTER A REASONABLE AMOUNT OF TIME.
712
713                             2.2 SOFTWARE PARAMETERS
714                                 ------------------
715
716                                     THE FOLLOWING QUESTIONS ARE ASKED WHEN ONE ANSWERS YES TO THE CHANGE SOFTWARE
717                                     QUESTION ON A START, RESTART,OR CONTINUE.
718                                     THEY ALLOW FLEXABILITY IN THE WAY THE PROGRAM BEHAVES.
719
720                                             CLEAR COUNTERS (L) Y ?
721
722                                             RESET RANDOM VARIABLES (L) N ?
723
724                                             PRINT RECOVERABLE ERRORS  (L) N ?
725
726                                             HALT AFTER EACH CMD (L) N ?
727
728                                             INHIBIT RECOVERY (L) N ?
729
730                                             BAD TAPE SPOT DETECTION (L) Y ?
731
732                                             DISABLE INTERRUPTS (L) N ?
733
734                                             INHIBIT RFC ERROR REPORTS (L) N ?
735
736                                             CHANGE CMD SEQUENCE (L) N ?     (SEE NOTE1:)
737
738                                             DEFAULT SWITCH SETTINGS (L) Y ?
739
740                                             100IPS (L) N ?
741
742                                             WRITE BUFFERING (L) N ?
743
```

```
READ BUFFERING (L) N ?


ANSWERING NO TO THE DEFAULT SWITCH QUESTION WILL CAUSE THE
100 IPS QUESTION TO BE ASKED.

ANSWERING YES TO THE 100 IPS QUESTION WILL INHIBIT THE LAST
TWO QUESTIONS.

ANSWERING NO TO THE 100 IPS QUESTION WILL CAUSE THE WRITE
BUFFERING QUESTION TO BE ASKED.

ANSWERING YES TO THE WRITE BUFFERING QUESTION WILL INHIBIT THE
LAST QUESTION.

ANSWERING NO TO THE WRITE BUFFERING QUESTION WILL CAUSE THE
READ BUFFERING QUESTION TO BE ASKED.


NOTE1:   THIS QUESTION SHOULD BE ANSWERED (N) UNLESS AN
        OPERATOR SELECTED SEQUENCE IS TO BE EXECUTED.
        IF THIS QUESTION WAS ANSWERED Y, THE FOLLOWING
        QUESTIONS MUST BE ANSWERED OR DEFAULTED WITH A <CR> ONLY:

CHARACTERISTICS CODE (O) 40 ?   (0,20,40,200) (OCTAL)
CMD/2 (D) 13 ?                    (1-27)    (DECIMAL)
BRF COUNT (D) 1 ?                 (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 1 ?           (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)
CMD/3 (D) 4 ?                     (1-27)    (DECIMAL)
BRF COUNT (D) 2048 ?              (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 32000 ?       (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)
CMD/4 (D) 3 ?                     (1-27)    (DECIMAL)
BRF COUNT (D) 2048 ?              (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 32000 ?       (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)
CMD/5 (D) 2 ?                     (1-27)    (DECIMAL)
BRF COUNT (D) 2048 ?              (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 32000 ?       (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)
CMD/6 (D) 13. ?                   (1-27)    (DECIMAL)
BRF COUNT (D) 1 ?                 (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 1 ?           (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)
CMD/7 (D) 27. ?                   (1-27)    (DECIMAL)
BRF COUNT (D) 2048 ?              (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 32000 ?       (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)
CMD/8 (D) 27. ?                   (1-27)    (DECIMAL)
BRF COUNT (D) 2048 ?              (1-2K)    (DECIMAL)
# OF OPERATIONS (D) 32000 ?       (1-32K)   (DECIMAL)
PATTERN (D) 7 ?                   (0-8)     (DECIMAL)

NOTE:   THE PROGRAM AUTOMATICALLY INSERTS A CHARACTERISTIC CODE OF  40
        AS THE FIRST COMMAND IN THE SEQUENCE TABLE.  IF A
        DIFFERENT CHARACTERISTIC IS DESIRED, THE OPERATOR SHOULD
```

ENTER THAT CHARACTERISTIC CODE. A TOTAL OF 7 COMMANDS
MAY BE ENTERED IN ADDITION TO THE SET CHARACTERISTICS
COMMAND. IF THE OPERATOR WISHES TO USE LESS THAN 7
COMMANDS, AN END COMMAND MUST BE ENTERED AND THEN A
CONTROL Z (^Z) CAN BE ENTERED TO TERMINATE SOFTWARE DIALOGUE.

2.2.1 COMMAND LIST FOR USE IN SOFTWARE DIALOGUE.

CODE	COMMAND	DESCRIPTION
1 =	DRI	DRIVE INITIATE.
2 =	RDF	READ FORWARD.
3 =	RDR	READ REVERSE.
4 =	WRT	WRITE.
5 =	WTV	WRITE/VERIFY. IE. WRITE N RECORDS; READ REVERSE AND CHECK N RECORDS OF DATA; READ FORWARD AND CHECK N RECORDS.
6 =	SRF	SPACE RECORDS FORWARD.
7 =	SRR	SPACE RECORDS REVERSE.
8 =	RNR	READ NEXT REVERSE, IE. SPACE FWD, READ REV.
9 =	RNF	READ NEXT FORWARD, IE. READ FWD, SPACE REV.
10 =	RPF	READ PREVIOUS FWD, IE. SPACE REV, READ FWD.
11 =	RPR	READ PREVIOUS REV, IE. READ REV, SPACE FWD.
12 =	WRR	WRITE RETRY.
13 =	RWD	REWIND.
14 =	MBR	MESSAGE BUFFER RELEASE.
15 =	WTM	WRITE TAPE MARK.
16 =	WTR	WRITE TAPE MARK RETRY.
17 =	SFF	SPACE FILES FORWARD.
18 =	SFR	SPACE FILES REVERSE.
19 =	GES	GET EXTENDED STATUS.
20 =	ERS	ERASE 3 INCHES OF TAPE.
21 =	UNL	UNLOAD.
22 =	CLN	CLEAN TAPE
23 =	SCH	SET DEVICE CHARACTERISTIC. WHERE BRF=200, 40, 20, 0. 200 = ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT) 40 = ENABLE ATTENTION INTERRUPTS. 20 = ENABLE MESSAGE BUFFER RELEASE INTERRUPTS. SEE TSV05/TS05 PROGRAMMING SPECIFICATION FOR DESCRIPTION.
25 =	JMP	JUMP TO THE NTH COMMAND IN THE COMMAND SEQUENCE TABLE, WHERE N IS DEFINED IN THE BRF FIELD. THE NUMBER OF JUMPS IS ENTERED IN THE # OF OPERATIONS FIELD
26 =	DLY	DELAY "N" MILISECONDS WHERE N IS DEFINED IN THE # OF OPERATIONS.
27 =	END	END OF COMMAND SEQUENCE.

2.2.2 DATA PATTERN LIST FOR USE IN SOFTWARE DIALOGUE.

PATTERN #	DESCRIPTION.
0	INCREMENTING PATTERN. 0 - 377.
1	ALL "1"'S PATTERN.
2	ALL "0"'S PATTERN.
3	"1" BIT WALKING FROM R TO L IN A FIELD OF "0"'S.
4	"0" BIT WALKING FROM R TO L IF A FIELD OF "1"'S.
5	ALTERNATING "1" AND "0" BITS WITH ALTERNATE BYTES COMPLIMENTED.
6	ALTERNATING BYTES OF 000 AND 377.

SEQ 0018

```
858                                          7       RANDOM DATA PATTERN.
859                                          8       NO PATTERN GENERATION.
```

2.3 EXAMPLES OF SOFTWARE DIALOGUE

```
CHANGE HW (L) ?

#UNITS (D)  ?

TSDB ADDRESS (0) 172520 ?

VECTOR (0) 224 ?

SELECT DRIVE 0-1 (0) ?
```

IN ADDITION, ON A START, RESTART OR CONTINUE THE SUPERVISOR REQUESTS CHANGES TO THE SOFTWARE OPERATING PARAMETERS, AS FOLLOWS:

```
CHANGE SW (L) ?
```

2.3.1 BASIC FUNCTION AND DATA RELIABILITY WITH ALL ERROR REPORTING ENABLED

A) RECEIVE PROMPT (DR>)
B) ENTER STA/TES:1-2<CR>
C) ANSWER HARDWARE QUESTIONS.
D) PROCEED WITH THE FOLLOWING DIALOGUE:

```
CHANGE SW (L) ?                          Y<CR>

CLEAR COUNTERS (L) N ?                   Y<CR>
RESET RANDOM VARIABLES (L) N ?           <CR>
PRINT RECOVERABL' ERRORS  (L) N ?        Y<CR>
HALT AFTER EACH .MD (L) N ?              <CR>
INHIBIT RECOVERY (L) N ?                 <CR>
BAD TAPE SPOT DETECTION (L) Y ?          <CR>
DISABLE INTERRUPTS (L) N ?               <CR>
INHIBIT RFC ERROR REPORT (L) N ?         <CR>
CHANGE CMD SEQUENCE (L) N ?              <CR>
DEFAULT SWITCH SETTINGS (L) Y ?          <CR>
```

2.3.2 TO SET UP A SCOPE LOOP FOR A FAILURE IN BASIC FUNCTIONS.

A) RECEIVE PROMPT (DR>)
B) ENTER STA/TES:1/FLA:LOE:IER:ISR:IDU<CR>
C) ANSWER HARDWARE QUESTIONS.
D) PROCEED WITH THE FOLLOWING DIALOGUE:

```
CHANGE SW (L) ?                          Y<CR>
CLEAR COUNTERS (L) N ?                   Y<CR>
RESET RANDOM VARIABLES (L) N ?           N<CR>
PRINT RECOVERABLE ERRORS  (L) N ?        N<CR>
HALT AFTER EACH CMD (L) N ?              N<CR>
INHIBIT RECOVERY (L) N ?                 N<CR>
BAD TAPE SPOT DETECTION (L) Y ?          N<CR>
DISABLE INTERRUPTS (L) N ?               N<CR>
```

```
                                INHIBIT RFC ERROR REPORT (L) N ?        Y<CR>
                                CHANGE CMD SEQUENCE (L) N ?             N<CR>
                                DEFAULT SWITCH SETTINGS (L) Y ?          <CR>
```

2.3.3 TO SET UP A SCOPE LOOP FOR A FAILURE IN DATA RELIABILITY

A) RECEIVE PROMPT (DR>)
B) ENTER STA/TES:5/FLA:IER:ISR:IDU/EOP:1000<CR>
C) ANSWER HARDWARE QUESTIONS.
D) PROCEED WITH THE FOLLOWING DIALOGUE:

```
- CHANGE SW (L) ?                                Y<CR>
  CLEAR COUNTERS (L) N ?                         Y<CR>
  RESET RANDOM VARIABLES (L) N ?                 N<CR>
  PRINT RECOVERABLE ERRORS  (L) N ?              N<CR>
  HALT AfTER EACH CMD (L) N ?                    N<CR>
  INHIBIT RECOVERY (L) N ?                       N<CR>
  BAD TAPE SPOT DETECTION (L) Y ?                N<CR>
  DISABLE INTERRUPTS (L) N ?                     Y<CR>
  INHIBIT RFC ERROR REPORT (L) N ?               Y<CR>
  CHANGE CMD SEQUENCE (L) N ?                    Y<CR>
  CHARACTERISTICS CODE (O) 40 ?                  40<CR>
  CMD/2 (D) 5 ?                                  13<CR>   (REWIND)
  BRF COUNT (D) 2048 ?                            1<CR>
  # OF OPERATIONS (D) 10 ?                       1<CR>
  PATTERN (D) 7 ?                                 1<CR>
  CMD/3 (D) 5 ?                                   4<CR>   (WRITE)
  BRF (D) 2048 ?                               1000<CR>
  # OF OPERATIONS (D) 10 ?                    10000<CR>
  PATTERN (D) 7 ?                                 1<CR>
  CMD/4 (D) 5 ?                                  27<CR>   (END)
  BRF (D) 2048 ?                                 <^Z>
```

2.4 EXECUTION TIMES

2.4.1 SYSTEM CONFIGURATION

PDP11/23
MOS MEMORY
LA36
TSV05/TS05

2.4.2 TEST EXECUTION TIMES (2400 FT. TAPE)

TEST 1 - BASIC FUNCTIONS - 30 SECONDS PER PASS.
TEST 2 - DATA RELIABILITY - 45 MINUTES PER PASS.
TEST 3 - WRITE COMPATABILITY - 20 MINUTES PER PASS.
TEST 4 - READ COMPATABILITY - 20 MINUTES PER PASS.
TEST 5 - RANDOM/OPERATOR SELECTED SEQUENCE -20 MINUTES PER PASS.

NOTE: ALL EXECUTION TIMES ARE SHOWN FOR ONE DRIVE OEPRATION.

3.0 ERROR INFORMATION

3.1 ERROR REPORTING

ALL ERROR REPORTS EXCEPT FOR ERRORS #1 AND #17 INCLUDE A DUMP
OF THE FOLLOWING INFORMATION:

ERROR #, TEST #, SUBTEST #, PROGRAM COUNTER, UNIT #,
COMMAND, PREVIOUS COMMAND, PASS COUNT, # OF
RECORDS FROM BOT, RECORD READ COUNT, THE COMMAND PACKET, TSSR,
TCC, TSBA, RFC, AND THE EXTENDED STATUS REGISTERS
(SEE 2.3.14.1 FOR LIST OF COMMANDS).

STANDARD ERROR REPORT FORMAT:

```
CVTSE SFT ERR XXXXX  TST XXX  SUB XXX  PC: XXXXXX
(ASCII ERROR MESSAGE)
XXX CMD FAILED - UNIT X  PASS: XXXXX  RECORD: XXXXX
PREVIOUS CMD WAS  XXX          * RECORD READ: XXXXX *
CMDPKT  TSBA    RFC     TSSR    TCC
XXXXXX  XXXXXX  XXXXXX  XXXXXX  X
XXXXXX
XXXXXX
XXXXXX
XST0    XST1    XST2    XST3    XST4
XXXXXX  XXXXXX  XXXXXX  XXXXXX  XXXXXX
```

* CAUTION *

INTERPRET THAT "RECORD READ" COUNT WITH CAUTION.
IF VERY DIFFERENT FROM RECORD COUNT TRACKED BY THE DIAGNOSTIC,
TAPE POSITION IS NOT NECESSARELY LOST. ERRORS IN READING THAT
RECORD MIGHT HAVE CAUSED RECORD COUNT TO BE ERRONEOUSLY
READ FROM TAPE.
IN TEST 2, IF DIAGNOSTIC IS RESTARTED OR CONTINUED, RECORD COUNT
IS RESET TO ZERO ALTHOUGH THE TAPE IS NOT REWOUND. THIS IS
NECESSARY BECAUSE THERE IS NO ACCURATE WAY TO DETERMINE
ON WHAT RECORD COUNT OF WHICH UNIT THE DIAGNOSTIC WAS HALTED
BEFORE RESTARTING OR CONTINUING.
IT IS SUGGESTED THAT A "PRINT" BE REQUESTED WHEN HALTING DIAG
TO GET A PRINT OF THE RECORD COUNT WHEN HALTED.

EXAMPLE OF AN ERROR REPORT:

```
CVTSE SFT ERR 00009  TST 002  SUB 000  PC: 010606
RECOVERABLE ERROR
WRT CMD FAILED - UNIT 2  PASS:     2  RECORD:   254
PREVIOUS CMD WAS  WRT
CMDPKT  TSBA    RFC     TSSR    TCC
100005  002324  000000  100210  4
051766
000000
```

```
                                        000371
                                        XST0    XST1    XST2    XST3    XST4
                                        000350  000002  100004  000000  040055
```

3.1.1 ERROR #1 - COMMAND PACKET ADDRESS NOT ON A MODULO 4 BOUNDRY:

IF THIS ERROR IS REPORTED, THE PROGRAM DID NOT LOAD PROPERLY. THIS IS A SYSTEM FATAL ERROR AND THE PROGRAM MUST BE RELOADED TO CORRECT IT.

3.1.2 ERROR #2 - TS05 NOT READY:

BEFORE ANY COMMAND IS ISSUED TO THE TS05, THE SUBSYSTEM READY BIT IN THE TSSR IS CHECKED. IF THE SSR IS NOT SET, THE PROGRAM REPORTS THE NOT READY ERROR. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST SEQUENCE UNLESS THE IDU OPTION IS USED.

3.1.3 ERROR #3 - NO RESPONSE ERROR:

ONCE THE TSDB IS LOADED, THE TS05 HAS ONE MILLISECOND TO RESPOND OR THE PROGRAM REPORTS A NO RESPONSE ERROR. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST SEQUENCE UNLESS THE IDU OPTION IS USED.

3.1.4 ERROR #4 - NO INTERRUPT ERROR:

COMMAND WAS ISSUED AND NO INTERRUPT RECEIVED. THE PROGRAM REPORTS THAT NO INTERRUPT OCCURRED. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.5 SPECIAL CONDITION ERRORS:

IF, DURING EXECUTION, AN INCIDENT OCCURS FORCING THE TSSR SPECIAL CONDITION BIT TO SET, THE PROGRAM WILL SELECT ONE OF 8 ERROR HANDLING ROUTINES, DEPENDING ON THE TERMINATION CLASS CODE.

THE TERMINATION CLASS CODES IN THE TSSR ARE PROCESSED AS FOLLOWS WHEN SPECIAL CONDITION IS SET:

3.1.5.1 ERROR #5 - TERMINATION CLASS CODE 0, UNDEFINED SPECIAL CONDITION

THE ERROR IS REPORTED, A HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.

3.1.5.2 ERROR #6 - TERMINATION CLASS CODE 1, ATTENTION CONDITION

THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE

SUCH AS GOING OFFLINE OR COMING ONLINE. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.5.3 ERROR #7 - TERMINATION CLASS CODE 2, TAPE STATUS ALERT

A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE TO THE PROGRAM. BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, EOT. ACTION TAKEN DEPENDS ON THE TEST BEING EXECUTED.
IF THE CONDITION IS UNEXPECTED, THE ERROR IS REPORTED AND A HARD ERROR IS LOGGED. THE PROGRAM PROCEEDS NORMALLY.

3.1.5.4 ERROR #8 - TERMINATION CLASS CODE 3, FUNCTION REJECT

THE SPECIFIED FUNCTION WAS NOT INITIATED. BITS OF INTEREST ARE RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

31.5.5 ERROR #9 - TERMINATION CLASS CODE 4, RECOVERABLE ERROR

TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN THE FUNCTION WAS INITIATED. RECOVERY PROCEDURE IS TO LOG THE ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND. IF RETRY LIMIT IS REACHED BEFORE THE ERROR IS RECOVERED, RETRY LIMIT EXCEEDED IS REPORTED AS DESCRIBED IN ERROR #14 BELOW.

3.1.5.6 ERROR #10 - TERMINATION CLASS CODE 5, RECOVERABLE ERROR

TAPE POSITION HAS NOT CHANGED. RECOVERY PROCEDURE IS TO LOG THE ERROR AND RE-ISSUE THE ORIGINAL COMMAND. IF RETRY LIMIT IS REACHED BEFORE THE ERROR IS RECOVERED, RETRY LIMIT EXCEEDED IS REPORTED AS DESCRIBED IN ERROR #14 BELOW.

3.1.5.7 ERROR #11 - TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR

TAPE POSITION HAS BEEN LOST. THE ONLY VALID RECOVERY PROCEDURE IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR SEQUENCE NUMBERS. IF DENSITY CHECK IS SET THIS DIAGNOSTIC WILL REWIND AND RETRY THE COMMAND, OTHERWISE THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.5.8 ERROR #12 - TERMINATION CLASS CODE 7, FATAL SUBSYSTEM ERROR

THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE. REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR. THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.6 ERROR #13 - RFC NON-ZERO ERROR:

IF, AFTER EXECUTION, THE RESIDUAL FRAME COUNT IS NON-ZERO, THE ERROR IS REPORTED AND A HARD ERROR IS LOGGED. THE PROGRAM THEN PROCEEDS NORMALLY. THE REPORTING AND LOGGING OF THESE ERRORS IS OPTIONAL.

3.1.7 ERROR #14 - RETRY LIMIT EXCEEDED:

ON A WRITE COMMAND THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

ON A READ COMMAND THIS ERROR IS LOGGED AS A HARD ERROR AND THE PROGRAM PROCEEDS NORMALLY.

3.1.8 ERROR #15 - TOO MANY INTERRUPTS:

IF MORE THAN ONE INTERRUPT OCCURS PER COMMAND, THIS ERROR IS REPORTED. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.9 ERROR #16 - CAPSTAN RUNAWAY:

CAPSTAN DID NOT STOP WITHIN ACCEPTABLE WINDOW AFTER LAST COMMAND. THE PROGRAM WILL ISSUE A GET STATUS COMMAND BEFORE REPORTING THE ERROR SO THAT THE DEAD TRACK FIELD IN EXTENDED STATUS REGISTER 2 WILL CONTAIN THE TACH COUNT WHEN THE TAPE STOPPED.
THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.10 ERROR #17 - DATA COMPARE ERROR:

IF A DATA VALIDATION ERROR OCCURS DURING A WRITE/VERIFY COMMAND, THE PROGRAM PRINTS WHAT THE DATA SHOULD HAVE BEEN AND WHAT THE DATA WAS, AND PRINTS THE BYTE AND RECORD NUMBER THE ERROR OCCURRED ON. ONLY THE FIRST 10 BYTES IN ERROR PER RECORD ARE PRINTED.
THE TOTAL # OF BYTES IN ERROR PER RECORD IS ALSO PRINTED. A HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION WITH /FLAG:HOE. THERE ARE NO OTHER HALTS.

4.0 PERFORMANCE REPORT

```
UNIT X   PASS:XXXXX  RECORD:XXXXX
BYTES WRITTEN  XXX,XXX,XXX,XXX
BYTES READ REV XXX,XXX,XXX,XXX
BYTES READ FWD XXX,XXX,XXX,XXX
```

	WRT	RDR	RDF
RECOVERABLE ERRORS	XXXXX	XXXXX	XXXXX
UNRECOVERABLE ERRORS	XXXXX	XXXXX	XXXXX

SPEC COND	HARD	FATAL	COMPARE
XXXXX	XXXXX	XXXXX	XXXXX

5.0 TEST SUMMARIES

5.1 TEST 1 - BASIC FUNCTIONS.

EXECUTES AND VERIFIES CORRECT COMPLETION OF ALL TSO5 FUNCTIONS.

SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.
+ SET CHARACTERISTIC 200.
+ DRIVE INITIATE.
+ SET CHARACTERISTIC 20.
+ GET STATUS
+ SET CHARACTERISTIC 40.
+ PRINT TSO5 MICROCODE LEVEL (PASS 1 ONLY)

SUBTEST 2 - REWIND.
+ REWIND.
+ REWIND AT BOT.

SUBTEST 3 - WRITE/VERIFY.
+ WRITE/VERIFY PATTERN 1.
+ WRITE/VERIFY PATTERN 2.
+ WRITE/VERIFY PATTERN 3.
+ WRITE/VERIFY PATTERN 4.
+ WRITE/VERIFY PATTERN 5.
+ WRITE/VERIFY PATTERN 6.
+ WRITE/VERIFY PATTERN 0.

SUBTEST 4 - WRITE TAPE MARK, ERASE.
+ WRITE TAPE MARK.
+ WRITE 10 RECORDS
+ ERASE 10 TIMES
+ WRITE TAPE MARK.
+ WRITE TAPE MARK RETRY.

SUBTEST 5 - SPACE FILES.
+ SPACE 2 FILES REVERSE.
+ SPACE 2 FILES FORWARD.
+ SPACE 2 FILES REVERSE.
+ SPACE 2 FILES FORWARD.

SUBTEST 6 - SPACE RECORDS.
+ REWIND.
+ SPACE 7 RECORDS FORWARD.
+ SPACE 7 RECORDS REVERSE.
+ SPACE 7 RECORDS FORWARD.

```
1260                                    + SPACE 7 RECORDS REVERSE.
1261
1262                            SUBTEST 7  - WRITE RETRY.
1263                                    + REWIND.
1264                                    + WRITE DATA.
1265                                    + WRITE RETRY.
1266
1267                            SUBTEST 8  - READ REV RETRY.
1268                                    + READ REVERSE.
1269                                    + READ NEXT REVERSE.
1270                                    + READ NEXT FORWARD.
1271
1272                            SUBTEST 9  - READ FWD RETRY.
1273                                    + READ FORWARD.
1274                                    + READ PREVIOUS FORWARD.
1275                                    + READ PREVIOUS REVERSE.
1276
1277                            SUBTEST 10 - CLEAN.
1278                                    + CLEAN.
1279                                    + REWIND.
1280
1281                            SUBTEST 11  - WRITE/VERIFY SWAPPED DATA BYTES.
1282                                    + WRITE/VERIFY EVEN LENGTH (RECORD 1).
1283                                    + WRITE/VERIFY ODD LENGTH (RECORD 2).
1284                                    + SET DATA BYTE SWAP.
1285                                    + WRITE/VERIFY EVEN LENGTH (RECORD 3).
1286                                    + WRITE/VERIFY ODD LENGTH (RECORD 4).
1287                                    + CLEAR DATA BYTE SWAP.
1288
1289                            SUBTEST 12  - READ SWAPPED DATA BYTES.
1290                                    + READ REV RECORD 4.
1291                                    + READ REV RECORD 3.
1292                                    + SET DATA BYTE SWAP.
1293                                    + READ REV RECORD 2.
1294                                    + READ REV RECORD 1.
1295                                    + READ FWD RECORD 1.
1296                                    + READ FWD RECORD 2.
1297                                    + CLEAR DATA BYTE SWAP.
1298                                    + READ FWD RECORD 3.
1299                                    + READ FWD RECORD 4.
```

5.2 TEST 2 - DATA RELIABILITY.

1. THE TAPE IS INITIATED WITH THE FOLLOWING COMMANDS:
   SET CHARACTERISTIC 40
   REWIND
   WRITE 64 RECORDS OF RANDOM LENGTH AND DATA
2. WRITE AND READ COMMANDS ARE SELECTED AT RANDOM AND ARE EXECUTED A RANDOM NUMBER OF TIMES WITH RANDOM LENGTHS AND RANDOM PATTERN UNTIL END OF TAPE IS REACHED.
3. AT THE END OF EACH PASS, A REWIND COMMAND IS ISSUED AND A PERFORMANCE REPORT IS PRINTED.

NOTE: IF A RESTART COMMAND IS USED TO INITIATE TEST 1, THE INITIAL REWIND COMMAND IS NOT ISSUED.

5.3 TEST 3 - WRITE COMPATABILITY/WRITE UTILITY.

REWINDS AND WRITES RECORDS OF RANDOM LENGTHS AND RANDOM DATA FROM BOT TO EOT.

5.4 TEST 4 - READ COMPATABILITY/READ UTILITY.

REWINDS AND READS ENTIRE TAPE, FORWARD AND REVERSE.

5.5 TEST 5 - RANDOM/OPERATOR SELECTED COMMAND SEQUENCE.

A DEFAULT SEQUENCE OF REWIND/WRITE/READ REV/READ FWD/REWIND OF ENTIRE TAPE IS EXECUTED WITH RANDOM PATTERN AND RECORD LENGTH OF 2048 BYTES. OPERATOR CAN ENTER SEQUENCE OF COMMANDS UP TO SEVEN IF THEY DON'T WANT DEFAULT SEQUENCE.

6.0 DEVICE INFORMATION TABLES

6.1 GENERAL

THE TS05 TAPE SUBSYSTEM CONSISTS OF A TSV05 Q-BUS CONTROLLER CONNECTED TO A TS05 DRIVE. FROM A SOFTWARE VIEWPOINT THIS CONFIGURATION IS UNIQUE (FOR A Q-BUS DEVICE) IN A NUMBER OF WAYS:

A. ONLY ONE REGISTER MAY BE WRITTEN - TSDB (TAPE SYSTEM DATA BUFFER),

B. TWO REGISTERS MAY BE READ - TSSR AND TSBA (TAPE SYSTEM STATUS REGISTER AND TAPE SYSTEM BUS ADDRESS REGISTER),

C. COMMANDS ARE NOT WRITTEN TO THE DRIVE; RATHER, COMMAND POINTERS ARE WRITTEN WHICH POINT TO COMMAND PACKETS SOMEWHERE IN CPU MEMORY. THE COMMAND POINTER IS USED BY THE TS05 SUBSYSTEM TO FETCH THE WORD(S) WITHIN THE COMMAND PACKET. THE WORDS WITHIN THE COMMAND PACKET ARE:

```
1358
1359                                        1.  COMMAND WORD
1360                                        2.  LOW ORDER BUFFER ADDRESS
1361                                        3.  HIGH ORDER BUFFER ADDRESS
1362                                        4.  BYTE COUNT
1363
1364                                D. THE TSSR CONTAINS ALL THE INFORMATION WHICH WILL BE NEC-
1365                                   ESSARY TO DETERMINE WHETHER:
1366                                        1. THE DRIVE IS READY TO ACCEPT ANOTHER COMMAND,
1367                                        2. THE PREVIOUS COMMAND WAS EXECUTED WITHOUT ERROR.
1368                                   IF EITHER OF THE ABOVE CONDITIONS IS UNTRUE AT "JOB DONE"
1369                                   OR "COMMAND INITIATION" TIME,IT MAY BE NECESSARY
1370                                   TO GET THE EXTENDED STATUS REGISTERS TO DETERMINE WHAT
1371                                   ACTION IS TO BE TAKEN AND/OR LOG THE ERROR INFORMATION.
1372
1373                                E. EXTENDED STATUS REGISTERS ARE NOT READ DIRECTLY FROM
1374                                   DRIVE REGISTERS; RATHER, A "GET STATUS" COMMAND
1375                                   IS ISSUED WHICH WILL CAUSE THE TS05 TO TRANSFER EXTENDED
1376                                   STATUS INFORMATION TO THE MEMORY AREA POINTED TO BY THE
1377                                   BUFFER ADDRESS OF THE "GET STATUS" COMMAND. THERE ARE FIVE
1378                                   EXTENDED STATUS REGISTERS. SEE .3.
1379
1380                                F. THE TSDB MUST BE WRITTEN WITH A DATO INSTRUCTION TO
1381                                   PROPERLY WRITE THE COMMAND POINTER. A DATOB WILL
1382                                   CAUSE A MAINTENANCE FUNCTION. A DATO TO THE TSSR WILL CAUSE
1383                                   SUBSYSTEM INIT.
1384
1385                                G. COMMAND PACKETS MUST RESIDE ON DIVIDE BY FOUR
1386                                   MEMORY BOUNDARIES (AS OPPOSED TO DIVIDE BY 2 OR WORD
1387                                   BOUNDARIES) .
1388
1389
```

SEQ 0029

6.2 Q-BUS INTERFACE SPECIFICATIONS

TSV05/ TSO5	INT. VECTOR	UNIBUS ADDRESS	REGISTER
FIRST	224	772520	TSBA/TSDB
		772522	TSSR

6.3 BIT DEFINITIONS FOR TSV05/TS05 REGISTERS

6.3.1 TSV05/TS05 REGISTER SUMMARY

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
(R/O) TSBA	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A01	A00
(W/O) TSDB	P15	P14	P13	P12	P11	P10	P09	P08	P07	P06	P05	P04	P03	P02	P17	P16
(R/O) TSSR	SC	0	SCE	RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC0	0
(W/O)TSDBX	BT	0	0	0	P21	P20	P19	P18	(TSDBX EXISTS ONLY WHEN ENABLED BY THE EXTENDED FEATURES SWITCH ON THE M7196)							
XST0	TMK	RLS	LET	RLL	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BOT	EOT
XST1	DLT	0	COR	0	0	0	0	RBP	0	0	0	0	0	0	UNC	0
XST2	OPM	RCE	0	0	0	WCF	0	0	RL7	RL6	RL5	RL4	RL3	RL2	RL1	RL0
XST3	MICRO DIAGNOSTIC ERROR CODE							0	OPI	REV	TRF	DCK	0	0	RIB	
XST4	HSP	RCE	0	0	0	0	0	0	WRITE RETRY COUNT							

TERMINATION CLASS CODES (TSSR TC0-TC2):

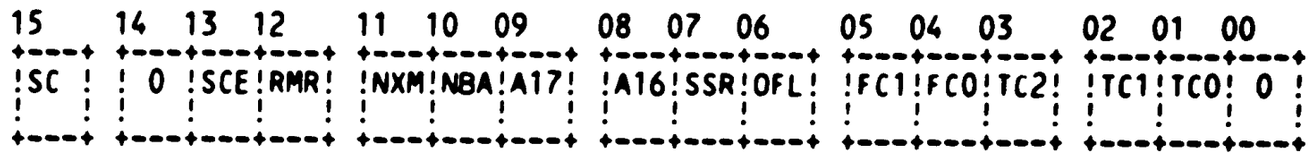
0 = NORMAL TERMINATION
1 = ATTENTION CONDITION
2 = TAPE STATUS ALERT
3 = FUNCTION REJECT
4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD DOWN TAPE FROM START OF FUNCTION
5 = RECOVERABLE ERROR - TAPE NOT MOVED
6 = UNRECOVERABLE ERROR - TAPE POSITION LOST
7 = FATAL CONTROLLER ERROR

FATAL CLASS CODES (TSSR FC0-FC1):

0 = MICRO DIAGNOSTIC FAILURE. SEE ERROR CODE BYTE (XST3) FOR FAILED FUNCTION.
1 = RESERVED
2 = NOT USED
3 = RESERVED FOR FUTURE USE ALWAYS READ AS A 0

6.3.2 TSV05 STATUS REGISTER (TSSR)

Q-BUS ADDRESS + 2 - READ ONLY



BIT	NAME	TCC	DEFINITION
15	SC	S	SPECIAL CONDITION. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT. SPECIFICALLY, EITHER AN ERROR WAS DETECTED OR AN EXCEPTION CONDITION OCCURRED. EXCEPTION CONDITIONS CAN BE TAPE MARKS ON READ COMMANDS, REVERSE MOTION AND AT BOT, EOT WHILE WRITING, ETC. MAY ALSO BE SET BY THE ERROR BITS CONTAINED IN THE TSSR REGISTER: SCE, RMR, AND NXM. THE TERMINATION CLASS BITS ARE SOMETHING OTHER THAN 0 (UNLESS RMR IS THE ONLY ERROR - SEE RMR).
14	-	-	RESERVED (ALWAYS A 0)
13	SCE	FCO	SANITY CHECK ERROR-SETS WHEN THE CONTROLLER DETECTS AN ABNORMAL CONDITION WITHIN ITSELF DURING EXECUTION OF IT'S FUNCTIONS AND THE PROBLEM IS SERIOUS ENOUGH THAT A MESSAGE PACKET IS NOT STORED.
12	RMR	S	REGISTER MODIFICATION REFUSED. SET BY THE TSV05 WHEN A COMMAND POINTER IS LOADED INTO TSDB AND SUB-SYSTEM READY (SSR) IS NOT SET. NOTE THAT THIS BIT CAUSES SPECIAL CONDITION BUT NO TERMINATION CLASS (IN FACT, THE TS05 NEVER SEES THIS ERROR) BECAUSE ON A SYSTEM WITH NO BUGS, THIS BIT MAY COME UP ON AN ATTENTION MESSAGE. IF ATTNS ARE NOT ENABLED, THIS BIT COMING UP IS AN INDICATION OF EITHER A FATAL CONTROLLER ERROR OR A SOFTWARE BUG.
11	NXM	4/5	NON-EXISTENT MEMORY. SET BY THE TSV05 WHEN TRYING TO TRANSFER TO OR FROM A MEMORY LOCATION WHICH DOES NOT EXIST. MAY OCCUR WHEN FETCHING THE COMMAND PACKET, FETCHING OR STORING DATA, OR STORING THE MESSAGE PACKET.
10	NBA	S	NEED BUFFER ADDRESS. WHEN SET, INDICATES THAT THE TS05 NEEDS A MESSAGE BUFFER ADDRESS. THIS BIT IS CLEARED DURING THE SET CHARACTERISTICS

				COMMAND (IF A GOOD ADDRESS WAS GIVEN).
	09	A17	S	BUS ADDRESS BIT 17. A17 AND A16 (BIT 08) TRACK THE VALUES OF BITS 17 AND 16 OF THE TSBA REGISTER. LOADED FROM TSDB BITS 01-00 WHEN TSDB IS WRITTEN.
	08	A16	S	BUS ADDRESS BIT 16. SEE A17 (BIT 09).
	07	SSR	S	SUB-SYSTEM READY. WHEN SET, INDICATES THAT THE TSV05/TS05 SUBSYSTEM IS NOT BUSY AND IS READY TO ACCEPT A NEW COMMAND POINTER.
	06	OFL	S,1,3	OFF-LINE. WHEN SET, INDICATES THAT THE TS05 IS OFF-LINE AND UNAVAILABLE FOR ANY TAPE MOTION COMMANDS. THIS BIT CAN CAUSE A TERMINATION CLASS OF 1 (ON ATTN INTERRUPT) OR 3 (RESULTS IN NEF).
	05	FC1	7	FATAL TERMINATION CLASS 01. FC1 AND FC0 (BIT 04) ARE USED TO INDICATE THE TYPE OF FATAL ERROR WHICH HAS OCCURRED ON THE TS05. THESE BITS ARE VALID ONLY WHEN SC IS SET AND THE TERMINATION CLASS CODE BITS ARE ALL SET (111).
	04	FC0	7	FATAL TERMINATION CLASS 00. SEE FC1 (BIT 05).
	03	TC2	S	TERMINATION CLASS BIT 02. THIS BIT, ALONG WITH THE TC1 AND TC0 BITS, ACT AS AN OFFSET VALUE WHENEVER AN ERROR OR EXCEPTION CONDITION OCCURS ON A COMMAND. EACH OF THE EIGHT POSSIBLE VALUES OF THIS FIELD REPRESENT A PARTICULAR CLASS OF ERRORS OR EXCEPTIONS. THE CONDITIONS IN EACH CLASS HAVE SIMILAR SIGNIFICANCE AND, AS APPLICABLE, RECOVERY PROCEDURES. THE CODE PROVIDED IN THIS FIELD IS EXPECTED TO BE UTILIZED AS AN OFFSET INTO A DISPATCH TABLE FOR HANDLING OF THE CONDITION.
	02	TC1	S	TERMINATION CLASS BIT 01. SEE TC2 (BIT 03).
	01	TC0	S	TERMINATION CLASS BIT 00. SEE TC2 (BIT 03).
	00	-	-	NOT USED. (ALWAYS A 0)

Q-BUS ADDRESS + 2 - WRITE ONLY

SUBSYSTEM INITIALIZE

6.3.2.1 TSV05 EXTENDED DATA BUFFER REGISTER (TSDBX)

TSDBX

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
BT		0	0	0	P21	P20	P19	P18							

(TSDBX EXISTS ONLY WHEN ENABLED BY THE EXTENDED FEATURES SWITCH ON THE M7196)

BIT	NAME	TCC	DEFINITION
15	BT	-	BOOT COMMAND BIT. WHEN WRITTEN TO A 1,WITH SSR=1, CAUSES THE TAPE TO BE REWOUND TO BOT, THE FIRST TAPE RECORD TO BE SKIPPED, AND THE SECOND RECORD TO BE LOADED INTO CPU MEMORY SPACE STARTING AT LOCATION 0.
14-12			RESERVED (ALWAYS A 0)
11-08	P<21:18>		COMMAND POINTER BITS 21-18. WHEN THE TSDBX IS WRITTEN AND SSR=1, THE DATA IS LOADED INTO BITS 21-18 OF THE INTERNAL TSBA REGISTER.
07-00			RESERVED (ALWAYS A 0)

6.3.3 EXTENDED STATUS REGISTER 0 (XSTAT0)

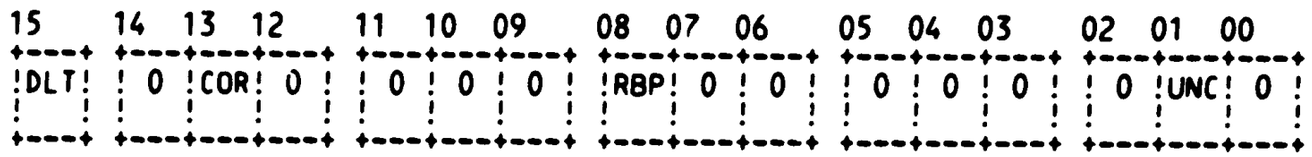
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
TMK	RLS	LET	RLL	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BOT	EOT

BIT	NAME	TCC	DEFINITION
15	TMK	S,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN THE BYTE COUNT ON READ OPERATIONS, A SPACE RECORD OPERATION ENCOUNTERED A TAPE MARK OR BOT BEFORE THE POSITION COUNT WAS EXHAUSTED, OR A SKIP TAPE MARKS COMMAND WAS TERMINATED BY ENCOUNTERING BOT OR A DOUBLE TAPE MARK (IF THAT OPERATIONAL MODE IS ENABLED, SEE LET) PRIOR TO EXHAUSTING THE POSITION COUNTER.

13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT AND THE FIRST RECORD ENCOUNTERED IS A TAPE MARK. THE SETTING OF THIS BIT WILL NOT OCCUR UNLESS THIS MODE OF TERMINATION IS ENABLED THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT INDICATES THAT THE RECORD READ WAS LONGER THAN THE BYTE COUNT SPECIFIED.
11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT LOCK SWITCH ACTIVATED DURING THE OPERATION.
10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES THAT THE COMMAND COULD NOT BE EXECUTED DUE TO ONE OF THE FOLLOWING CONDITIONS: - THE COMMAND SPECIFIED REVERSE TAPE DIRECTION BUT THE TAPE WAS ALREADY POSITIONED AT BOT. - THE ISSUING OF ANY MOTION COMMAND EXCEPT

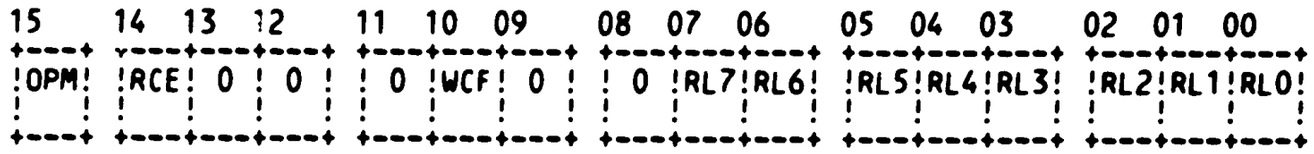
				WHEN THE VOLUME CHECK BIT IS SET. - ANY COMMAND, EXCEPT GET STATUS OR DRIVE INITIALIZE, WHEN THE TS05 IS OFF-LINE. - ANY WRITE COMMAND WHEN THE TAPE DOES NOT CONTAIN A WRITE ENABLE RING (WRITE LOCK STATUS - WLS).
	09	ILC	3	ILLEGAL COMMAND. SET WHEN A COMMAND IS ISSUED AND EITHER ITS COMMAND FIELD OR ITS COMMAND MODE FIELD CONTAINS CODES WHICH ARE NOT SUPPORTED BY THE TS05.
	08	ILA	3	ILLEGAL ADDRESS. (MORE THAN 18 BITS OR ODD WHEN AN EVEN ADDRESS IS REQUIRED.)
	07	MOT	S	TAPE IS MOVING.
	06	ONL	S	ON LINE. WHEN SET, INDICATES THAT THE TS05 IS ON-LINE AND OPERABLE.
	05	IE	S	INTERRUPT ENABLE. REFLECTS THE STATE OF THE INTERRUPT ENABLE BIT SUPPLIED ON THE LAST COMMAND.
	04	VCK	S	VOLUME CHECK. WHEN SET, INDICATES THAT THE DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED OFF-LINE. CLEARED BY THE CLEAR VOLUME CHECK (CVC) BIT IN THE COMMAND HEADER WORD. THIS BIT CAN CAUSE A TERMINATION CLASS OF 3.
	03	PED	S	PHASE ENCODED DRIVE. ALWAYS SET, INDICATES THAT THE TS05 IS CAPABLE OF READING AND WRITING ONLY 1600 BPI PHASE ENCODED DATA.
	02	WLK	S,3	WRITE LOCKED. WHEN SET, INDICATES THAT THE MOUNTED REEL OF TAPE DOES NOT HAVE A WRITE-ENABLE RING INSTALLED. THE TAPE IS, THEREFORE, WRITE PROTECTED.
	01	BOT	S,3	BEGINNING OF TAPE. WHEN SET, INDICATES THAT THE TAPE IS POSITIONED AT THE LOAD POINT AS DENOTED BY THE BOT REFLECTIVE STRIP ON THE TAPE.
	00	EOT	S,2	END OF TAPE. THIS BIT IS SET WHENEVER THE TAPE IS POSITIONED AT OR BEYOND THE END OF TAPE REFLECTIVE STRIP.

6.3.4 EXTENDED STATUS REGISTER 1 (XSTAT1)



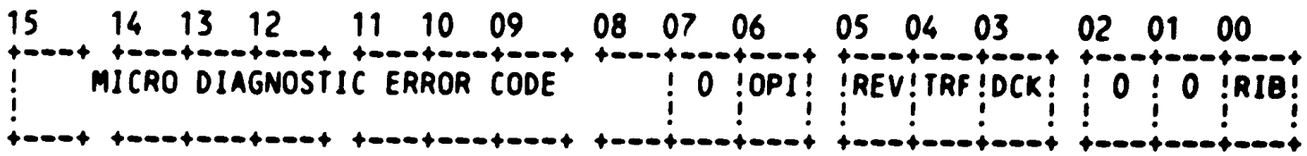
BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE FIFO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE Q-BUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TSO5.
14	-	-	NOT USED. (ALWAYS A 0)
13	COR	S	CORRECTABLE DATA. CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12-09			RESERVED (ALWAYS A 0)
08	RPB	4	READ BUS PARITY ERROR. SET WHEN CONTROLLER DETECTS A PARITY ERROR ON THE READ DATA LINES OF THE TRANSPORT BUS.
07-02 & 00			RESERVED (ALWAYS A 0)
01	UNC	4	UNCORRECTABLE DATA ERROR.

6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)



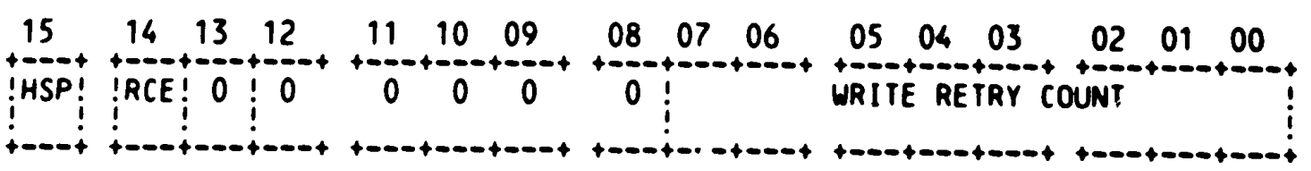
BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	RCE	7,F2	RAM CHECKSUM ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13-11			RESERVED (ALWAYS A 0)
10	WCF	7	WRITE CLOCK FAILURE. SET DURING A WRITE TO INDICATE THAT THE FIFO IS NOT BEING EMPTIED BY THE TRANSPORT.
09-08			RESERVED (ALWAYS A 0)
07-00	RL 7-0	-	REVISION LEVEL.

6.3.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



BIT	NAME	TCC	DEFINITION
15 TO 08			MICRO DIAGNOSTIC ERROR CODE. (SEE LIST OF CODES BELOW).
07			RESERVED (ALWAYS A 0)
06	OPI	6	OPERATION INCOMPLETE. SET WHEN A READ, SPACE, OR SKIP OPERATION HAS MOVED 25 FEET OF TAPE WITHOUT DETECTING ANY DATA ON THE TAPE.
05	REV	S	DIRECTION OF CURRENT OPERATION WAS REVERSE (BUT IS 0 IF REWIND OR FORWARD)
04	-	-	RESERVED (ALWAYS A 0)
03	DCK	S,6	DENSITY CHECK. SET WHEN A PE IDENTIFICATION BURST (IDB) WAS NOT DETECTED WHEN MOVING OFF OF BOT.
02-01			RESERVED (ALWAYS A 0)
00	RIB	2	REVERSE INTO BOT. A READ, SPACE, OR SKIP COMMAND ALREADY IN PROGRESS HAS ENCOUNTERED THE BOT MARKER WHEN MOVING TAPE IN THE REVERSE DIRECTION. TAPE MOTION WILL BE HALTED AT BOT.

6.3.7 EXTENDED STATUS REGISTER 4 (XSTAT4)



BIT	NAME	TCC	DEFINITION

15	HSP	S	HIGH SPEED. WHEN SET,INDICATES THAT THE TRANSPORT IS OPERATING IN HIGH SPEED MODE.(100IPS) WHEN CLEAR,THE TRANSPORT IS OPERATING IN LOW SPEED MODE.(25IPS)
14	RCE	6	RETRY COUNT EXCEEDED. WHEN SET,INDICATES THAT THE CONTROLLER WAS BUFFERING WRITE DATA AND COULD NOT SUCESSFULLY OUTPUT THE BUFFERED RECORD WITHIN THE SPECIFIED NUMBER OF RETRIES. CAUSES TAPE POSITION LOST TERMINATION.
13-8		-	RESERVED (ALWAYS A 0)
7-0	WRC	S	WRITE RECOUNT COUNT STATISTIC. THIS FIELD INDICATES, WHEN THE CONTROLLER IS BUFFERING WRITE DATA RECORDS, THE TOTAL NUMBER OF CONTROLLER INITIATED RETRIES PERFORMED IN ORDER TO WRITE THE PREVIOUS BUFFERED RECORD. THIS COUNT IS CLEARED AFTER IT IS DISPLAYED.

7.0 DIAGNOSTIC HISTORY

REVISION A - MAR 1982
- MODIFIED CZTSHC FROM TS11 FOR TSV05

```
                                .TITLE PROGRAM HEADER AND TABLES
                                .SBTTL  PROGRAM HEADER

                                        .ENABL  ABS,AMA
002000          002000          .       =       2000
002000                                  BGNMOD

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

002000                                  POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU

002000                                  HEADER  CVTSE,A,0,5000,1
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000  103                                                             .ASCII /C/
002001  126                                                             .ASCII /V/
002002  124                                                             .ASCII /T/
002003  123                                                             .ASCII /S/
002004  105                                                             .ASCII /E/
002005  000                                                             .BYTE   0
002006  000                                                             .BYTE   0
002007  000                                                             .BYTE   0
002010                          L$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$TIML::                ;LONGEST TEST TIME
002014  005000                                                          .WORD   5000
002016                          L$HPCP::                ;POINTER TO H.W. QUES.
002016  027732                                                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  030040                                                          .WORD   L$SOFT
002022                          L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002174                                                          .WORD   L$HW
002024                          L$SPTP::                ;PTR. TO S.W. PTABLE
002024  002204                                                          .WORD   L$SW
002026                          L$LADP::                ;DIAG. END ADDRESS
002026  032004                                                          .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  000001                                                          .WORD   1
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   0
002044                          L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
002044  000000                                                          .WORD   0
```

```
002046
002046  000000
002050
002050     003
002051     003
002052
002052  000000
002054  000000
002056
002056  000000
002060
002060  002164
002062
002062  017546
002064
002064  000000
002066
002066  000000
002070
002070  024030
002072
002072  023756
002074
002074  000000
002076
002076  002136
002100
002100  104035
002102
002102  000000
002104
002104  021302
002106
002106  023714
002110
002110  023272
002112
002112  021274
002114
002114  000000
002116
002116  000000
002120
002120  000000
65

LSEXP1::        ;EXPANSION WORD
LSMREV::        ;SVC REV AND EDIT #
LSEF::          ;DIAG. EVENT FLAGS
LSSPC::
LSDEVP::        ; POINTER TO DEVICE TYPE LIST
LSREPP::        ;PTR. TO REPORT CODE
LSEXP4::
LSEXP5::
LSAUT::         ;PTR. TO ADD UNIT CODE
LSDUT::         ;PTR. TO DROP UNIT CODE
LSLUN::         ;LUN FOR EXERCISERS TO FILL
LSDESP::        ;POINTER TO DIAG. DESCRIPTION
LSLOAD::        ;GENERATE SPECIAL AUTOLOAD EMT
LSETP::         ;POINTER TO ERRTBL
LSICP::         ;PTR. TO INIT CODE
LSCCP::         ;PTR. TO CLEAN-UP CODE
LSACP::         ;PTR. TO AUTO CODE
LSPRT::         ;PTR. TO PROTECT TABLE
LSTEST::        ;TEST NUMBER
LSDLY::         ;DELAY COUNT
LSHIME::        ;PTR. TO HIGH MEM

        .WORD   0
        .BYTE   CSREVISION
        .BYTE   CSEDIT
        .WORD   0
        .WORD   0
        .WORD   0
        .WORD   LSDVTYP
        .WORD   LSRPT
        .WORD   0
        .WORD   0
        .WORD   LSAU
        .WORD   LSDU
        .WORD   0
        .WORD   LSDESC
        EMT     ESLOAD
        .WORD   0
        .WORD   LSINIT
        .WORD   LSCLEAN
        .WORD   LSAUTO
        .WORD   LSPROT
        .WORD   0
        .WORD   0
        .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.
                                ;--

                                        DISPATCH 5
002122                          L$DISPATCH::
002122  000005                                                          .WORD   5
002124
002124  024134                                                          .WORD   T1
002126  025622                                                          .WORD   T2
002130  026456                                                          .WORD   T3
002132  026652                                                          .WORD   T4
002134  027032                                                          .WORD   T5

                                .SBTTL  DESCRIPTIVE TEXT

                                ;++
                                ;2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVICE UNDER TES
                                ;--

                                        DESCRIPT        <DATA RELIABILITY TEST>
002136                          L$DESC::
002136  104     101     124                                             .ASCIZ  /DATA RELIABILITY TE
002141  101     040     122
002144  105     114     111
002147  101     102     111
002152  114     111     124
002155  131     040     124
002160  105     123     124
002163  000

                                                                        .EVEN
                                        DEVTYP          <TSV05>
002164                          L$DVTYP::
002164  124     123     126                                             .ASCIZ  /TSV05/
002167  060     065     000
                                                                        .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 RUN-TIME P-TABLE.
                                ;--

002172                                  BGNHW   DFPTBL
002172  000003                                                                  .WORD   L10000-L$HW/2
002174                          L$HW::
002174                          DFPTBL::


002174  172520                  .WORD   172520          ;TSDB ADDRESS.
002176  000224                  .WORD   224             ;VECTOR ADDRESS.
002200  000000                  .WORD   0               ;DRIVE #0 FOR DEFAULT

002202                                  ENDHW
002202                          L10000:
```

```
                        .SBTTL  SOFTWARE P-TABLE

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

002202                          BGNSW   SFPTBL
002202  000051                                                 .WORD   L10001-L$SW/2
002204                  L$SW::
002204                  SFPTBL::

002204  001             CLRFLG:: .BYTE  1               ;CLEAR COUNTERS FLAG.
002205  000             RRANV::  .BYTE  0               ;RESET RANDOM VARIABLES EACH PASS FLAG.
002206  000             HAE::    .BYTE  0               ;HALT AFTER EACH COMMAND FLAG.
002207  000             ERCVER:: .BYTE  0               ;ENABLE RECOVERABLE ERROR PRINTS FLAG.
002210  001             BADTSW:: .BYTE  1               ;BAD TAPE SWITCH TO REWRITE ON SAME SPOT & DETECT BAD TAPE
002211  000                      .BYTE  0               ;SPARE
002212  000             DINT::   .BYTE  0               ;DISABLE INTERRUPTS FLAG.
002213  000             IREC::   .BYTE  0               ;INHIBIT ERROR RECOVERY FLAG.
002214  000             CHGFLG:: .BYTE  0               ;CHANGE CMD SEQ TABLE FLAG.
002215  000                      .BYTE  0               ;SPARE.
002216  000             PIRE::   .BYTE  0               ;INHIBIT RESIDUAL FRAMECOUNT ERROR REPORT FLAG.
002217  000                      .BYTE  0               ;SPARE.
002220  000040          CHAR::   CH.EAI                 ;CHARACTERISTICS CODE (DEFAULT = 40).
002222  000015          CMDD::   .WORD  13.             ;COMMAND 2 (DEFAULT = REWIND).
002224  000001                   .WORD  1               ;BYTE COUNT
002226  000001                   .WORD  1               ;NUMBER OF OPERATIONS
002230  000007                   .WORD  RANP            ;PATTERN
002232  000004                   .WORD  4               ;COMMAND 3  (DEFAULT = WRITE)
002234  004000                   .WORD  DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
002236  076400                   .WORD  32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
002240  000007                   .WORD  RANP            ;PATTERN (DEFAULT = RANDOM).
002242  000003                   .WORD  3               ;COMMAND 4 (DEFAULT = READ REV).
002244  004000                   .WORD  DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
002246  076400                   .WORD  32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
002250  000007                   .WORD  RANP            ;PATTERN (DEFAULT = RANDOM).
002252  000002                   .WORD  2               ;COMMAND 5 (DEFAULT = READ FWD).
002254  004000                   .WORD  DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
002256  076400                   .WORD  32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
002260  000007                   .WORD  RANP            ;PATTERN (DEFAULT = RANDOM).
002262  000015                   .WORD  13.             ;COMMAND 6 (DEFAULT = REWIND).
002264  000001                   .WORD  1               ;BYTE COUNT
002266  000001                   .WORD  1               ;NUMBER OF OPERATIONS
002270  000007                   .WORD  RANP            ;PATTERN
002272  000033                   .WORD  27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 7
002274  004000                   .WORD  DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
002276  076400                   .WORD  32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
002300  000007                   .WORD  RANP            ;PATTERN (DEFAULT = RANDOM).
002302  000033                   .WORD  27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 8
002304  004000                   .WORD  DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
002306  076400                   .WORD  32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
002310  000007                   .WORD  RANP            ;PATTERN (DEFAULT = RANDOM).
002312  000001          TS1MD::  .WORD  1               ;DEFAULT SWITCH SETTING
002314  000000          RDBUF::  .WORD  0               ;ENABLE READ BUFFERING
002316  000000          WTBUF::  .WORD  0               ;ENABLE WRITE BUFFERING
002320  000000          HSSW::   .WORD  0               ;RUN AT 100IPS SWITCH
```

```
    174 002322  000000          EXTFEA::.WORD   0               ;EXTENDED FEATURES SOFTWARE SW 0=OFF;1=ON
    175 002324  000000          BENBSW::.WORD   0               ;BUFFER ENABLE SOFTWARE SW 0=OFF;1=ON
    176
    177 002326                          ENDSW
        002326                  L10001:
    178
    179 002326                          ENDMOD
```

```
                                .TITLE GLOBAL AREAS
                                .SBTTL  GLOBAL EQUATES SECTION

002326                                  BGNMOD

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

002326                                  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
                                ;
000040                          EF.START==      32.                     ; START COMMAND WAS ISSUED
000037                          EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
000036                          EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
000035                          EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
000034                          EF.PWR==        28.                     ; 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
    212
    220
    221                         ; REGISTER USAGE.
    222                         ;
    223                         ;       R0 - PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
    224                         ;       R1 - COMMAND SEQUENCE TABLE POINTER.
    225                         ;       R2 - GENERAL PURPOSE REGISTER.
    226                         ;       R3 - GENERAL PURPOSE REGISTER.
    227                         ;       R4 - GENERAL PURPOSE REGISTER.
    228                         ;       R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
    229                         ;       R6 - STACK POINTER.
    230                         ;       R7 - PROGRAM COUNTER.
    231
    232                         ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSSR REGISTERS.
    233
    234         100000          TS.SC==100000                   ;SPECIAL CONDITION BIT.
    235         040000          TS.UPE==40000                   ;UNIBUS PARITY ERROR
    236         020000          TS.SPE==20000                   ;SERIAL BUS PARITY ERROR.
    237         010000          TS.RMR==10000                   ;REGISTER MODIFICATION REFUSED.
    238         004000          TS.NXM==4000                    ;NON-EXISTENT MEMORY.
    239         002000          TS.NBA==2000                    ;NEED BUFFER ADDRESS.
    240         001000          TS.A17==1000                    ;BUS ADDRESS BIT 17.
    241         000400          TS.A16==400                     ;BUS ADDRESS BIT 16.
    242         000200          TS.SSR==200                     ;UNIT READY BIT.
    243         000100          TS.OFL==100                     ;OFF LINE.
    244         177717          TSC.FCC==177717                 ;FATAL CLASS CODE MASK.
    245         177761          TSC.TCC==177761                 ;TERMINATION CLASS CODE MASK.
    246
    247                         ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
    248
    249         100000          ACK.C==100000                   ;ACKNOWLEDGE BIT
    250         040000          CVC.C==40000                    ;CLEAR VOLUME CHECK.
    251         020000          OPP.C==20000                    ;OPPOSITE BIT
    252         010000          SWB.C==10000                    ;SWAP BYTE BIT
```

```
                004000          MOD.C3==4000            ;MODE BIT 3
                004000          BRF.C==4000             ;BYTE/RECORD/FILE COUNT FLAG BIT.  NOT USED
                                                        ;BY TSO5 BUT USED INTERNALLY BY THIS PROGRAM ONLY.
                002000          MOD.C2==2000            ;MODE BIT 2
                001000          MOD.C1==1000            ;MODE BIT 1
                000400          MOD.C0==400             ;MODE BIT 0
                000200          IE.C==200               ;INTERRUPT ENABLE
                000100          FMT.C1==100             ;FORMAT BIT 1
                000100          VFY.C==100              ;WRITE VERIFY FLAG BIT.  INTERNAL USE ONLY.
                                                        ;NOT USED BY TSO5.
                000040          FMT.C0==40              ;FORMAT BIT 0.
                000040          JMP.C==40               ;JUMP BIT-TO DIRECT THIS PROGRAM TO JUMP TO
                                                        ;A CERTAIN LOCATION IN THE COMMAND SEQUENCE
                                                        ;TABLE.  INTERNAL USE ONLY.
                000020          CMD.C4==20              ;COMMAND BIT 4
                000020          DLY.C==20               ;INSERT DELAY. INTERNAL USE ONLY.
                000010          CMD.C3==10              ;COMMAND BIT 3
                000004          CMD.C2==4               ;COMMAND BIT 2
                000002          CMD.C1==2               ;COMMAND BIT 1
                000001          CMD.C0==1               ;COMMAND BIT 0

                                ;BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.

                000200          CH.ESS==200             ;ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT).
                000040          CH.EAI==40              ;ENABLE ATTENTION INTERRUPTS.
                000020          CH.ERI==20              ;ENABLE MESSAGE BUFFER RELEASE INTERRUPTS.
                000040          DFTSCH==CH.EAI          ;DEFAULT CHARACTERISTICS CODE.

                                ;BIT DEFINITIONS FOR EXTENDED CONTROL WORD

                000040          EF.HSS==40              ;ENABLE HIGH SPEED SELECT
                000030          EF.RWB==30              ;ENABLE BOTH READ & WRITE BUFFERING
                000020          EF.RBO==20              ;ENABLE READ BUFFERING ONLY

                                ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
                                ;IN THE MESSAGE BUFFER.

                000004          MS.RFC==4               ;RESIDUAL FRAME COUNT.
                000006          MS.XS0==6               ;EXT STATUS REG 0
                000010          MS.XS1==10              ;EXT STATUS REG 1
                000012          MS.XS2==12              ;EXT STATUS REG 2
                000014          MS.XS3==14              ;EXT STATUS REG 3
                000016          MS.XS4==16              ;EXT STATUS REG 4

                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0.

                100000          X0.TMK==100000          ;TAPE MARK.
                040000          X0.RLS==40000           ;RECORD LENGTH SHORT.
                020000          X0.LET==20000           ;LOGICAL EOT.
                010000          X0.RLL==10000           ;RECORD LENGTH LONG.
                000100          X0.ONL==100             ;ON LINE BIT.
                000004          X0.WLK==4               ;WRITE LOCK BIT
                000002          X0.BOT==2               ;BOT BIT.
                000001          X0.EOT==1               ;EOT BIT.

                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2.

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```
                100000          X2.OPM==100000                  ;OPERATION IN PROGRESS, TAPE MOVING
                000200          X2.EFE==200                     ;EXTENDED FEATURES ENABLED
                000100          X2.BFE==100                     ;BUFFERING ENABLED

                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3.

                000010          X3.DCK==10                      ;DENSITY CHECK.
                157400          X3.RNY==157400                  ;CAPSTAN RUNAWAY UDIAG ERROR CODE.

                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 4.

                100000          X4.HSS==100000                  ;HIGH SPEED SWITCH INDICATING 100IPS
                040000          X4.RCE== 40000                  ;RETRY COUNT EXCEEDED


                                ;THE FOLLOWING DEFINITIONS SHOW THE RELATIVE POSITIONS OF THE COMMAND
                                ;PACKET ENTRIES.

                000000          CP.CMD==0                       ;CMDPKT+0==TSO5 COMMAND.
                000002          CP.ADL==2                       ;CMDPKT+2==BUFFER ADDRESS LOW.
                000004          CP.ADH==4                       ;CMDPKT+4==BUFFER ADDRESS HIGH.
                000006          CP.CNT==6                       ;CKDPKT+6==BYTE/FILE/RECORD COUNT

                                ;MISCELLANEOUS DEFINITIONS.

                000340          INTPRI==PRI07                   ;PRIORITY TO BE USED IN INTERRUPT STATE.
                000012          SCHCNT==12                      ;ARBITRARY BYTE LENGTH FOR CHARACTERISTIC
                                                                ;BUFFER LENGTH. (EVEN #)
                000020          MSGCNT==20                      ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
                000020          DIACNT==20                      ;DIAGNOSTIC COMMAND BUFFER EXTENT.
                004000          DATCNT==2048.                   ;MAXIMUM RECORD LENGTH IN BYTES,
                                                                ;THIS COUNT SHOULD BE A MULTIPLE OF 256 TO INSURE
                                                                ;PROPER READ/WRITE BUFFER ALLOCATION BY THE SUPER.
                177740          RNOPSC==177740                  ;RANDOM # OF OPERATIONS MASK.
                000007          RANP==7                         ;CODE TO SELECT RANDOM PATTERN.
                000020          RRECL==16.                      ;READ RECOVERY ATTEMPT LIMIT.
                000020          WRECL==16.                      ;WRITE RECOVERY ATTEMPT LIMIT.
                153624          RANBC==153624                   ;CONSTANT USED TO RESET RANDOM # GENERATOR BASE.
                032561          RANSC==32561                    ;CONSTANT USED TO RESET RANDOM # SAVE LOCATION.
                177774          NINUSE==177774                  ;NOT IN USE CODE FOR DEVICE STATE TABLE.
                177740          NCMD.C==ACK.C!CVC.C!OPP.C!SWB.C!MOD.C3!MOD.C2!MOD.C1!MOD.C0!IE.C!FMT.C1!FMT.C0
                                                                ;NOT "COMMAND" BITS.

                                ;THE FOLLOWING DEFINES THE COMMAND WORD FOR EACH TSO5 COMMAND.

                100013          DRI==   ACK.C!CMD.C3!CMD.C1!CMD.C0
                                                                ;DRIVE INIT.

                104001          RDF==   ACK.C!BRF.C!CMD.C0
                                                                ;READ FORWARD

                104401          RDR==   ACK.C!BRF.C!MOD.C0!CMD.C0
                                                                ;READ REVERSE

                104005          WRT==   ACK.C!BRF.C!CMD.C0!CMD.C2
                                                                ;WRITE COMMAND
```

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                104105          WTV==   ACK.C!BRF.C!VFY.C!CMD.C0!CMD.C2
                                                        ;WRITE VERIFY

                104010          SRF==   ACK.C!BRF.C!CMD.C3
                                                        ;SPACE RECORD FORWARD

                104410          SRR==   ACK.C!BRF.C!MOD.C0!CMD.C3
                                                        ;SPACE RECORD REVERSE

                105401          RNR==   ACK.C!BRF.C!MOD.C1!MOD.C0!CMD.C0
                                        ;READ REV RETRY1 - REREAD NEXT REVERSE, IE. SPACE FWD, READ REVERSE

                125401          RNF==   ACK.C!BRF.C!OPP.C!MOD.C1!MOD.C0!CMD.C0
                                        ;READ REV RETRY2 - REREAD NEXT FORWARD, IE.READ FORWARD, SPACE REVERSE

                105001          RPF==   ACK.C!BRF.C!MOD.C1!CMD.C0
                                        ;READ FWD RETRY1 - REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, READ FORWARD

                125001          RPR==   ACK.C!BRF.C!OPP.C!MOD.C1!CMD.C0
                                        ;READ FWD RETRY2 - REREAD PREVIOUS REVERSE, IE. READ REVERSE, SPACE FORWARD

                105005          WRR==   ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.C0
                                                        ;WRITE RETRY

                102010          RWD==   ACK.C!MOD.C2!CMD.C3
                                                        ;REWIND COMMAND

                100012          MBR==   ACK.C!CMD.C3!CMD.C1
                                                        ;MESSAGE BUFFER RELEASE

                100011          WTM==   ACK.C!CMD.C3!CMD.C0
                                                        ;WRITE TAPE MARK.

                101011          WTR==   ACK.C!MOD.C1!CMD.C3!CMD.C0
                                                        ;WRITE TAPE MARK RETRY.

                105010          SFF==   ACK.C!BRF.C!MOD.C1!CMD.C3
                                                        ;SPACE FILE FORWARD

                105410          SFR==   ACK.C!BRF.C!MOD.C0!MOD.C1!CMD.C3
                                                        ;SPACE FILE REVERSE

                100017          GES==   ACK.C!CMD.C0!CMD.C1!CMD.C2!CMD.C3
                                                        ;GET EXTENDED STATUS

                100411          ERS==   ACK.C!MOD.C0!CMD.C3!CMD.C0
                                                        ;ERASE 3 INCHES OF TAPE

                100412          UNL==   ACK.C!MOD.C0!CMD.C3!CMD.C1
                                                        ;UNLOAD COMMAND

                101012          CLN==   ACK.C!MOD.C1!CMD.C3!CMD.C1
                                                        ;ERASE TAPE.

                140004          SCH==   ACK.C!CVC.C!CMD.C2      ;SET DEVICE CHARACTERISTICS.

                140006          WSM==   ACK.C!CVC.C!CMD.C2!CMD.C1       ;WRITE SUB-SYS MEM
```

```
                        100006                  DIA==   ACK.C!CMD.C2!CMD.C1     ;DIAGNOSTICS.

                        000040                  JMP==   JMP.C                   ;JUMP TO 'N''TH COMMAND

                        000020                  DLY==   DLY.C                   ;DELAY 'N'' MS.

                        177777                  END==   177777                  ;END OF COMMAND SEQUENCES

                                                .SBTTL  GLOBAL DATA SECTION
                                                ;++
                                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                                ; IN MOPE THAN ONE TEST.
                                                ;--



                                                ;       COMMAND PACKET.

                        002330                  .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.
002330  000000          CMDPKT:: 0                              ;1ST WORD IS TS05 COMMAND.
002332  000000                   0                              ;2ND WORD IS THE BUFFER LOW ADDRESS.
002334  000000                   0                              ;3RD WORD IS THE BUFFER HIGH ADDRESS.
002336  000000                   0                              ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.


                                                ;       GET STATUS COMMAND PACKET.

                        002340                  .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.
002340  100017          GSCPK:: .WORD   GES


                                                ;       MESSAGE BUFFER RELEASE COMMAND PACKET.

                        002344                  .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.

002344  100012          BRCPK:: .WORD   MBR


                                                ;       REWIND COMMAND PACKET (USED IN ERROR RECOVERY ONLY)

                        002350                  .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.

002350  102010          RWCPK:: .WORD   RWD
002352  000001                  .WORD   1


                                                ;       WORK AREA FOR ANALYSIS OF MESSAGE PACKET CONTENTS.

002354                  MSGPKT:: .BLKW  8.              ;1ST WORD:: MESSAGE TYPE.
                                                        ;2ND WORD:: DATA FIELD LENGTH.
                                                        ;3RD WORD:: RESIDUAL FRAME COUNT.
                                                        ;4TH WORD:: XSTAT0
                                                        ;5TH WORD:: XSTAT1
                                                        ;6TH WORD:: XSTAT2
                                                        ;7TH WORD:: XSTAT3
```

```
                                                        ;8TH WORD:: XSTAT4
                        ;       MESSAGE PACKETS.

002374                  MSGPK0:: .BLKW  8.              ;MESSAGE PACKET FOR DEVICE #0
002414                  MSGPK1:: .BLKW  8.              ;MESSAGE PACKET FOR DEVICE #1
002434                  MSGPK2:: .BLKW  8.              ;MESSAGE PACKET FOR DEVICE #2
002454                  MSGPK3:: .BLKW  8.              ;MESSAGE PACKET FOR DEVICE #3

                        ;       SET CHARACTERISTIC BLOCK.

002474  002374          SCHBK:: MSGPK0                  ;1ST WORD:: MSGPKT ADDR LO(SET UP BY EXCUTE ROUTINE).
002476  000000                  0                       ;2ND WORD:: MSGPKT ADDR HI.
002500  000020                  MSGCNT                  ;3RD WORD:: MSG BUFFER LENGTH (BYTES)
002502  000040                  CH.EAI                  ;4TH WORD:: CHARACTERISTICS WORD(SET BY SETUP ROUTINE).
002504  000000                  0                       ;5TH WORD:: HSP & BUFFER CONTROL ON EXT'D FEATURES

                        ;       WRITE SUB-SYSTEM MEMORY CHARACTERISTIC BLOCK.

002506  000000          WSMBK:: 0                       ;1ST WORD:: SEL 0
002510  000000                  0                       ;2ND WORD:: SEL 2
002512  000000                  0                       ;3RD WORD:: SEL 4

                        ;       TS05 REGISTER ADDRESSES.

002514                  TSDB:: .BLKW    4               ;TS05 DATA BUFFER ADDRESSES.
002524                  TSSR:: .BLKW    4               ;TS05 STATUS REGISTER ADDRESSES.
002534                  TSVCT:: .BLKW   4               ;TS05 VECTOR ADDRESSES.
        002514          TSBA==TSDB                      ;DATA BUFFER ADDRESS REGISTER.


                        ;       ADDRESSES OF MESSAGE PACKETS.

002544  002374          MSGPKA:: MSGPK0                 ;DEVICE 0.
002546  002414                   MSGPK1                 ;DEVICE 1.
002550  002434                   MSGPK2                 ;DEVICE 2.
002552  002454                   MSGPK3                 ;DEVICE 3.

                        ;       ADDRESSES OF INTERRUPT HANDLING ROUTINES.

002554  010034          TS5INT:: TS5IN0                 ;DEVICE 0.
002556  010042                   TS5IN1                 ;DEVICE 1.
002560  010050                   TS5IN2                 ;DEVICE 2.
002562  010056                   TS5IN3                 ;DEVICE 3.

                        ;       TS05 CODE LEVELS, WILL BE STORED AFTER SCH CMD IN BASIC FUNCTION TEST

002564  000000          TS5CL:: 0                       ;DEVICE 0
002566  000000                  0                       ;DEVICE 1
002570  000000                  0                       ;DEVICE 2
002572  000000                  0                       ;DEVICE 3

                        ;       TS05 EXT. FEA & BUF. ENA SW'S, WILL BE STORED AFTER SCH CMD IN BASIC FUNCTION TEST

002574  000000          TS5SW:: 0                       ;DEVICE 0
002576  000000                  0                       ;DEVICE 1
002600  000000                  0                       ;DEVICE 2
```

```
538 002602  000000                        0                       ;DEVICE 3
539
540                                 ;       UNIT NUMBERS OF ALL DEVICES BEING TESTED(1-4).
541                                 ;       WHEN DEVICE IS NOT IN USE, IT,S LOCATION WILL = -3.
542                                 ;       R5 WILL ALWAYS CONTAIN THE PRESENT LOGICAL UNIT NUMBER X 2.
543
544 002604  177774                  DEVTBL:: .WORD  NINUSE
545 002606  177774                           .WORD  NINUSE
546 002610  177774                           .WORD  NINUSE
547 002612  177774                           .WORD  NINUSE
548 002614  177777                           .WORD  END
549
550
551                                 ;       BAD TAPE TABLE POINTER: USED BY WRITE RETRY ROUTINE
552                                 ;       "WRTY" TO LOG BAD TAPE SPOTS ON UNITS UNDER TEST
553
554 002616  003046                  BTADDR:: BT0
555 002620  003120                            BT1
556 002622  003172                            BT2
557 002624  003244                            BT3
558                                 ;       COUNT R AREA.
559
560         002626                  CNTBGN=.
561 002626                          WRBC:: .BLKW    20              ;BYTES WRITTEN.
562 002666                          RRBC:: .BLKW    20              ;BYTES READ REV.
563 002726                          RFBC:: .BLKW    20              ;BYTES READ FWD.
564 002766                          WRREC:: .BLKW   4               ;RECOVERABLE WRITE ERRORS.
565 002776                          WRUNR:: .BLKW   4               ;UNRECOVERABLE WRITE ERRORS.
566 003006                          RRREC:: .BLKW   4               ;RECOVERABLE READ REV ERRORS.
567 003016                          RRUNR:: .BLKW   4               ;UNRECOVERABLE READ REV ERRORS.
568 003026                          RFREC:: .BLKW   4               ;RECOVERABLE READ FWDERRORS.
569 003036                          RFUNR:: .BLKW   4               ;UNRECOVERABLE READ FWD ERRORS.
570 003046                          BT0::   .BLKW   21.             ;UNIT 0 BAT TAPE SPOTS LOG
571 003120                          BT1::   .BLKW   21.             ;UNIT 1 BAT TAPE SPOTS LOG
572 003172                          BT2::   .BLKW   21.             ;UNIT 2 BAT TAPE SPOTS LOG
573 003244                          BT3::   .BLKW   21.             ;UNIT 3 BAT TAPE SPOTS LOG
574 003316                          WRTYCT:: .BLKW  4               ;WRITE RETRY COUNTER
575 003326                          PASCNT:: .BLKW  4               ;PASS COUNT.
576 003336                          SCCNT:: .BLKW   4               ;SPECIAL CONDITION COUNT.
577 003346                          VFYCNT:: .BLKW  4               ;COUNT OF TS05 DATA COMPARE ERRORS.
578 003356                          HRDCNT:: .BLKW  4               ;COUNT OF HARD ERRORS.
579 003366                          FTLCNT:: .BLKW  4               ;COUNT OF FATAL ERRORS.
580         003376                  CNTEND=.                        ;END OF STATICTICAL COUNTERS.
581 003376                          RECCNT:: .BLKW  4               ;NUMBER OF RECORDS FROM BOT: CLEARED  ON REWIND
582                                                                 ;AND WHEN RESTARTING OR CONTINUING TEST 2.
583         000550                  CNTLEN==CNTEND-CNTBGN           ;LENGTH OF STATISTICAL COUNTER AREA.
584
585
586                                 ;       THE FOLLOWING ARE THE DEFINITIONS OF VARIABLES
587                                 ;       USED BY THE PROGRAM.
588
589 003406  000000                  DATAWT:: .WORD  0               ;WRITE BUFFER ADDRESS.
590         003406                  DIABLK==DATAWT                  ;WRITE BUFFER ALSO USED FOR DIAG CMD.
591 003410  000000                  DATARD:: .WORD  0               ;READ BUFFER ADDRESS.
592 003412  000000                  NCNT:: .WORD    0               ;STORAGE FOR VALUE OF N.
593 003414  000000                  NCNT1:: .WORD   0               ;TEMP STORAGE FOR VALUE OF N.
594 003416  000000                  BRFCNT:: .WORD  0               ;STORAGE FOR BPCR VALUE.
```

```
                                CMDWRD:: .WORD  END             ;CONTAINS COMMAND WORD BEING EXECUTED PRESENTLY.
                                CMDSAV:: .WORD  END             ;SAVE LOCATION FOR CMD WORD DURING ERROR RECOVERY
                                PCMDWD:: .WORD  END             ;CONTAINS PREVOUS COMMAND WORD.
                                CMDLG:: .WORD   0               ;CURRENT COMMAND LOGGING CODE.
                                LENMSK:: .WORD  0               ;RANDOM WRITE LENGTH MASK, TO BE SET UP BY TESTS
                                RANB:: .WORD    153624          ;RANDOM # GENERATOR BASE.
                                RANS:: .WORD    32561           ;RANDOM # SAVE LOCATION.
                                TIME1:: .WORD   0               ;TIME COUNT 1.
                                TIME2:: .WORD   0               ;TIME COUNT 2.
                                JLOOP:: .WORD   0               ;JMP COMMAND LOOP COUNT.
                                JLOC::  .WORD   0               ;JMP COMMAND LOCATION COUNT.
                                PATERN:: .WORD  0               ;PATTERN SELECT CODE.
                                CTCC:: .WORD    0               ;CURRENT TERMINATION CLASS CODE.
                                R5SAVE:: .WORD  0               ;LOCATION FOR SAVING CURRENT DEVICE POINTER.
                                TSSREG:: .WORD  0               ;CURRENT STATUS REGISTER.
                                WTMFLG:: .WORD  0               ;WRITE TAPE MARK FLAG

                                ;       ERROR FLAG AREA, THESE FLAGS ARE CLEARED DURING INITIALIZATION AND
                                ;       AFTER EACH COMMAND IS COMPLETED.

                        003460  BGNFLG=.
                        000000  RETRYC:: .WORD  0               ;# OF RECOVERY ATTEMPTS EXECUTED.
                           000  RPTCNT:: .BYTE  0               ;WRITE REPEAT ON SAME SPOT CNTR: 4 PER WRITE RETRY
                           000  WRTYFG:: .BYTE  0               ;WRITE RETRY ON SAME SPOT IN PROGRESS FLAG
                           000  WRTYER:: .BYTE  0               ;WRITE RETRY ON SAME SPOT ERROR FLAG
                           000  RECLOG:: .BYTE  0               ;RECORD COUNT HAS BEEN UPDATED FOR THIS RECORD.
                           000  ERLOG:: .BYTE   0               ;DATA BYTES AND ERRORS HAVE BEEN LOGGED FOR THIS RECORD.
                           000  RWERR:: .BYTE   0               ;READ/WRITE ERROR HAS OCCURED.
                           000  UNREC:: .BYTE   0               ;UNRECOVERABLE ERROR HAS OCCURED.
                           000  ERRREC:: .BYTE  0               ;ERROR RECOVERY MODE.
                                .EVEN
                        003472  ENDERF=.

                                ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.

                                INTFLG:: .BLKW  4               ;INTERRUPT OCCURRED FLAGS FOR EACH DEVICE.
                                EOTFLG:: .BLKW  4               ;EOT/BOT FLAGS FOR EACH DEVICE (XSTAT0).
                        000000  BTPT::   .WORD  0               ;BAD TAPE SPOT POINTER TO BT0-BT3 VIA BTADDR
                           000  EXPBOT:: .BYTE  0               ;BOT IS EXPECTED, DO NOT ABORT ON BOT/FUNC RTI.
                           000  RANDOM:: .BYTE  0               ;RANDOM EVERYTHING FLAG.
                           000  VFYFLG:: .BYTE  0               ;SET DURING WRITE/VERIFY COMMAND.
                           000  RPTFLG:: .BYTE  0               ;PERFORMANCE REPORT HAS BEEN REQUESTED.
                           000  SWBFLG:: .BYTE  0               ;ENABLES SWAP BYTE FUNCTION WHEN NOT EQUAL TO ZERO.
                           000  IRE::    .BYTE  0               ;INHIBIT RESIDUAL FRAME COUNT ERROR REPORT.
                           000  DROPED:: .BYTE  0               ;CURRENT UNIT HAS BEEN DROPPED
                           000  T1SWB::  .BYTE  0               ;TEST1 SWAP BYTES FLAG
                           000  ALLEOT:: .BYTE  0               ;ALL UNITS @ EOT FLAG
                           000  ERSFLG:: .BYTE  0               ;ERASE FLAG:  DO ERASE AFTER A SPACE REV TO DELETE
                                                                ;BADLY WRITTEN RECORD.  1 TO 4 ERASES LEAVING
                                                                ;A 3 TO 12 INCH GAP MAY RESULT.
                                .EVEN
                        003526  ENDFLG=.

                                ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED ONLY AFTER BEING CHECKED.

                           000  STAFLG:: .BYTE  0               ;START FLAG - SET BY INIT CODE IF STARTING.
```

```
     652 003527     000                PWRFLG:: .BYTE  0               ;POWER FAILURE FLAG - SET ONLY DURING INIT.
     653 003530     000                TRAPD4:: .BYTE  0               ;TRAPED AT 4 FLAG
     654 003531     000                MISCFG:: .BYTE  0               ;MISCELLANEOUS FLAG
     655 003532  000000                TSUNT:: .WORD   0               ;NUMBER OF THE UNIT UNDER TEST PLUS HSSP&BUF
     656 003534  000000                TSNP::  .WORD   0               ;FOR PRINT OUT UNIT # ONLY
     657
     658                               ;       OPERATOR FLAG SETTINGS PASSED BY DIAG. SUPERVISOR IN A 16 BIT WORD
     659                               ;       SEE GLOBAL EQUATES SECTION FOR FLAG BIT LIST
     660
     661 003536  000000                OPFLAG:: .WORD  0       ;READ ONLY OPERATOR FLAG WORD
     662                                       .EVEN
     663
     664                                       ;THE FOLLOWING IS THE COMMAND SEQUENCE TABLE.  THE TABLE
     665                                       ;HAS DEFAULT VALUES AT PROGRAM LOAD AS SHOWN.  THESE VALUES
     666                                       ;CAN BE UPDATED BY A TEST OR BY OPERATOR INPUT.
     667
     668 003540  140004                CMDSEQ:: .WORD  SCH             ;SET CHARACTERISTICS.
     669 003542  000040                         .WORD  CH.EAI
     670 003544  000001                         .WORD  1
     671 003546  000000                         .WORD  0
     672 003550  102010                CMDSE2:: .WORD  RWD             ;REWIND.
     673 003552  000001                         .WORD  1               ;BYTE COUNT.
     674 003554  000001                         .WORD  1               ;ONCE.
     675 003556  000007                         .WORD  RANP            ;PATTERN.
     676 003560  104005                         .WORD  WRT             ;WRITE.
     677 003562  004000                         .WORD  DATCNT          ;MAX BUFFER LENGTH.
     678 003564  076400                         .WORD  32000.          ;32,000 RECORDS.
     679 003566  000007                         .WORD  RANP            ;RANDOM PATTERN.
     680 003570  104401                         .WORD  RDR             ;READ REV.
     681 003572  004000                         .WORD  DATCNT          ;MAX BUFFER LENGTH.
     682 003574  076400                         .WORD  32000.          ;32,000 RECORDS
     683 003576  000007                         .WORD  RANP            ;RANDOM PATTERN.
     684 003600  104001                         .WORD  RDF             ;READ FWD.
     685 003602  004000                         .WORD  DATCNT          ;MAX BUFFER LENGTH.
     686 003604  076400                         .WORD  32000.          ;32,000 RECORDS.
     687 003606  000007                         .WORD  RANP            ;RANDOM PATTERN.
     688 003610  102010                         .WORD  RWD             ;REWIND.
     689 003612  000001                         .WORD  1               ;BYTE COUNT.
     690 003614  000001                         .WORD  1               ;ONCE.
     691 003616  000007                         .WORD  RANP            ;PATTERN.
     692 003620                                 .BLKW  40.             ;EXTENSTION TO DOUBLE BUFFER SIZE
     693 003740  177777                SEQEND:: .WORD  END             ;SOFT END OF SEQUENCE TABLE.
     694 003742  177777                         .WORD  END
     695 003744  177777                         .WORD  END
     696 003746  177777                         .WORD  END
     697 003750  177777                         .WORD  END             ;HARD END OF SEQUENCE TABLE.
     698                                       ;THE FOLLOWING IS THE TS05 COMMAND TABLE
     699
     700 003752  100013                CMDTBL:: .WORD  DRI             ;DRIVE INIT.
     701 003754  104001                         .WORD  RDF             ;READ FORWARD.
     702 003756  104401                         .WORD  RDR             ;READ REVERSE.
     703 003760  104005                         .WORD  WRT             ;WRITE
     704 003762  104105                         .WORD  WTV             ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND
     705                                                               ;CHECK DATA ON ALL RECORDS, RDF AND
     706                                                               ;CHECK DATA ON ALL RECORDS.)
     707 003764  104010                         .WORD  SRF             ;SPACE 'N' RECORDS FORWARD.
     708 003766  104410                         .WORD  SRR             ;SPACE 'N' RECORDS REVERSE.
```

```
                                        .WORD   RNR             ;READ NEXT REVERSE. I.E., SPACE FWD, READ REVERSE.
                                        .WORD   RNF             ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
                                        .WORD   RPF             ;READ PREVIOUS FORWARD. I.E., SPACE REVERSE, READ FORWARD
                                        .WORD   RPR             ;READ PREVIOUS REVERSE. I.E., READ REVERSE, SPACE FORWARD
                                        .WORD   WRR             ;WRITE RETRY.
                                        .WORD   RWD             ;REWIND.
                                        .WORD   MBR             ;MESSAGE BUFFER RELEASE
                                        .WORD   WTM             ;WRITE TAPE MARK
                                        .WORD   WTR             ;WRITE TAPE MARK RETRY.
                                        .WORD   SFF             ;SPACE 'N' FILES FORWARD.
                                        .WORD   SFR             ;SPACE 'N' FILES REVERSE.
                                        .WORD   GES             ;GET EXTENDED STATUS.
                                        .WORD   ERS             ;ERASE 3 INCHES OF TAPE.
                                        .WORD   UNL             ;REWIND AND UNLOAD.
                                        .WORD   CLN             ;CLEAR TAPE.
                                        .WORD   SCH             ;SET CHARACTERISTICS.
                                        .WORD   DIA             ;DIAGNOSTIC COMMAND.
                                        .WORD   JMP             ;JUMP TO THE NTH COMMAND IN THE SEQUENCE.
                                        .WORD   DLY             ;DELAY 'N' MS.
                                        .WORD   END             ;END OF COMMAND TABLE

                                ;       THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.

                        104     122     111 CMDASC:: .ASCII /DRI/           ;DRIVE INIT.
                        122     104     106         .ASCII  /RDF/           ;READ FORWARD.
                        122     104     122         .ASCII  /RDR/           ;READ REVERSE.
                        127     122     124         .ASCII  /WRT/           ;WRITE
                        127     124     126         .ASCII  /WTV/           ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND CHECK DATA
                                                                            ;ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECORDS.)
                        123     122     106         .ASCII  /SRF/           ;SPACE 'N' RECORDS FORWARD.
                        123     122     122         .ASCII  /SRR/           ;SPACE 'N'  RECORDS REVERSE.
                        122     116     122         .ASCII  /RNR/           ;READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE.
                        122     116     106         .ASCII  /RNF/           ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
                        122     120     106         .ASCII  /RPF/           ;READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ FORWARD
                        122     120     122         .ASCII  /RPR/           ;READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE FORWARD
                        127     122     122         .ASCII  /WRR/           ;WRITE RETRY.
                        122     127     104         .ASCII  /RWD/           ;REWIND.
                        115     102     122         .ASCII  /MBR/           ;MESSAGE BUFFER RELEASE
                        127     124     115         .ASCII  /WTM/           ;WRITE TAPE MARK
                        127     124     122         .ASCII  /WTR/           ;WRITE TAPE MARK RETRY.
                        123     106     106         .ASCII  /SFF/           ;SPACE 'N' FILES FORWARD.
                        123     106     122         .ASCII  /SFR/           ;SPACE 'N' FILES REVERSE.
                        107     105     123         .ASCII  /GES/           ;GET EXTENDED STATUS.
                        105     122     123         .ASCII  /ERS/           ;ERASE 3 INCHES OF TAPE.
                        125     116     114         .ASCII  /UNL/           ;REWIND AND UNLOAD.
                        103     114     116         .ASCII  /CLN/           ;CLEAN TAPE.
                        123     103     110         .ASCII  /SCH/           ;SET CHARACTERISTICS.  WHERE BRF=200, 40, 20, 0.
                                                                            ;SEE TSV05/TS05 PROGRAMMING SPECIFICATION FOR DESCRIPTION.
                        104     111     101         .ASCII  /DIA/           ;DIAGNOSTICS.  SEE TSV05/TS05 PROGRAMMING SPECIFICATION
                                                                            ;FOR DESCRIPTION.  ODT MUST BE USED TO LOAD DIAGNOSTIC DATA
                                                                            ;INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
                        112     115     120         .ASCII  /JMP/           ;JUMP TO THE NTH COMMAND IN THE COMMAND
                                                                            ;SEQUENCE TABLE, WHERE N IS DEFINED IN
                                                                            ;THE # OF OPERATIONS.
                        104     114     131         .ASCII  /DLY/           ;DELAY 'N' MS, WHERE N IS DEFINED IN
                                                                            ;THE # OF OPERATIONS.
                        105     116     104         .ASCII  /END/           ;END OF COMMAND SEQUENCE.
```

```
                                        .EVEN


                                .SBTTL  GLOBAL TEXT SECTION

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


                                ;
                                ; FORMAT STATEMENTS USED IN PRINT CALLS
                                ;

                                        .NLIST  BEX

004162  045  116  045  CODELM:: .ASCIZ /%N%AUNIT %D1%A TS05 CODE LEVEL %O3%N%N/
004231  045  116  045  SWSET::  .ASCIZ  /%N%AUNIT %D1%A TS05 SWITCH SETTINGS %O3%N%N/
                                .EVEN
004306  130  130  130  HALTM::  .ASCIZ  /XXX CMD - TYPE <CR> TO CONTINUE/
004346  103  115  104  CMDPKM:: .ASCIZ /CMD PACKET ADR NOT ON MODULO 4 BOUNDARY: RELOAD!/
                                .EVEN
004430  104  101  124  WTVERM:: .ASCIZ /DATA COMPARE ERROR/
004453  116  117  040  TOERM::  .ASCIZ  /NO TSV05 RESPONSE/
004475  125  116  104  SCERM::  .ASCIZ  /UNDEFINED SPEC COND/
005521  122  106  103  RFCERM:: .ASCIZ /RFC NON ZERO/
005536  124  123  126  NSSRM::  .ASCIZ  /TSV05 NOT READY/
005556  122  105  124  RLEXM::  .ASCIZ  /RETRY LIMIT EXCEEDED/
005603  104  122  111  ATTNM::  .ASCIZ  /DRIVE OFF LINE/
005622  106  125  116  FUNRM::  .ASCIZ  /FUNCTION REJECT/
005642  106  101  124  FATSM::  .ASCIZ  /FATAL SUBSYSTEM ERROR/
005670  116  117  040  NOINTM:: .ASCIZ /NO INTERRUPT/
005705  124  101  120  TSAM::   .ASCIZ  /TAPE STATUS ALERT/
005727  124  117  117  TOOMM::  .ASCIZ  /TOO MANY INTERRUPTS/
005753  103  101  120  RNYM::   .ASCIZ  /CAPSTAN RUNAWAY-GET STATUS RESULTS:/
006017  122  105  103  RERM::   .ASCIZ  /RECOVERABLE ERROR/
006041  125  116  122  URERM::  .ASCIZ  /UNRECOVERABLE ERROR/
006065  045  116  045  DROPDM::  .ASCIZ /%N%ADROPPED UNIT %D1%N/
006114  045  116  045  AUDRPM::  .ASCIZ /%N%AALL UNITS DROPPED%N%N/
006146  045  116  045  AUDRUN::  .ASCIZ /%N%ADIAGNOSTIC ONLY SUPPORTS ONE CONTROLLER%N%N/
006226  045  116  045  DTAER2::  .ASCIZ '%N%ABYTE:%D4%S2%AWAS:%B8%S2%AS/B:%B8%N'
006275  045  104  064  DTAER3::  .ASCIZ '%D4%A BYTES IN ERROR OUT OF %D4%N'
006337  045  101  116  DTAER4::  .ASCIZ /%ANO DATA READ%N/
006360  045  101  122  DTAER5::  .ASCIZ /%ARECORD TOO LONG: >%O4%A BYTES%N/
006422  045  101  122  NURTY1::  .ASCIZ /%ARECOVERED ON RETRY #%D2%N/
006456  045  101  104  OFLINM::  .ASCIZ /%ADRIVE %D1%A OFF LINE%N/
006507  045  101  107  GETSTM::  .ASCIZ /%AGET STATUS CMD RESULTS:%N/
006543  045  116  045  NODEV::   .ASCII  /%N%ABUS TRAP AT %O6%N/
006570  045  101  111            .ASCIZ  /%AINTERFACE BAD OR TSDB NOT SET TO ABOVE ADDRESS%N/
006653  040  052  052  UNIWLK:   .ASCIZ  / *****TAPE IS WRITE-LOCKED AND WILL CAUSE ERRORS*****/
006741  045  116  000  CRLF::    .ASCIZ  /%N/
006744  045  116  045  CRLFSP::  .ASCIZ /%N%S7/
                                .LIST   BEX
                                .EVEN
```

```
                                .SBTTL  GLOBAL ERROR REPORT SECTION

                                ;++
                                ; 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..
                                ;--


                                        BGNMSG  DTAERM
                                DTAERM::
                                DATERM::PRINTB  #STAER1,TSNP,PASCNT(R5),RECCNT(R5)
005752  016546  003376                                                  MOV     RECCNT(R5),-(SP)
005756  016546  003326                                                  MOV     PASCNT(R5),-(SP)
005762  013746  003534                                                  MOV     TSNP,-(SP)
005766  012746  006436                                                  MOV     #STAER1,-(SP)
005772  012746  000004                                                  MOV     #4,-(SP)
005776  010600                                                          MOV     SP,R0
006000  104414                                                          TRAP    C$PNTB
006002  062706  000012                                                  ADD     #12,SP

                                        PRINTB  #STAER7
006006  012746  006530                                                  MOV     #STAER7,-(SP)
006012  012746  000001                                                  MOV     #1,-(SP)
006016  010600                                                          MOV     SP,R0
006020  104414                                                          TRAP    C$PNTB
006022  062706  000004                                                  ADD     #4,SP

                                        MOV     R2,RECRED               ;SAVE R2
                                        MOV     R3,TIME1                ;SAVE R3
                                        MOV     R4,TIME2                ;SAVE R4
                                        JSR     PC,RECTAP                       ;RETRIEVE RECORD READ
                                        MOV     RECRED,R2               ;RESTORE R2
                                        MOV     R3,RECRED               ;SAVE RECORD READ
                                        MOV     TIME1,R3                ;RESTORE R3
                                        MOV     TIME2,R4                ;RESTORE R4
                                        PRINTB  #STAER6,RECRED          ;PRINT RECORD READ
006066  013746  007066                                                  MOV     RECRED,-(SP)
006072  012746  006562                                                  MOV     #STAER6,-(SP)
006076  012746  000002                                                  MOV     #2,-(SP)
006102  010600                                                          MOV     SP,R0
006104  104414                                                          TRAP    C$PNTB
006106  062706  000006                                                  ADD     #6,SP

                                        EXIT    MSG
006112  000167                                                          .WORD   J$JMP
006114  000000                                                          .WORD   L10002-2-.

                                        .EVEN

                                        ENDMSG
                                L10002:
006116  104423                                                          TRAP    C$MSG

                                        BGNMSG  STAERM
                                STAERM::
                                STAERM::PRINTB  #STAER1,TSNP,PASCNT(R5),RECCNT(R5)
006120  016546  003376                                                  MOV     RECCNT(R5),-(SP)
006124  016546  003326                                                  MOV     PASCNT(R5),-(SP)
006130  013746  003534                                                  MOV     TSNP,-(SP)
006134  012746  006436                                                  MOV     #STAER1,-(SP)
```

```
     006140  012746  000004                                                     MOV     #4,-(SP)
     006144  010600                                                             MOV     SP,R0
     006146  104414                                                             TRAP    C$PNTB
     006150  062706  000012                                                     ADD     #12,SP
862  006154                          PRINTB  #STAER7
     006154  012746  006530                                                     MOV     #STAER7,-(SP)
     006160  012746  000001                                                     MOV     #1,-(SP)
     006164  010600                                                             MOV     SP,R0
     006166  104414                                                             TRAP    C$PNTB
     006170  062706  000004                                                     ADD     #4,SP
863  006174  013702  002330          MOV     CMDPKT,R2
864  006200  042702  177740          BIC     #177740,R2
865  006204  005302                  DEC     R2                      ;IF CMD IS A READ
866  006206  005702                  TST     R2
867  006210  001016                  BNE     50000$
868  006212  004737  010064          JSR     PC,RECTAP                       ;THEN RETRIEVE
869  006216  010337  010064          MOV     R3,RECTAP               ;AND
870  006222                          PRINTB  #STAER6,RECRED          ;TYPE RECORD READ
     006222  013746  007066                                                     MOV     RECRED,-(SP)
     006226  012746  006562                                                     MOV     #STAER6,-(SP)
     006232  012746  000002                                                     MOV     #2,-(SP)
     006236  010600                                                             MOV     SP,R0
     006240  104414                                                             TRAP    C$PNTB
     006242  062706  000006                                                     ADD     #6,SP
871  006246                 50000$:  PRINTX  #STAER2
     006246  012746  006616                                                     MOV     #STAER2,-(SP)
     006252  012746  000001                                                     MOV     #1,-(SP)
     006256  010600                                                             MOV     SP,R0
     006260  104415                                                             TRAP    C$PNTX
     006262  062706  000004                                                     ADD     #4,SP
872  006266                          PRINTX  #STAER3,CMDPKT,@TSDB(R5),MSGPKT+MS.RFC,TSSREG,CTCC
     006266  013746  003450                                                     MOV     CTCC,-(SP)
     006272  013746  003454                                                     MOV     TSSREG,-(SP)
     006276  013746  002360                                                     MOV     MSGPKT+MS.RFC,-(SP)
     006302  017546  002514                                                     MOV     @TSDB(R5),-(SP)
     006306  013746  002330                                                     MOV     CMDPKT,-(SP)
     006312  012746  006675                                                     MOV     #STAER3,-(SP)
     006316  012746  000006                                                     MOV     #6,-(SP)
     006322  010600                                                             MOV     SP,R0
     006324  104415                                                             TRAP    C$PNTX
     006326  062706  000016                                                     ADD     #16,SP
873  006332                          PRINTX  #STAER4,CMDPKT+2,CMDPKT+4,CMDPKT+6
     006332  013746  002336                                                     MOV     CMDPKT+6,-(SP)
     006336  013746  002334                                                     MOV     CMDPKT+4,-(SP)
     006342  013746  002332                                                     MOV     CMDPKT+2,-(SP)
     006346  012746  006733                                                     MOV     #STAER4,-(SP)
     006352  012746  000004                                                     MOV     #4,-(SP)
     006356  010600                                                             MOV     SP,R0
     006360  104415                                                             TRAP    C$PNTX
     006362  062706  000012                                                     ADD     #12,SP
874  006366                          PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3,MSGPKT+MS.XS
     006366  013746  002372                                                     MOV     MSGPKT+MS.XS4,-(SP)
     006372  013746  002370                                                     MOV     MSGPKT+MS.XS3,-(SP)
     006376  013746  002366                                                     MOV     MSGPKT+MS.XS2,-(SP)
     006402  013746  002364                                                     MOV     MSGPKT+MS.XS1,-(SP)
     006406  013746  002362                                                     MOV     MSGPKT+MS.XS0,-(SP)
     006412  012746  006753                                                     MOV     #STAER5,-(SP)
```

```
        006416  012746  000006                                                  MOV     #6,-(SP)
        006422  010600                                                          MOV     SP,R0
        006424  104415                                                          TRAP    C$PNTX
        006426  062706  000016                                                  ADD     #16,SP
    875 006432                          EXIT    MSG
        006432  000167                                                          .WORD   J$JMP
        006434  000432                                                          .WORD   L10003-2-.
    876
    877                                 .NLIST  BEX
    878 006436      045     101     130 STAER1: .ASCIZ  /%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
    879                                 .EVEN
    880 006530      045     101     120 STAER7: .ASCIZ  /%APREVIOUS CMD WAS  XXX  /
    881 006562      045     123     061 STAER6: .ASCIZ  /%S11%A* RECORD READ:%D5%A */
    882 006616      045     116     045 STAER2: .ASCIZ  /%N%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/
    883 006675      045     117     066 STAER3: .ASCIZ  /%06%S2%06%S2%06%S2%06%S2%D1%N/
    884 006733      045     117     066 STAER4: .ASCII  /%06%N/
    885 006740      045     117     066         .ASCII  /%06%N/
    886 006745      045     117     066         .ASCIZ  /%06%N/
    887 006753      045     101     130 STAER5: .ASCII  /%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%S4%AXST4%N/
    888 007027      045     117     066         .ASCIZ  /%06%S2%06%S2%06%S2%06%S2%06%N/
    889                                 .LIST   BEX
    890                                 .EVEN
    891 007066  000000                  RECRED: .WORD   0                       ;RECORD READ FROM TAPE
    892
    893 007070                          ENDMSG
        007070                          L10003:
        007070  104423                                                          TRAP    C$MSG
    894
    895                                 .SBTTL  GLOBAL SUBROUTINES SECTION
    896
    897                                 ;++
    898                                 ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
    899                                 ; THAT ARE USED IN MORE THAN ONE TEST.
    900                                 ;--
    901
    902
    903
    904                                 ;+
    905                                 ;
    906                                 ;ROUTINE TO DO A SOFT INITIALIZE OF THE CONTROLLER
    907                                 ;BY WRITING INTO THE TSSR REGISTER. AFTER THE INIT,
    908                                 ;THE TSSR REGISTER IS TESTED FOR ERRORS. ANY ERRORS
    909                                 ;DETECTED SHOULD BE TREATED AS DEVICE FATAL ERRORS.
    910                                 ;
    911                                 ;INPUTS:
    912                                 ;
    913                                 ;       R5      CURRENT UNIT NUMBER
    914                                 ;
    915                                 ;
    916                                 ;OUTPUTS:
    917                                 ;
    918                                 ;       R0      CONTENTS OF TSSR, IF ERROR
    919                                 ;       CARRY   SET IF INIT WAS OKAY
    920                                 ;               CLEAR IF FATAL ERROR
    921                                 ;
    922                                 ;CALLING SEQUENCE:
    923                                 ;       JSR     PC,FIRSTU
```

```
                                ;       JSR     PC,SOFINIT
                                ;       BCS     CONTINUE
                                ;       ERRDF                   ;REPORT FATAL ERROR
                                ;
                                ;-

007072                          SOFINIT::
007072  012775  000000  002524          MOV     #0,@TSSR(R5)            ; (SAVREG) SAVE THE REGISTERS
007100  004737  012700                  JSR     PC,WSSR                 ; DO THE INIT.
007104  012703  000550                  MOV     #360.,R3                ;WAIT FOR UNIT TO BE READY
007110  004737  007204          2$:     JSR     PC,WAITF                ; WAIT FOR SSR
007114  103416                          BCS     3$
007116                          .       DELAY   250
007116  012727  000250                                                  MOV     #250.,(PC)+
007122  000000                                                          .WORD   0
007124  013727  002116                                                  MOV     L$DLY,(PC)+
007130  000000                                                          .WORD   0
007132  005367  177772                                                  DEC     -6(PC)
007136  001375                                                          BNE     .-4
007140  005367  177756                                                  DEC     -22(PC)
007144  001367                                                          BNE     .-20
007146  005303                          DEC     R3
007150  001357                          BNE     2$
007152  017500  002524          3$:     MOV     @TSSR(R5),R0            ;GET THE TSSR REGISTER
007156  010004                          MOV     R0,R4                   ;TSSR CONTENTS
007160  042704  176277                  BIC     #^C<TS.A17!TS.A16!TS.OFL>,R4
007164  052704  002200                  BIS     #TS.SSR!TS.NBA,R4       ;R4 HAS EXPECTED CONTENTS
007170  020400                          CMP     R4,R0                   ;ONLY EXPECTED BITS SET ?
007172  001402                          BEQ     5$                      ;BRANCH IF OKAY
007174  000241                          CLC                             ;CLEAR THE CARRY FOR ERROR
007176  000401                          BR      10$                     ;GO TO EXIT
007200  000261                  5$:     SEC                             ;SET THE CARRY BIT
007202  000207                  10$:    RTS     PC                      ;RETURN TO CALLER

                                ;
                                ; SUBROUTINE TO WAIT FOR THE SUBSYSTEM READY FLAG
                                ;
                                ;INPUTS:
                                ;
                                ;       R5      CURRENT UNIT NUMBER
                                ;
                                ;
                                ;OUTPUTS:
                                ;
                                ;       R0      CONTENTS OF LAST TSSR READ
                                ;       CARRY   SET - READY BIT SET
                                ;               CLR - TIMEOUT WAITING FOR READY
                                ;
007204                          WAITF:: BREAK                   ; DO A SUPVSR BREAK FIRST.
007204  104422                                                          TRAP    C$BRK
007206  012746  005670                  MOV     #3000.,-(SP)            ; 300 MSEC TIMER.
007212  017500  002524          2$:     MOV     @TSSR(R5),R0            ;READ THE TSSR REGISTER
007216  105700                          TSTB    R0                      ;TEST FOR READY BIT SET
007220  100420                          BMI     3$                      ; EXIT ON STOP FLAG.
007222                          .       DELAY   25                      ; WAIT
007222  012727  000025                                                  MOV     #25,(PC)+
```

```
007226  000000                                                                  .WORD   0
007230  013727  002116                                                          MOV     L$DLY,(PC)+
007234  000000                                                                  .WORD   0
007236  005367  177772                                                          DEC     -6(PC)
007242  001375                                                                  BNE     .-4
007244  005367  177756                                                          DEC     -22(PC)
007250  001367                                                                  BNE     .-20
971 007252  005316                      DEC     (SP)            ;REDUCE DELAY COUNT
972 007254  001356                      BNE     2$              ;RETRY UNTIL TIMER EXPIRES
973 007256  000241                      CLC                     ; C = 0, CONTROLLER STILL RUNNING...
974 007260  000401                      BR      4$              ;...OR HUNG-UP AFTER 300 MSEC.
975 007262  000261              3$:     SEC                     ; C = 1, CONTROLLER IS STOPPED.
976 007264  005326              4$:     DEC     (SP)+           ;RESTORE STACK WITHOUT CHANGING CARRY BIT
977 007266  000207                      RTS     PC
978
979
980
981                              ;+
982                              ;
983                              ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS COMMAND AND CHECK FEATURES
984                              ;
985                              ;INPUT:
986                              ;
987                              ;       R4      ADDRESS OF COMMAND PACKET
988                              ;       R5      CURRENT UNIT NUMBER
989                              ;       REQUIRES A CALL TO SOFINIT BE DONE PREVIOUSLY
990                              ;
991                              ;OUTPUT:
992                              ;
993                              ;       R0      TSSR CONTENTS
994                              ;       CARRY   SET - WRITE CHARACTERISTICS COMMAND OK
995                              ;               CLR - WRITE CHARACTERISTICS FAILED
996                              ;
997                              ;IMPLICIT OUTPUT:
998                              ;
999                              ;       SOFTWARE SWITCHES SET AS FOLLOWS:
1000                             ;               EXTFEA = EXTENDED FEATURES PRESENT
1001                             ;               BENBSW = BUFFER ENABLE SWITCH ON OR OFF
1002                             ;
1003                             ;
1004                             ;SIDE EFFECTS:
1005                             ;
1006                             ;
1007                             ;-
1008
1009 007270                      WRTCHK::
1010 007270  010475  002514      10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
1011 007274  004737  007204              JSR     PC,WAITF                ;WAIT FOR SSR
1012 007300  103401                      BCS     40$                     ;BR, IF SSR IS SET AND OK
1013 007302  000421                      BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
1014 007304  005724              40$:    TST     (R4)+                   ;STEP IT
1015 007306  011402                      MOV     (R4),R2                 ;POINT TO WRT CHARA DATA PACKET
1016 007310  011203                      MOV     (R2),R3                 ;GET ADDRESS OF MESSAGE BUFFER
1017 007312  032763  000200  000012      BIT     #X2.EFE,MS.XS2(R3)      ;EXTENDED FEATURES BIT SET?
1018 007320  001402                      BEQ     45$                     ;BR IF NO
1019 007322  005237  002322              INC     EXTFEA                  ;SET EXTENDED FEATURES SW SWITCH
1020 007326                      45$:
```

```
                                        BIT     #X2.BFE,MS.XS2(R3)      ;BUFFER ENABLE SWITCH SET
                                        BEQ     50$                     ;BR, IF SWITCH NOT SET
                                        INC     BENBSW                  ;SET SOFTWARE SWITCH FOR ENABLED
                                50$:
                                55$:    SEC                             ;SET CARRY NO TROUBLE
                                        BR      70$                     ;EXIT
                                60$:    CLC                             ;CARRY CLEAR = ERROR
                                70$:    MOV     @TSSR(R5),R0            ;RETURN TSSR CONTENTS
                                        RTS     PC                      ;RETURN

                                ;+
                                ;
                                ;ROUTINE TO CHECK WRITE LOCK CONDITION
                                ;
                                ;INPUT:
                                ;
                                ;       R4      ADDRESS OF COMMAND PACKET
                                ;       R5      CURRENT UNIT NUMBER
                                ;
                                ;-
                                WLKCHK::
                                10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
                                        JSR     PC,WAITF                ;WAIT FOR SSR
                                        BCS     40$                     ;BR, IF SSR IS SET AND OK
                                        BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
                                40$:    TST     (R4)+                   ;STEP IT
                                        MOV     (R4),R2                 ;POINT TO WRT CHARA DATA PACKET
                                        MOV     (R2),R3                 ;GET ADDRESS OF MESSAGE BUFFER
                                        BIT     #X0.WLK,MS.XS0(R3)      ;IS UNIT WRITE LOCKED?
                                        BEQ     55$                     ;NO,PROCEED WITH TESTING
                                        ERRHRD  1,UNIWLK                ;TAPE IS WRITE LOCKED
                                                                                TRAP    C$ERHRD
                                                                                .WORD   1
                                                                                .WORD   UNIWLK
                                                                                .WORD   0
                                        JSR     PC,DROPU                ;DROP IT
                                        BR      60$                     ;EXIT WITH CARRY=0
                                55$:    SEC                             ;SET CARRY NO TROUBLE
                                        BR      70$                     ;EXIT
                                60$:    CLC                             ;CARRY CLEAR = ERROR
                                70$:
                                        RTS     PC                      ;RETURN


                                ;+
                                ;
                                ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS COMMAND
                                ;
                                ;INPUT:
                                ;
                                ;       R4      ADDRESS OF COMMAND PACKET
                                ;       R5      CURRENT UNIT NUMBER
                                ;       REQUIRES A CALL TO SOFINIT BE DONE PREVIOUSLY
                                ;
                                ;OUTPUT:
                                ;
                                ;       R0      TSSR CONTENTS
```

```
                                ;       CARRY   SET - WRITE CHARACTERISTICS COMMAND OK
                                ;               CLR - WRITE CHARACTERISTICS FAILED
                                ;
                                ;IMPLICIT OUTPUT:
                                ;
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;
                                ;-

007436                          WRTCHR::
007436  010475  002514          10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
007442  004737  007204                  JSR     PC,WAITF                ;WAIT FOR SSR
007446  103401                          BCS     50$                     ;BR, IF SSR IS SET AND OK
007450  000402                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
007452                          50$:
007452  000261                          SEC                             ;SET CARRY NO TROUBLE
007454  000401                          BR      70$                     ;EXIT
007456  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
007460  017500  002524          70$:    MOV     @TSSR(R5),R0            ;RETURN TSSR CONTENTS
007464  000207                          RTS     PC                      ;RETURN


                                ;+
                                ;
                                ;ROUTINE TO DO SET UP OF RUNNING CONDITIONS
                                ;
                                ;INPUTS:
                                ;
                                ;       R5      CURRENT UNIT NUMBER
                                ;
                                ;
                                ;OUTPUTS:
                                ;
                                ;
                                ;CALLING SEQUENCE:
                                ;       JSR     PC,FIRSTU
                                ;       JSR     PC,SOFINIT
                                ;       BCS     CONTINUE
                                ;       ERRDF                   ;REPORT FATAL ERROR
                                ;       JSR     PC,MDSET
                                ;
                                ;-

007466                          MDSET:: BREAK                           ; DO A SUPVSR BREAK FIRST.
007466  104422                                                                  TRAP    C$BRK
007470  004737  007766                  JSR     PC,SETDEF               ;RESTORE DEFAULT
007474  004737  007356                  JSR     PC,WLKCHK               ;CHECK WRITE LOCK
007500  103416                          BCS     1$                      ;C=1 IS O.K.
007502                                  DELAY   1                       ;WAIT
007502  012727  000001                                                          MOV     #1,(PC)+
007506  000000                                                                  .WORD   0
007510  013727  002116                                                          MOV     L$DLY,(PC)+
007514  000000                                                                  .WORD   0
007516  005367  177772                                                          DEC     -6(PC)
```

```
        007522  001375                                                          BNE     .-4
        007524  005367  177756                                                  DEC     -22(PC)
        007530  001367                                                          BNE     .-20
   1125 007532                          BREAK                                  ;BREAK TO SUPER
        007532  104422                                                          TRAP    C$BRK
   1126 007534                          DOCLN                                  ;DO CLEAN AND ABORT
        007534  104444                                                          TRAP    C$DCLN
   1127 007536  005737  002312    1$:   TST     TS1MD                          ;RUN IN DEFAULT MODE?
   1128 007542  001064                BNE     10$                            ;YES,RETURN
   1129 007544  004737  007766        JSR     PC,SETDEF                      ;RESTORE DEFAULT
   1130 007550  004737  007270        JSR     PC,WRTCHK                      ;GO DO SWITCH CHECK
   1131 007554  005737  002320        TST     HSSW                           ;DO WE RUN AT 100IPS?
   1132 007560  001415                BEQ     3$                             ;NO
   1133 007562  052737  000040  003532 BIS     #EF.HSS,TSUNT                  ;YES,SET THE BIT
   1134 007570  005737  002322        TST     EXTFEA                         ;ARE WE SET?
   1135 007574  001002                BNE     2$                             ;YES
   1136 007576  004737  007724        JSR     PC,INVRT                       ;INVERT THE SWITCH
   1137 007602  004737  007766    2$: JSR     PC,SETDEF                      ;NOW SET THE MODES
   1138 007606  004737  007436        JSR     PC,WRTCHR                      ;DO IT
   1139 007612  000443                BR      11$
   1140 007614  005737  002316    3$: TST     WTBUF                          ;RUN WITH WRITE BUFFERING?
   1141 007620  001415                BEQ     5$                             ;NO
   1142 007622  052737  000030  003532 BIS     #EF.RWB,TSUNT                  ;YES SET THE BITS
   1143 007630  005737  002322        TST     EXTFEA                         ;ARE WE SET?
   1144 007634  001002                BNE     4$                             ;YES
   1145 007636  004737  007724        JSR     PC,INVRT                       ;INVERT THE SWITCH
   1146 007642  004737  007766    4$: JSR     PC,SETDEF                      ;NOW SET THE MODES
   1147 007646  004737  007436        JSR     PC,WRTCHR                      ;DO IT
   1148 007652  000423                BR      11$
   1149 007654  005737  002314    5$: TST     RDBUF                          ;RUN WITH READ BUFFERING?
   1150 007660  001415                BEQ     10$                            ;NO
   1151 007662  052737  000020  003532 BIS     #EF.RBO,TSUNT                  ;YES SET THE BITS
   1152 007670  005737  002322        TST     EXTFEA                         ;ARE WE SET?
   1153 007674  001002                BNE     6$                             ;YES
   1154 007676  004737  007724        JSR     PC,INVRT                       ;INVERT THE SWITCH
   1155 007702  004737  007766    6$: JSR     PC,SETDEF                      ;NOW SET THE MODES
   1156 007706  004737  007436        JSR     PC,WRTCHR                      ;DO IT
   1157 007712  000403                BR      11$
   1158
   1159 007714  013737  003532  002504 10$:  MOV     TSUNT,SCHBK+10           ;AND UNIT #
   1160
   1161 007722  000207            11$:  RTS     PC                             ;RETURN
   1162
   1163
   1164                                 ;
   1165                                 ; SUBROUTINE TO INVERT SENSE OF EXT'D FEATURES SWITCH
   1166                                 ;
   1167                                 ;INPUTS:
   1168                                 ;
   1169                                 ;
   1170                                 ;
   1171                                 ;OUTPUTS:
   1172                                 ;
   1173
   1174
   1175 007724                          INVRT::
   1176 007724  012737  140006  002330        MOV     #WSM,CMDPKT+CP.CMD       ;WRT SUB-SYS MEM
```

```
1177 007732  012737  002506  002332          MOV     #WSMBK,CMDPKT+CP.ADL    ;MSG BUF ADDR
1178 007740  012737  000006  002336          MOV     #6,CMDPKT+CP.CNT        ;BYTE COUNT
1179 007746  012737  100010  002506          MOV     #100010,WSMBK           ;INVERT THE SWITCH
1180 007754  012704  002330                  MOV     #CMDPKT,R4              ;
1181 007760  004737  007436                  JSR     PC,WRTCHR               ;DO IT
1182 007764  000207                          RTS     PC                      ;RETURN
1183
1184                                 ;
1185                                 ; SUBROUTINE TO SETUP DEFAULT SET CHAR CMD
1186                                 ;
1187                                 ;INPUTS:
1188                                 ;
1189                                 ;
1190                                 ;
1191                                 ;OUTPUTS:
1192                                 ;
1193                                 ;       R4      ADDRESS OF COMMAND PACKET
1194
1195 007766                          SETDEF::
1196 007766  012701  140004                  MOV     #SCH,R1                 ;WRITE CHAR CMD
1197 007772  010137  002330                  MOV     R1,CMDPKT+CP.CMD        ;SET UP COMMAND
1198 007776  012737  002474  002332          MOV     #SCHBK,CMDPKT+CP.ADL    ;SET UP ADR LO TO POINT TO MSG BUF(MSGPKO)
1199 010004  012737  000012  002336          MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
1200 010012  012737  000040  002502          MOV     #DFTSCH,SCHBK+6         ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
1201 010020  013737  003532  002504          MOV     TSUNT,SCHBK+10          ;UNIT #
1202 010026  012704  002330                  MOV     #CMDPKT,R4              ;ADDRESS OF CMD PACKET
1203 010032  000207                          RTS     PC                      ;RETURN
1204
1205
1206                                 ;       MODULES TO HANDLE TS05 INTERRUPTS.
1207
1208
1209 010034                                  BGNSRV  TS5IN0
     010034                          TS5IN0::
1210 010034  005237  003472                  INC     INTFLG                  ;SET INTERRUPT OCCURRED FLAG.
1211 010040                                  ENDSRV
     010040                          L10004:
     010040  000002                                                          RTI
1212
1213 010042                                  BGNSRV  TS5IN1
     010042                          TS5IN1::
1214 010042  005237  003474                  INC     INTFLG+2        ;SET INTERRUPT OCCURRED FLAG.
1215 010046                                  ENDSRV
     010046                          L10005:
     010046  000002                                                          RTI
1216
1217 010050                                  BGNSRV  TS5IN2
     010050                          TS5IN2::
1218 010050  005237  003476                  INC     INTFLG+4        ;SET INTERRUPT OCCURRED FLAG.
1219 010054                                  ENDSRV
     010054                          L10006:
     010054  000002                                                          RTI
1220
1221 010056                                  BGNSRV  TS5IN3
     010056                          TS5IN3::
1222 010056  005237  003500                  INC     INTFLG+6        ;SET INTERRUPT OCCURRED FLAG.
1223 010062                                  ENDSRV
```

```
 010062                                  L10007:
 010062  000002                                                                          RTI

                                         ;       SUBROUTINE TO RETRIEVE RECORD COUNT READ FROM TAPE FOR ERROR
                                         ;       PRINTS.
                                         ;       INPUTS:
                                         ;       OUTPUTS:  R3 = RECORD COUNT READ
                                         ;       REGISTERS:  R2, R3, R4
                                         ;       CALLS:

 010064  032737  000400  003420  RECTAP::BIT     #MOD.CO,CMDWRD                  ;READ REV FETCH
 010072  001430                          BEQ     50001$
 010074  013702  002360                  MOV     MSGPKT+MS.RFC,R2                ;FIND LAST READ AD.
 010100  063702  003410                  ADD     DATARD,R2
 010104  032702  000001                  BIT     #BIT00,R2                       ;ODD AD., REASSEMBLE
 010110  001417                          BEQ     50002$
 010112  005202                          INC     R2                              ;REC COUNT STARTING
 010114  111203                          MOVB    (R2),R3                         ;WITH UPPER BYTE FETCH
 010116  142703  177400                  BICB    #177400,R3
 010122  000303                          SWAB    R3
 010124  005302                          DEC     R2          ;LET R2 := R2 - #1          ;LOWER BYTE AD.
 010126  105737  003520                  TSTB    SWBFLG      ;IFB SWBFLG NE #0 THEN
 010132  001401                          BEQ     50003$
 010134  005302                          DEC     R2            ;LET R2 := R2 - #1               ;LOWER BYTE AD. ON SWAP

 010136                          50003$:
 010136  111204                          MOVB    (R2),R4                 ;FETCH LOWER BYTE
 010140  142704  177400                  BICB    #177400,R4
 010144  050403                          BIS     R4,R3
 010146  000401                          BR      50004$
 010150                          50002$:
 010150  011203                          MOV     (R2),R3     ;LET R3 := (R2)             ;EVEN AD. FETCH
 010152                          50004$:
 010152  000402                          BR      50005$
 010154                          50001$:
 010154  017703  173230                  MOV     @DATARD,R3         ;LET R3 := @DATARD            ;READ FWD FETCH

 010160                          50005$:
 010160  000207                          RTS     PC

                                 ;       SUBROUTINE TO STORE A  SET CHARACTERISTIC COMMAND AS
                                 ;       THE FIRST ENTRY IN THE SEQUENCE TABLE.
                                 ;       INPUTS:
                                 ;       OUTPUTS:
                                 ;       REGISTERS:
                                 ;       CALLS:

 010162                          SETCH::
 010162  012701  003540                  MOV     #CMDSEQ,R1              ;INIT CMD SEQUENCE TABLE POINTER.
 010166  012721  140004                  MOV     #SCH,(R1)+              ;THIS CODE SETS UP A SET CHARACTERISTIC
 010172  012721  000040                  MOV     #DFTSCH,(R1)+           ;COMMAND AS THE FIRST COMMAND IN THE
 010176  012721  000001                  MOV     #1,(R1)+                ;SEQUENCE TABLE.
 010202  005721                          TST     (R1)+                   ;SKIP PATTERN LOCATION.
 010204  000207                          RTS PC

                                 ;       SUBROUTINE TO STORE A REWIND COMMAND IN THE SEQUENCE TABLE
                                 ;       INPUTS:
```

```
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

010206  012721  102010        SETRW:: MOV     #RWD,(R1)+                      ;CMD = REWIND.
010212  012721  000001                  MOV     #1,(R1)+                        ;BRF.
010216  012721  000001                  MOV     #1,(R1)+                        ;# OF OPERATIONS.
010222  005721                          TST     (R1)+                   ;SKIP PATTERN.
010224  000207                          RTS     PC                      ;RETURN

                                        ;       SUBROUTINE TO EXECUTE ALL COMMANDS IN THE SEQUENCE TABLE ON ALL
                                        ;       DEVICES.
                                        ;       INPUTS:
                                        ;       OUTPUTS:        R2 = TERMINATION INDICATOR (0=END OF TABLE,1=EOT)
                                        ;       REGISTERS:
                                        ;       CALLS:          CMDAC,SETUP,EXSUB,CKHAE,NEXTU,FIRSTU,VFYDAT.

010226  012701  003540        EXALL:: MOV     #CMDSEQ,R1      ;INIT SEQUENCE TABLE POINTER.
010232                        50006$:
010232  021127  177777                  CMP     (R1),#END       ;WHILE THERE ARE CMDS IN THE SEQUENCE TABLE.
010236  001530                          BEQ     50007$
010240  004737  011172                  JSR     PC,SETUP        ;GO SETUP THE COMMAND BLOCK.
010244                        50010$: BREAK                   ; DO A SUPVSR BREAK FIRST.
010244  104422                                                                  TRAP    C$BRK
010246  023737  003412  003414          CMP     NCNT,NCNT1      ;WHILE THERE ARE RECORDS REMAINING:
010254  002116                          BGE     50011$
010256  004737  011064                  JSR     PC,CMDAC        ;STORE CMD ASCII IN ERROR MESSAGE.
010262  105737  003515                  TSTB    RANDOM          ;IF IN RANDOM MODE:
010266  001435                          BEQ     50012$
010270  023727  003420  104005          CMP     CMDWRD,#WRT     ;IF CMD IS A WRITE THEN:
010276  001031                          BNE     50013$
010300  105737  003516                  TSTB    VFYFLG          ;IF DATA IS NOT TO BE VERIFIED THEN:
010304  001026                          BNE     50014$
010306  063737  003434  003432          ADD     RANS,RANB       ;LET RANB := RANB + RANS  ;GENERATE
010314  063737  003432  003434          ADD     RANB,RANS       ;LET RANS := RANS + RANB  ;RANDOM
010322  013737  003434  003416          MOV     RANS,BRFCNT     ;LET BRFCNT := RANS        ;LENGTH
010330  043737  003430  003416          BIC     LENMSK,BRFCNT   ;MASK RANDOM LENGTH.
010336  023727  003416  000022          CMP     BRFCNT,#18.     ;DO NOT ALLOW BYTE COUNT OF LESS THAN 18
010344  002003                          BGE     50015$
010346  012737  000022  003416          MOV     #18.,BRFCNT     ;CHANGE COUNT OF 0-17 TO 18.

010354                        50015$:
010354  013737  003416  002336          MOV     BRFCNT,CMDPKT+CP.CNT    ;MOVE BRF TO CMD PACKET.

010362                        50014$:

010362                        50013$:

010362                        50012$:
010362  004737  010524                  JSR     PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
010366  004737  017456                  JSR     PC,CKHAE                ;CHECK HALT AFTER EACH CMD FLAG.
010372  012702  000001                  MOV     #1,R2           ;LET R2 := #1           ;SET ALL UNITS AT BOT/EOT.
010376  004737  017060                  JSR     PC,FIRSTU               ;FIND FIRST UNIT.

010402                        50016$:
010402  026527  002604  177777          CMP     DEVTBL(R5),#END         ;WHILE THERE ARE MORE UNITS:
010410  001426                          BEQ     50017$
```

```
1335 010412  032737  000400  003420          BIT     #MOD.CO,CMDWRD          ;IF CMD IS REVERSE THEN:
1336 010420  001406                          BEQ     50020$
1337 010422  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)      ;IF NOT AT BOT THEN:
1338 010430  001001                          BNE     50021$
1339 010432  005002                          CLR     R2                  ;LET R2 := #0 ;CLEAR EOT/BOT FLAG.
1340
1341 010434                          50021$:
1342 010434  000411                          BR      50022$                          ;ELSE IF CMD IS NOT REVERSE:
1343 010436                          50020$:
1344 010436  032765  000001  003502          BIT     #X0.EOT,EOTFLG(R5)
1345 010444  001404                          BEQ     50023$
1346 010446  032737  000001  003420          BIT     #CMD.CO,CMDWRD
1347 010454  001001                          BNE     50024$
1348 010456                          50023$:
1349                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1350 010456  005002                          CLR     R2              ;CLEAR EOT/BOT FLAG.
1351
1352 010460                          50024$:
1353
1354 010460                          50022$:
1355 010460  004737  017126                  JSR     PC,NEXTU                ;FIND NEXT UNIT
1356 010464  000746                          BR      50016$
1357 010466                          50017$:
1358 010466  020227  000001                  CMP     R2,#1                   ;IF ALL UNIT ARE AT EOT/BOT THEN:
1359 010472  001001                          BNE     50025$
1360 010474  000412                          BR      EXARTN          ;RETURN WITH R2 = #1.
1361
1362 010476                          50025$:
1363 010476  005237  003412                  INC     NCNT        ;LET NCNT := NCNT + #1      ;UPDATE RECORD COUNT.
1364 010502  013737  003420  003424          MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS COMMAND WORD.
1365
1366 010510  000655                          BR      50010$
1367 010512                          50011$:
1368 010512  004737  016044                  JSR     PC,VFYDAT       ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
1369                                                 ;VERIFY THE LAST N RECORDS OF DATA.
1370
1371 010516  000645                          BR      50006$
1372 010520                          50007$:
1373 010520  005002                          CLR     R2      ;LET R2 := #0   ;SET NORMAL RETURN INDICATOR.
1374 010522  000207                  EXARTN: RTS PC                          ;RETURN.
1375
1376
1377
1378                                 ;       SUBROUTINE TO ISSUE COMMAND TO ALL DEVICES, WAIT FOR
1379                                 ;       ALL INTERRUPTS, AND CHECK ALL STATUS.
1380                                 ;       INPUTS:
1381                                 ;       OUTPUTS:
1382                                 ;       REGISTERS:
1383                                 ;       CALLS:          EXCUTE,GOWAIT,NEXTU,FIRSTU.
1384
1385 010524  004737  017060          EXSUB:: JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
1386 010530                          50026$:
1387 010530  026527  002604  177777          CMP     DEVTBL(R5),#END         ;WHILE THERE ARE MORE DEVICES:
1388 010536  001465                          BEQ     50027$
1389 010540  032737  000400  003420          BIT     #MOD.CO,CMDWRD      ;IF CMD IS REVERSE THEN:
1390 010546  001421                          BEQ     50030$
1391 010550  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)  ;IF NOT AT BOT
```

```
1392 010556  001014                        BNE     50031$
1393 010560  032765  000001  003502        BIT     #X0.EOT,EOTFLG(R5)      ;BUT IF AT EOT
1394 010566  001406                        BEQ     50032$
1395 010570  105737  003524                TSTB    ALLEOT                  ;AND ALL OTHERS AT EOT
1396 010574  001402                        BEQ     50033$
1397 010576  004737  012054                JSR     PC,EXCUTE                 ;THEN EXECUTE REV CMD
1398                                                                 ;IF NOT ALL AT EOT, FREEZE UNIT(S) AT EOT
1399 010602                        50033$:
1400 010602  000402                        BR      50034$          ;IF NOT AT BOT AND
1401 010604                        50032$:
1402 010604  004737  012054                JSR     PC,EXCUTE                       ;NOT AT EOT, EXEC REV CMD
1403
1404 010610                        50034$:
1405
1406 010610                        50031$:
1407 010610  000435                        BR      50035$                          ;ELSE IF CMD IS NOT REVERSE:
1408 010612                        50030$:
1409 010612  023727  003426  000002        CMP     CMDLG,#2
1410 010620  001011                        BNE     50036$
1411 010622  032765  000002  003502        BIT     #X0.BOT,EOTFLG(R5)
1412 010630  001405                        BEQ     50036$
1413                                                                 ;CLEAR BAD SPOT COUNTS WHEN WRITING FROM BOT
1414 010632  016537  002616  003512        MOV     BTADDR(R5),BTPT             ;LET BTPT := BTADDR(R5)
1415 010640  005077  172646                CLR     @BTPT               ;LET @BTPT := #0
1416
1417 010644                        50036$:
1418 010644  032765  000001  003502        BIT     #X0.EOT,EOTFLG(R5)
1419 010652  001404                        BEQ     50037$
1420 010654  032737  000001  003420        BIT     #CMD.CO,CMDWRD
1421 010662  001003                        BNE     50040$
1422 010664                        50037$:
1423                                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1424 010664  004737  012054                JSR     PC,EXCUTE                 ;ISSUE CMD TO TS05
1425
1426 010670  000405                        BR      50041$
1427 010672                        50040$:
1428 010672  105737  003524                TSTB    ALLEOT              ;IFB ALLEOT NE #0 THEN
1429 010676  001402                        BEQ     50042$
1430 010700  004737  012054                JSR     PC,EXCUTE
1431
1432 010704                        50042$:
1433
1434 010704                        50041$:
1435
1436 010704                        50035$:
1437 010704  004737  017126                JSR     PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
1438
1439 010710  000707                        BR      50026$
1440 010712                        50027$:
1441 010712  105737  003517                TSTB    RPTFLG          ;IF REPORT HAS BEEN REQUESTED THEN:
1442 010716  001403                        BEQ     50043$
1443 010720  105037  003517                CLRB    RPTFLG                  ;CLR THE FLAG,
1444 010724                                DORPT                   ;PRINT THE PERFORMANCE REPORT.
     010724  104424                                                            TRAP    C$DRPT
1445 010726                        50043$:
1446 010726  004737  017060                JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
1447 010732                        50044$:
```

```
1448 010732  026527  002604  177777          CMP     DEVTBL(R5),#END   ;WHILE THERE ARE MORE DEVICES:
1449 010740  001450                           BEQ     50045$
1450 010742  032737  000400  003420          BIT     #MOD.CO,CMDWRD      ;IF CMD IS REVERSE THEN:
1451 010750  001421                           BEQ     50046$
1452 010752  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)  ;IF NOT AT BOT
1453 010760  001014                           BNE     50047$
1454 010762  032765  000001  003502          BIT     #X0.EOT,EOTFLG(R5)      ;BUT IF AT EOT
1455 010770  001406                           BEQ     50050$
1456 010772  105737  003524                   TSTB    ALLEOT                          ;AND ALL OTHERS AT EOT
1457 010776  001402                           BEQ     50051$
1458 011000  004737  012364                   JSR     PC,GOWAIT                       ;THEN WAIT FOR CMD END
1459                                                                                   ;IF NOT ALL AT EOT, DO NOT WAIT
1460 011004                           50051$:
1461                                                                                   ;NOT AT BOT, AND NOT AT EOT
1462 011004  000402                           BR      50052$
1463 011006                           50050$:
1464 011006  004737  012364                   JSR     PC,GOWAIT                       ;WAIT FOR INT,CHECK STAT
1465
1466 011012                           50052$:
1467
1468
1469 011012                           50047$:
1470 011012  000420                           BR      50053$                          ;ELSE IF CMD IS FORWARD:
1471 011014                           50046$:
1472 011014  032765  000001  003502          BIT     #X0.EOT,EOTFLG(R5)
1473 011022  001404                           BEQ     50054$
1474 011024  032737  000001  003420          BIT     #CMD.CO,CMDWRD
1475 011032  001003                           BNE     50055$
1476 011034                           50054$:
1477                                                        ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1478 011034  004737  012364                   JSR     PC,GOWAIT                   ;WAIT FOR INT,CHECK STATUS.
1479
1480 011040  000405                           BR      50056$
1481 011042                           50055$:
1482 011042  105737  003524                   TSTB    ALLEOT              ;IFB ALLEOT NE #0 THEN
1483 011046  001402                           BEQ     50057$
1484 011050  004737  012364                   JSR     PC,GOWAIT
1485
1486 011054                           50057$:
1487
1488 011054                           50056$:
1489
1490 011054                           50053$:
1491 011054  004737  017126                   JSR     PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
1492
1493 011060  000724                           BR      50044$
1494 011062                           50045$:
1495 011062  000207                           RTS     PC                          ;RETURN.
1496
1497                                  ;       THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
1498                                  ;       COMMAND IN THE STANDARD ERROR MESSAGE.  ON ENTRY LOCATION CMDWRD
1499                                  ;       CONTAINS CURRENT CMD AND LOCATION PCMDWD CONTAINS PREVIOUS CMD.
1500                                  ;       INPUTS:
1501                                  ;       OUTPUTS:
1502                                  ;       REGISTERS:      R3, R4.
1503                                  ;       CALLS:          GCMDA
1504
```

```
1505 011064  013704  003420          CMDAC:: MOV     CMDWRD,R4;LET R4 := CMDWRD              ;R4 = CMD BINARY.
1506 011070  004737  011136                  JSR     PC,GCMDA                ;GET CMD ASCII.
1507 011074  112337  006440                  MOVB    (R3)+,STAER1+2          ;MOVE CMD ASCII
1508 011100  112337  006441                  MOVB    (R3)+,STAER1+3          ;
1509 011104  111337  006442                  MOVB    (R3),STAER1+4           ;INTO MSG.
1510 011110  013704  003424                  MOV     PCMDWD,R4                       ;R4 = PREVIOUS CMD BINARY.
1511 011114  004737  011136                  JSR     PC,GCMDA                ;GET CMD ASCII.
1512 011120  112337  006554                  MOVB    (R3)+,STAER7+24                 ;MOVE CMD ASCII
1513 011124  112337  006555                  MOVB    (R3)+,STAER7+25
1514 011130  111337  006556                  MOVB    (R3),STAER7+26                  ;INTO MSG.
1515 011134  000207                          RTS     PC                      ;RETURN. GO EXECUTE NEXT FUNCTION.
1516
1517
1518                                  ;       SUBROUTINE TO FIND THE ASCII EQUIVILENT OF THE COMMAND IN R4.
1519                                  ;       ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
1520                                  ;       INPUTS:         R4 = PRESENT COMMAND WORD.
1521                                  ;       OUTPUTS:        R3 = ADDRESS OF PRESENT COMMAND ASCII.
1522                                  ;       REGISTERS:
1523                                  ;       CALLS:
1524
1525 011136  005003                  GCMDA:: CLR     R3;LET R3 := #0                 ;INIT CMD TBL POINTER.
1526 011140                          50060$:
1527 011140  026304  003752                  CMP     CMDTBL(R3),R4           ;UNTIL CURRENT CMD IS FOUND:
1528 011144  001403                          BEQ     50061$
1529 011146  062703  000002                  ADD     #2,R3     ;LET R3 := R3 + #2            ;SEARCH CMD TABLE.
1530 011152  000772                          BR      50060$
1531 011154                          50061$:
1532 011154  010304                          MOV     R3,R4   ;LET R4 := R3
1533 011156  006203                          ASR     R3                      ;POINT TO ASCII FOR THAT COMMAND
1534 011160  000240                          NOP
1535 011162  060403                          ADD     R4,R3
1536 011164  062703  004040                  ADD     #CMDASC,R3
1537 011170  000207                          RTS     PC                      ;RETURN.
1538
1539                                  ;       THIS SUBROUTINE LOADS THE TS05 COMMAND PACKET FROM ONE
1540                                  ;       ENTRY IN THE SEQUENCE TABLE.
1541                                  ;       INPUTS:
1542                                  ;       OUTPUTS:
1543                                  ;       REGISTERS:      R2, R3.
1544                                  ;       CALLS:          GENPAT.
1545
1546 011172  005037  003426           SETUP:: CLR     CMDLG                   ;CLR CMD LOGGING CODE(DISABLES LOGGING)
1547 011176  012137  002330                  MOV     (R1)+,CMDPKT            ;LOAD THE COMMAND WORD.
1548 011202  011137  002336                  MOV     (R1),CMDPKT+CP.CNT      ;LOAD THE BYTE/RECORD/FILE COUNT.
1549 011206  011137  003416                  MOV     (R1),BRFCNT             ;SAVE BRF FOR THIS COMMAND.
1550 011212  013702  002330                  MOV     CMDPKT,R2               ;GET CMD.
1551 011216  042702  177740                  BIC     #NCMD.C,R2              ;CLR ALL BUT CMD BITS.
1552 011222  010203                          MOV     R2,R3                   ;SAVE IT TWICE.
1553 011224  162703  000010                  SUB     #CMD.C3,R3              ;POSITION COMMAND?
1554 011230  001003                          BNE     2$                      ;BR IF NOT.
1555 011232  011137  002332                  MOV     (R1),CMDPKT+2           ;MOVE BPCR IN 2ND PKT WORD FOR POSITION CMD.
1556 011236  000464                          BR      3$
1557 011240  023727  002330  100011   2$:     CMP     CMDPKT,#WTM             ;IF CMD IS A WRITE TAPE MARK THEN:
1558 011246  001003                          BNE     50062$
1559 011250  012737  000002  003426          MOV     #2,CMDLG                  ;WTM LOGGING CODE IS 2.
1560
1561 011256                          50062$:
```

```
1562 011256  010203                        MOV     R2,R3
1563 011260  162703  000001                SUB     #CMD.CO,R3          ;IS IT A READ?
1564 011264  001017                        BNE     1$                  ;BR IF NOT.
1565 011266  013737  003410  002332        MOV     DATARD,CMDPKT+CP.ADL ;IF SO, LOAD THE BUFFER ADDR.
1566 011274  032737  000400  002330        BIT     #MOD.CO,CMDPKT      ;IF CMD IS A READ REV THEN:
1567 011302  001404                        BEQ     50063$
1568 011304  012737  000004  003426        MOV     #4,CMDLG            ;LOGGING CODE IS 4.
1569                                                                   ;ELSE - IF CMD IS A READ FWD:
1570 011312  000403                        BR      50064$
1571 011314                         50063$:
1572 011314  012737  000006  003426        MOV     #6,CMDLG                    ;LOGGING CODE IS 6.
1573
1574 011322                         50064$:
1575 011322  000432                        BR      3$                  ;CONTINUE.
1576 011324  010203                  1$:   MOV     R2,R3               ;IS IT
1577 011326  162703  000004                SUB     #CMD.C2,R3          ;A SET CHARACTERISTICS CMD?
1578 011332  001014                        BNE     4$                  ;BR IF NOT.
1579 011334  012737  002474  002332        MOV     #SCHBK,CMDPKT+CP.ADL ;SET UP ADR LO FOR SET CHAR.
1580 011342  012737  000012  002336        MOV     #SCHCNT,CMDPKT+CP.CNT ;SET BUFFER EXTENT
1581 011350  011137  002502                MOV     (R1),SCHBK+6        ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
1582 011354  013737  003532  002504        MOV     TSUNT,SCHBK+10      ;UNIT #
1583 011362  000412                        BR      3$                  ;CONTINUE.
1584 011364  010203                  4$:   MOV     R2,R3               ;IS IT
1585 011366  162703  000006                SUB     #CMD.C1!CMD.C2,R3   ;A DIAGNOSTIC (DIA) CMD?
1586 011372  001006                        BNE     3$                  ;BR IF NOT.
1587 011374  012737  000020  002336        MOV     #DIACNT,CMDPKT+CP.CNT ;LOAD BUFFER EXTENT.
1588 011402  012737  003406  002332        MOV     #DIABLK,CMDPKT+CP.ADL ;LOAD BUFFER ADR LOW.
1589 011410  005721                  3$:   TST     (R1)+               ;POINT TO N (NUMBER OF TIMES TO EXECUTE THIS INS
1590 011412  012137  003414                MOV     (R1)+,NCNT1         ;SAVE NUMBER OF OPERATIONS
1591 011416  005037  003412                CLR     NCNT                ;CLEAR OPERATION COUNTER.
1592 011422  012137  003446                MOV     (R1)+,PATERN        ;SAVE PATTERN CODE FOR CURRENT CMD.
1593 011426  010203                        MOV     R2,R3               ;IS IT
1594 011430  162703  000005                SUB     #CMD.CO!CMD.C2,R3   ;A WRITE?
1595 011434  001010                        BNE     5$                  ;BR IF NOT.
1596 011436  013737  003406  002332        MOV     DATAWT,CMDPKT+CP.ADL ;LOAD WRITE BUFFER LO ORDER.
1597 011444  004737  011556                JSR     PC,GENPAT           ;GO GENERATE THE WRITE PATTERN.
1598 011450  012737  000002  003426        MOV     #2,CMDLG            ;WRITE LOGGING CODE IS 2.
1599 011456  032737  000100  002330  5$:   BIT     #VFY.C,CMDPKT       ;IF DATA VERIFICATION IS REQUIRED:
1600 011464  001407                        BEQ     50065$
1601 011466  112737  000001  003516        MOVB    #1,VFYFLG           ;SET VERIFY FLAG.
1602 011474  042737  000100  002330        BIC     #VFY.C,CMDPKT       ;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
1603                                                                   ;IF DATA VERIFICATION IS NOT REQUIRED:
1604 011502  000402                        BR      50066$
1605 011504                         50065$:
1606 011504  105037  003516                CLRB    VFYFLG              ;CLR VERIFY FLAG.
1607
1608 011510                         50066$:
1609 011510  013737  003420  003424        MOV     CMDWRD,PCMDWD       ;SAVE PREVIOUS CMD WORD.
1610 011516  013737  002330  003420        MOV     CMDPKT,CMDWRD       ;SAVE PRESENT CMD WORD.
1611 011524  105737  003520                TSTB    SWBFLG              ;IF SWAP BYTES IS ENABLED:
1612 011530  001403                        BEQ     50067$
1613 011532  052737  010000  002330        BIS     #SWB.C,CMDPKT       ;SET SWAP BIT IN COMMAND.
1614
1615 011540                         50067$:
1616 011540  042737  004000  002330        BIC     #BRF.C,CMDPKT       ;CLR BRF BIT (INTERNAL ONLY).
1617 011546  013737  002330  003422        MOV     CMDPKT,CMDSAV       ;SAVE 1ST WORD OF COMMAND PACKET.
1618 011554  000207                        RTS     PC                  ;RETURN.
```

```
                                ;       THIS SUBROUTINE SETS UP AND CALLS THE APPROPRIATE SUBROUTINE TO GENERATE
                                ;       THE DESIRED PATTERN FOR THE WRITE AND WRITE/VERIFY COMMANDS.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R2, R3, R4.
                                ;       CALLS:          PATR0 - PATR7

011556  013703  003446          GENPAT::MOV     PATERN,R3       ;SETUP PATTERN ROUTINE POINTER
011562  006303                          ASL     R3
011564  013704  003416                  MOV     BRFCNT,R4       ;SET LENGTH OF WRITE BFR
011570  005204                          INC     R4
011572  042704  000001                  BIC     #1,R4           ;ROUNDED UP TO NEXT WORD
011576  162704  000002                  SUB     #2,R4           ;WITH FIRST WORD RESERVED
011602  013702  003406                  MOV     DATAWT,R2       ;FOR RECORD COUNT
011606  062702  000002                  ADD     #2,R2
011612  004773  011620                  JSR     PC,@PATTBL(R3)  ;GO GENERATE THE APPROPRIATE PATTERN.
011616  000207                          RTS     PC              ;RETURN TO SETUP SUBROUTINE.

                                        ;TS05 WRITE PATTERN LOOKUP TABLE.  USED TO JSR TO THE
                                        ;CORRECT DATA PATTERN GENERATING ROUTINE.

011620  011642                  PATTBL: PATR0
011622  011700                          PATR1
011624  011720                          PATR2
011626  011730                          PATR3
011630  011754                          PATR4
011632  011766                          PATR5
011634  012000                          PATR6
011636  012020                          PATR7
011640  012052                          PATR8

                                        ;INCREMENTING PATTERN.  0 - 377.

011642  012703  000400          PATR0:: MOV     #400,R3;LET R3 := #400
011646  162704  000002          1$:     SUB     #2,R4;LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
011652  100411                          BMI     2$              ;BR IF DONE.
011654  010322                          MOV     R3,(R2)+        ;STORE DATA WORD.
011656  062703  001002                  ADD     #1002,R3        ;UPDATE PATTERN.
011662  020327  001000                  CMP     R3,#1000        ;IF PATTERN HAS WRAPPED AROUND THEN:
011666  001002                          BNE     50070$
011670  012703  000400                  MOV     #400,R3           ;INIT THE PATTERN AGAIN.

011674                          50070$:
011674  000764                          BR      1$              ;DO IT AGAIN.

011676  000207                  2$:     RTS     PC              ;RETURN.

                                        ;ALL ONE'S PATTERN.

011700  012703  177777          PATR1:: MOV     #-1,R3          ;ALL ONES PATTERN;.
011704  162704  000002          ZROPAT: SUB     #2,R4           ;DECREMENT BYTE COUNT.
011710  100402                          BMI     1$              ;DONE?,BR IF YES.
011712  010322                          MOV     R3,(R2)+        ;IF NOT LOAD NEXT BYTE WITH PATTERN.
011714  000773                          BR      ZROPAT          ;DO IT AGAIN.

011716  000207                  1$:     RTS     PC              ;RETURN.
```

```
                                        ;ALL ZEROES PATTERN.
                                        ;
011720  005003          PATR2:: CLR     R3              ;CLR PATTERN REGISTER.
011722  004737  011704          JSR     PC,ZROPAT       ;GO GENERATE IT.
011726  000207                  RTS     PC              ;RETURN.
                                        ;
                                        ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
                                        ;
011730  012703  000401  PATR3:: MOV     #401,R3         ;INIT PATTERN REGISTER.
011734  162704  000002  WLKZRO: SUB     #2,R4;LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
011740  100404                  BMI     1$              ;BR IF DONE.
011742  010322                  MOV     R3,(R2)+        ;LOAD DATA.
011744  006303                  ASL     R3              ;SHIFT PATTERN.
011746  005503                  ADC     R3              ;ADD CARRY BACK INTO PATTERN.
011750  000771                  BR      WLKZRO          ;DO IT AGAIN.
011752  000207          1$:     RTS     PC              ;RETURN.
                                        ;
                                        ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
                                        ;
011754  012703  177376  PATR4:: MOV     #177376,R3      ;INIT PATTERN REGISTER.
011760  004737  011734          JSR     PC,WLKZRO       ;GO GENERATE ;IT.
011764  000207                  RTS     PC              ;RETURN.
                                        ;
                                        ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
                                        ;COMPLEMENTED.
                                        ;
011766  012703  125125  PATR5:: MOV     #125125,R3      ;INIT PATTERN REGISTER.
011772  004737  011704          JSR     PC,ZROPAT       ;GO GENERATE IT.
011776  000207                  RTS     PC              ;RETURN.
                                        ;
                                        ;ALTERNATING BYTES OF 000 AND 377.
                                        ;
012000  012703  177400  PATR6:: MOV     #177400,R3      ;INIT PATTERN REGISTER.
012004  162704  000002  1$:     SUB     #2,R4           ;DECREMENT WORD COUNT.
012010  100402                  BMI     2$              ;BR IF DONE.
012012  010322                  MOV     R3,(R2)+        ;LOAD DATA.
012014  000773                  BR      1$              ;DO IT AGAIN.
012016  000207          2$:     RTS     PC              ;RETURN.
                                        ;
                                        ;RANDOM PATTERN GENERATOR
                                        ;
012020  162704  000002  PATR7:: SUB     #2,R4           ;DECREMENT WORD COUNT
012024  100411                  BMI     GIT             ;BR IF DONE.
012026  063737  003434  003432          ADD     RANS,RANB
012034  063737  003432  003434          ADD     RANB,RANS       ;GET NEW #.
012042  013722  003434                  MOV     RANS,(R2)+      ;SAVE #.
012046  000764                  BR      PATR7           ;CONTINUE.
012050  000207          GIT:    RTS     PC              ;RETURN
                                        ;
                                        ;       NO PATTERN GENERATION.
                                        ;
012052  000207          PATR8:: RTS     PC              ;RETURN.
                                        ;
                                        ;       THIS SUBROUTINE INITIATES TSO5 COMMAND EXECUTION
                                        ;       AND CHECKS FOR TSO5 RESPONSE.
                                        ;       INPUTS:
```

```
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2, R3.
                                        ;       CALLS:          DROPU, MOVMSG, FIRSTU, NEXTU, WSSR.

012054  012737  177777  003436  EXCUTE:: MOV    #-1,TIME1               ;INIT TIMEOUT COUNTER.
012062                          50071$: ;REPEAT                         ;WAIT -
012062  005337  003436                  DEC     TIME1                   ;UPDATE TIMEOUT COUNTER.
012066  005737  003436                  TST     TIME1                   ;IF TIMED OUT:
012072  001011                          BNE     50072$
012074  004737  012734                  JSR     PC,MOVMSG               ;MOVE CURRENT PACKET MSG.
012100                                  ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
        012100  104455                                                          TRAP    C$ERDF
        012102  000002                                                          .WORD   2
        012104  004536                                                          .WORD   NSSRM
        012106  006120                                                          .WORD   STAERM
012110  004737  017156                  JSR     PC,DROPU                ;DROP THE UNIT.
012114  000522                          BR      EXCRTN                  ;RETURN.

012116                          50072$:
012116  032775  000200  002524          BIT     #TS.SSR,@TSSR(R5)       ;WAIT UNTIL DEVICE IS READY.
012124  001756                          BEQ     50071$
012126  023727  003420  140004          CMP     CMDWRD,#SCH             ;IF WE ARE DOING A SET CHAR CMD THEN:
012134  001022                          BNE     50073$
012136  010537  003452                  MOV     R5,R5SAVE                 ;SAVE CURRENT DEVICE POINTER.
012142  004737  017060                  JSR     PC,FIRSTU                 ;FIND FIRST UNIT.
012146                          50074$:
012146  026527  002604  177777          CMP     DEVTBL(R5),#END   ;WHILE DEVTBL(R5) NE #END DO
012154  001405                          BEQ     50075$
012156  004737  012700                  JSR     PC,WSSR                     ;WAIT FOR UNIT READY OR TIME OUT.
012162  004737  017126                  JSR     PC,NEXTU                    ;FIND NEXT UNIT.

012166  000767                          BR      50074$
012170                          50075$:
012170  013705  003452                  MOV     R5SAVE,R5                 ;RESTORE CURRENT DEVICE POINTER.
012174  016537  002544  002474          MOV     MSGPKA(R5),SCHBK          ;SET UP ADR OF MSG PKT IN SCH BLOCK.

012202                          50073$:
012202  016503  002544                  MOV     MSGPKA(R5),R3           ;ADR OF THIS UNIT'S MSG PACKET.
012206  005002                          CLR     R2                              ;CLR COUNTER.
012210                          50076$:
012210  020227  000020                  CMP     R2,#MSGCNT              ;WHILE THERE ARE MORE LOCATIONS:
012214  001405                          BEQ     50077$
012216  012723  177777                  MOV     #-1,(R3)+               ;INIT THE MSG PACKET WITH ALL 1'S
012222  062702  000002                  ADD     #2,R2                   ;UPDATE COUNTER.

012226  000770                          BR      50076$
012230                          50077$:
012230  105737  002212                  TSTB    DINT                    ;ARE INTERRUPTS DISABLED.
012234  001023                          BNE     1$                      ;BR IF YES.
012236  126527  003472  000001          CMPB    INTFLG(R5),#1           ;IF MORE THAN ONE INTERRUPT HAS OCCURED:
012244  003412                          BLE     50100$
012246  017537  002524  003454          MOV     @TSSR(R5),TSSREG        ;FREEZE THE CURRENT STATUS REG FOR PRINT
012254                                  ERRDF   15,TOOMM,STAERM ;REPORT TOO MANY INTERRUPTS.
        012254  104455                                                          TRAP    C$ERDF
        012256  000017                                                          .WORD   15
        012260  004727                                                          .WORD   TOOMM
        012262  006120                                                          .WORD   STAERM
```

```
1782 012264  004737  017156                 JSR     PC,DROPU                        ;DROP THE UNIT
1783 012270  000434                         BR      EXCRTN                    ;RETURN - UNIT HAS BEEN DROPPED.
1784
1785 012272                          50100$:
1786 012272  005065  003472                 CLR     INTFLG(R5)                ;CLR INTERRUPT FLAG FOR THIS DEV.
1787 012276  052737  000200  002330         BIS     #IE.C,CMDPKT              ;SET INT ENABLE BIT.
1788 012304  105737  003471          1$:    TSTB    ERRREC;IFB ERRREC EQ #0 THEN            ;IF NOT RETRYING
1789 012310  001005                         BNE     50101$
1790 012312  005265  003376                 INC     RECCNT(R5)                ;LET RECCNT(R5) := RECCNT(R5) + #1
1791 012316  016577  003376  171062         MOV     RECCNT(R5),@DATAWT        ;THEN UPDATE REC COUNT TO WRITE IT ON TAPE
1792
1793 012324                          50101$:
1794 012324  012775  002330  002514         MOV     #CMDPKT,@TSDB(R5)         ;LOAD TSDB WITH CMDPKT ADDRESS
1795                                                                           ;THIS INITIATES COMMAND EXECUTION.
1796 012332  032775  000200  002524         BIT     #TS.SSR,@TSSR(R5)         ;IF READY DID NOT DROP THEN:
1797 012340  001410                         BEQ     50102$
1798 012342  004737  012734                 JSR     PC,MOVMSG                 ;MOVE CURRENT MESSAGE PACKET TO COMMON.
1799 012346                                 ERRDF   3,TOERM,STAERM            ;REPORT NO TS05 RESPONSE.
     012346  104455                                                                       TRAP    C$ERDF
     012350  000003                                                                       .WORD   3
     012352  004453                                                                       .WORD   TOERM
     012354  006120                                                                       .WORD   STAERM
1800 012356  004737  017156                 JSR     PC,DROPU                  ;DROP THE UNIT
1801
1802 012362                          50102$:
1803 012362  000207                  EXCRTN: RTS     PC                        ;RETURN.
1804
1805                                 ;       THIS SUBROUTINE WAITS FOR THE TS05 INERRUPT OR DONE BIT TO SET AND ALLOWS THE
1806                                 ;       OPERATOR TO TRANSFER CONROL TO THE SUPERVISOR.
1807                                 ;       UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
1808                                 ;       LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
1809                                 ;       INPUTS:
1810                                 ;       OUTPUTS:
1811                                 ;       REGISTERS:      R2, R3.
1812                                 ;       CALLS:          DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.
1813
1814 012364  012737  177777  003436 GOWAIT:: MOV     #-1,TIME1                 ;INIT TIME OUT COUNTER.
1815 012372                          50103$: ;REPEAT                           ;REPEAT UNTIL INTERRUPT OCCURES:
1816 012372                                 BREAK                             ;GO TO THE SUPER TO ALLOW TTY INPUT.
     012372  104422                                                                       TRAP    C$BRK
1817 012374  023727  003420  102010         CMP     CMDWRD,#RWD               ;IF COMMAND WAS REWIND THEN:
1818 012402  001014                         BNE     50104$
1819 012404                                 DELAY   10.                       ;WAIT  EXTRA MSECS EACH LOOP.
     012404  012727  000012                                                                MOV     #10.,(PC)+
     012410  000000                                                                .WORD   0
     012412  013727  002116                                                                MOV     L$DLY,(PC)+
     012416  000000                                                                .WORD   0
     012420  005367  177772                                                                DEC     -6(PC)
     012424  001375                                                                BNE     .-4
     012426  005367  177756                                                                DEC     -22(PC)
     012432  001367                                                                BNE     .-20
1820 012434                          50104$:
1821 012434  023727  003420  105010         CMP     CMDWRD,#SFF       ;IF CMDWRD EQ #SFF OR CMDWRD EQ #SFR THEN
1822 012442  001404                         BEQ     50105$
1823 012444  023727  003420  105410         CMP     CMDWRD,#SFR
1824 012452  001014                         BNE     50106$
1825 012454                          50105$:
```

```
1826 012454                            DELAY   12.             ;ADD DELAY FOR SPACE TAPE MARK COMMANDS
     012454  012727  000014                                                  MOV     #12.,(PC)+
     012460  000000                                                         .WORD   0
     012462  013727  002116                                                  MOV     L$DLY,(PC)+
     012466  000000                                                         .WORD   0
     012470  005367  177772                                                  DEC     -6(PC)
     012474  001375                                                         BNE     .-4
     012476  005367  177756                                                  DEC     -22(PC)
     012502  001367                                                         BNE     .-20
1827 012504                        50106$:
1828 012504  105737  002212                    TSTB    DINT                    ;IF INTERRUPTS ARE ENABLED.
1829 012510  001003                            BNE     50107$
1830 012512  016502  003472                    MOV     INTFLG(R5),R2   ;FETCH INTERRUPT OCCURRED FLAG.
1831
1832 012516  000406                            BR      50110$
1833 012520                        50107$:
1834 012520  012703  000200                    MOV     #TS.SSR,R3      ;SET UP A MASK FOR THE DONE BIT.
1835 012524  005103                            COM     R3
1836 012526  017502  002524                    MOV     @TSSR(R5),R2      ;FETCH DONE BIT.
1837 012532  040302                            BIC     R3,R2
1838
1839 012534                        50110$:
1840 012534  005337  003436                    DEC     TIME1           ;UPDATE TIMEOUT COUNTER.
1841 012540  005702                            TST     R2              ;REPEAT UNTIL INTERRUPT OR READY OCCURES.
1842 012542  001003                            BNE     50111$
1843 012544  005737  003436                    TST     TIME1
1844 012550  001310                            BNE     50103$
1845 012552                        50111$:
1846 012552  005737  003436                    TST     TIME1                   ;IF TIME OUT HAS OCCURRED:
1847 012556  001022                            BNE     50112$
1848 012560  016577  003376  170620            MOV     RECCNT(R5),@DATAWT
1849 012566  005377  170614                    DEC     @DATAWT
1850 012572  004737  012734                    JSR     PC,MOVMSG       ;MOVE CURRENT MSG PACKET TO COMMON AREA.
1851 012576                                    ERRDF   4,NOINTM,STAERM ;REPORT NO INTERRUPT.
     012576  104455                                                          TRAP    C$ERDF
     012600  000004                                                         .WORD   4
     012602  004670                                                         .WORD   NOINTM
     012604  006120                                                         .WORD   STAERM
1852 012606  004737  017156                    JSR     PC,DROPU                ;DROP THE UNIT.
1853 012612  012703  003472                    MOV     #ENDERF,R3      ;LET R3 := #ENDERF
1854 012616  004737  012664                    JSR     PC,CLRERR                       ;CLEAR ALL ERROR FLAGS
1855
1856 012622  000417                            BR      50113$
1857 012624                        50112$:
1858 012624  004737  012734                    JSR     PC,MOVMSG       ;MOVE CURRENT MSG. PACKET TO COMMON AREA.
1859 012630  004737  013020                    JSR     PC,RECUD        ;UPDATE THE RECORD COUNT.
1860 012634  004737  013166                    JSR     PC,CHKERR       ;CHECK FOR STATUS ERRORS.
1861 012640  105737  003463                    TSTB    WRTYFG          ;IFB WRTYFG EQ #0 THEN
1862 012644  001006                            BNE     50114$
1863 012646  004737  015544                    JSR     PC,LOG          ;LOG BYTES AND ERRORS.
1864 012652  012703  003472                    MOV     #ENDERF,R3      ;LET R3 := #ENDERF
1865 012656  004737  012664                    JSR     PC,CLRERR       ;CLEAR ALL ERROR FLAGS
1866
1867 012662                        50114$:
1868
1869 012662                        50113$:
1870 012662  000207                            RTS     PC                      ;RETURN IF DONE.
```

```
                                        ;       SUBROUTINE TO CLEAR FLAGS.
                                        ;       INPUTS:         R3 = LWA TO BE CLEARED + 2.
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2
                                        ;       CALLS:

012664  012702  003460                  CLRERR:: MOV    #BGNFLG,R2      ;LET R2 := #BGNFLG
012670                                  50115$: ;REPEAT
012670  005022                                  CLR     (R2)+           ;LET (R2)+ := #0
012672  020203                                  CMP     R2,R3           ;UNTIL R2 EQ R3
012674  001375                                  BNE     50115$
012676  000207                                  RTS     PC


                                        ;       SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

012700                                  WSSR::
012700  012737  177777  003436                  MOV     #-1,TIME1               ;INIT TIMEOUT COUNTER.
012706                                  50116$:                                   ;REPEAT UNTIL DEV READY OR TIMEOUT:
012706                                          BREAK                             ;BREAK TO THE SUPERVISOR.
012706  104422                                                                                  TRAP    C$BRK
012710  005337  003436                          DEC     TIME1                     ;UPDATE TIMEOUT COUNTER.
012714  032775  000200  002524                  BIT     #TS.SSR,@TSSR(R5) ;UNTIL #TS.SSR SETIN @TSSR(R5) OR TIME1 EQ #0
012722  001003                                  BNE     50117$
012724  005737  003436                          TST     TIME1
012730  001366                                  BNE     50116$
012732                                  50117$:
012732  000207                                  RTS     PC                        ;RETURN.


                                        ;       SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
                                        ;       TO UPDATE THE CURRENT TERMINATION CLASS CODE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2, R3.
                                        ;       CALLS:

012734  017537  002524  003454  MOVMSG::MOV     @TSSR(R5),TSSREG          ;FREEZE THE STATUS REG CONTENTS
012742  013702  003454                  MOV     TSSREG,R2                 ;EXTRACT THE TERMINATION CLASS CODE,
012746  042702  177761                  BIC     #TSC.TCC,R2
012752  010237  003450                  MOV     R2,CTCC                   ;AND SAVE IT
012756  006237  003450                  ASR     CTCC
012762  016503  002544                  MOV     MSGPKA(R5),R3           ;ADR OF THIS DEVICE'S MSG.
012766  005002                          CLR     R2                                ;CLR COUNTER.
012770                                  50120$:
012770  020227  000020                  CMP     R2,#MSGCNT              ;WHILE THERE ARE MORE LOCATIONS:
012774  001405                          BEQ     50121$
012776  012362  002354                  MOV     (R3)+,MSGPKT(R2)        ;MOVE MSG TO COMMON AREA.
013002  062702  000002                  ADD     #2,R2                   ;UPDATE COUNTER.

013006  000770                          BR      50120$
```

```
1927 013010                                50121$:
1928 013010  013737  002362  003502              MOV     MSGPKT+MS.XS0,EOTFLG     ;MOVE XSTAT0 TO EOT FLAG.
1929 013016  000207                              RTS     PC
1930
1931                                       ;       SUBROUTINE TO ADJUST THE RECORD COUNT.
1932                                       ;       INPUTS:
1933                                       ;       OUTPUTS:
1934                                       ;       REGISTERS:
1935                                       ;       CALLS:
1936
1937 013020  105737  003465          RECUD:: TSTB    RECLOG           ;IF RECORD HAS NOT BEEN LOGGED:
1938 013024  001057                          BNE     50122$
1939 013026  005365  003376                  DEC     RECCNT(R5)         ;LET RECCNT(R5) := RECCNT(R5) - #1
1940 013032  032737  000001  003450          BIT     #BIT0,CTCC       ;IF TAPE MOVED
1941 013040  001046                          BNE     50123$
1942 013042  032737  100000  002366          BIT     #X2.OPM,MSGPKT+MS.XS2
1943 013050  001442                          BEQ     50123$
1944 013052  105237  003465                  INCB    RECLOG                   ;SET RECORD LOGGED,
1945 013056  023727  003420  102010          CMP     CMDWRD,#RWD              ;IF THIS IS A REWIND CMD:
1946 013064  001003                          BNE     50124$
1947 013066  005065  003376                  CLR     RECCNT(R5)               ;CLEAR RECORD COUNT,
1948
1949 013072  000431                          BR      50125$
1950 013074                                50124$:
1951 013074  032737  004000  003420          BIT     #BRF.C,CMDWRD            ;IF BRF USED, UPDATE RECORD COUNT.
1952 013102  001425                          BEQ     50126$
1953 013104  032737  000400  003420          BIT     #MOD.CO,CMDWRD             ;IF A FORWARD CMD:
1954 013112  001007                          BNE     50127$
1955 013114  032737  000400  003424          BIT     #MOD.CO,PCMDWD             ;IF PREV CMD WAS A FWD ALSO:
1956 013122  001002                          BNE     50130$
1957 013124  005265  003376                  INC     RECCNT(R5)                 ;INCREMENT RECORD COUNT.
1958
1959 013130                                50130$:
1960                                                                       ;IF REVERSE CMD:
1961 013130  000412                          BR      50131$
1962 013132                                50127$:
1963 013132  032737  000400  003424          BIT     #MOD.CO,PCMDWD           ;IF PREVIOUS CMD WAS A REV ALSO:
1964 013140  001406                          BEQ     50132$
1965 013142  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)       ;WHEN NOT AT BOT THEN
1966 013150  001002                          BNE     50133$
1967 013152  005365  003376                  DEC     RECCNT(R5)                ;DECREMENT RECORD COUNT.
1968
1969 013156                                50133$:
1970
1971 013156                                50132$:
1972
1973 013156                                50131$:
1974
1975
1976 013156                                50126$:
1977
1978 013156                                50125$:
1979
1980 013156                                50123$:
1981 013156  016577  003376  170222          MOV     RECCNT(R5),@DATAWT         ;LET @DATAWT := RECCNT(R5)
1982
1983 013164                                50122$:
```

```
1984 013164  000207                          RTS     PC                      ;RETURN.
1985
1986                                 ;       THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
1987                                 ;       SUBROUTINE IS CALLED TO CHECK THE TS05 STATUS.
1988                                 ;       IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
1989                                 ;       IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
1990                                 ;       THEN AN ERROR RFC IS REPORTED.
1991                                 ;       INPUTS:
1992                                 ;       OUTPUTS:
1993                                 ;       REGISTERS:      R2, R4.
1994                                 ;       CALLS:          TCC0-TCC7.
1995
1996 013166  032737  100000  003454  CHKERR:: BIT     #TS.SC,TSSREG           ;IF SPECIAL COND STATUS IS SET THEN:
1997 013174  001441                          BEQ     50134$
1998 013176  023727  003450  000002          CMP     CTCC,#2                   ;IF TCC IS NOT 2 THEN:
1999 013204  001405                          BEQ     50135$
2000 013206  105737  003471                  TSTB    ERRREC                ;IF NOT IN ERROR RECOVERY:
2001 013212  001002                          BNE     50136$
2002 013214  005265  003336                  INC     SCCNT(R5)               ;INC SC COUNTER.
2003
2004 013220                          50136$:
2005
2006 013220                          50135$:
2007 013220  032737  004000  003454          BIT     #TS.NXM,TSSREG          ;WHEN NON-EXISTANT MEMO
2008 013226  001004                          BNE     50137$
2009 013230  032737  040000  003454          BIT     #TS.UPE,TSSREG
2010 013236  001412                          BEQ     50140$
2011 013240                          50137$:
2012 013240  032737  100000  002366          BIT     #X2.OPM,MSGPKT+MS.XS2           ;AND TAPE NOT MOVED
2013 013246  001003                          BNE     50141$
2014 013250  012702  000005                  MOV     #5,R2                           ;SET TCC5 INDEX
2015
2016 013254  000402                          BR      50142$
2017 013256                          50141$:
2018 013256  012702  000004                  MOV     #4,R2                   ;TAPE MOVED, SET TCC4 INDEX
2019
2020 013262                          50142$:
2021
2022 013262  000402                          BR      50143$
2023 013264                          50140$:
2024 013264  012702  003450                  MOV     CTCC,R2                         ;SET DETECTED TCC INDEX
2025
2026 013270                          50143$:
2027 013270  006302                          ASL     R2                      ;CURRENT TCC X 2.
2028 013272  004772  013372                  JSR     PC,@TCCRA(R2)           ;GO TO THE TCC HANDLING SUBROUTINE.
2029
2030 013276  000426                          BR      50144$
2031 013300                          50134$:
2032 013300  032737  004000  003420          BIT     #BRF.C,CMDWRD           ;IF BRF IS USED IN THIS CMD THEN:
2033 013306  001422                          BEQ     50145$
2034 013310  005737  002360                  TST     MSGPKT+MS.RFC             ;IF THERE IS AN RFC THEN:
2035 013314  001417                          BEQ     50146$
2036 013316  105737  003515                  TSTB    RANDOM          ;IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
2037 013322  001403                          BEQ     50147$
2038 013324  105737  003516                  TSTB    VFYFLG
2039 013330  001411                          BEQ     50150$
2040 013332                          50147$:
```

```
2041
2042 013332  105737  003521          TSTB    IRE                     ;IF NOT IN RANDOM OR IF CMD IS WTV:
2043 013336  001006                  BNE     50151$                  ;IF RFC ERROR REPORTS ARE ALLOWED:
2044 013340  005265  003356          INC     HRDCNT(R5)                ;UPDATE HARD ERROR COUNT
2045 013344                          ERRHRD  13,RFCERM,STAERM        ;REPORT RFC ERROR
     013344  104456                                                          TRAP    C$ERHRD
     013346  000015                                                          .WORD   13
     013350  004521                                                          .WORD   RFCERM
     013352  006120                                                          .WORD   STAERM
2046
2047 013354                  50151$:
2048
2049 013354                  50150$:
2050
2051 013354                  50146$:
2052
2053 013354                  50145$:
2054
2055 013354                  50144$:
2056 013354  105737  003467          TSTB    RWERR                   ;IF A READ/WRITE ERROR HAS OCCURRED THEN:
2057 013360  001403                  BEQ     50152$
2058 013362  013737  003422  002330  MOV     CMDSAV,CMDPKT             ;RESTORE CMD PACKET AFIER ERROR RECOV.
2059
2060 013370                  50152$:
2061 013370  000207                  RTS     PC                      ;RETURN.
2062
2063                          ;       ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
2064
2065 013372  013412          TCCRA:  TCC0
2066 013374  013430                  TCC1
2067 013376  013446                  TCC2
2068 013400  013556                  TCC3
2069 013402  013574                  TCC4
2070 013404  014210                  TCC5
2071 013406  014306                  TCC6
2072 013410  014450                  TCC7
2073
2074                          ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 0, UNDEFINED SPECIAL
2075                          ;       CONDITION ERROR.
2076                          ;       INPUTS:
2077                          ;       OUTPUTS:
2078                          ;       REGISTERS:
2079                          ;       CALLS:
2080
2081 013412  005265  003356  TCC0::  INC     HRDCNT(R5)                ;UPDATE HARD ERROR COUNT.
2082 013416                          ERRHRD  5,SCERM,STAERM          ;REPORT SPECIAL CONDITION ERROR.
     013416  104456                                                          TRAP    C$ERHRD
     013420  000005                                                          .WORD   5
     013422  004475                                                          .WORD   SCERM
     013424  006120                                                          .WORD   STAERM
2083 013426  000207                  RTS PC                          ;RETURN.
2084
2085
2086                          ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
2087                          ;       THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
2088                          ;       SUCH AS GOING OFFLINE OR COMING ONLINE.
2089                          ;       INPUTS:
```

```
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2,R4
                                        ;       CALLS:          DROPU
                                        TCC1::  ERRDF   6,ATTNM,STAERM          ;REPORT ATTENTION-UNIT OFF LINE.
013430  104455                                                                          TRAP    C$ERDF
013432  000006                                                                          .WORD   6
013434  004603                                                                          .WORD   ATTNM
013436  006120                                                                          .WORD   STAERM
013440  004737  017156                          JSR     PC,DROPU                ;DROP THE UNIT.
013444  000207                                  RTS     PC                      ;RETURN.

                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 2, TAPE STATUS ALERT.
                                        ;       A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE
                                        ;       TO THE PROGRAM.  BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, BOT, EOT.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

013446  032737  000002  002362  TCC2::  BIT     #X0.BOT,MSGPKT+MS.XS0
013454  001404                          BEQ     50153$
013456  105737  003514                  TSTB    EXPBOT
013462  001401                          BEQ     50153$
                                                                        ;IF AT BOT AND BOT IS EXPECTED:
013464  000433                          BR      TC2RTN          ;RETURN-TCC2 CAUSED BY EXPECTED BOT.

013466                                  50153$:
013466  032737  170002  002362                  BIT     #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT,MSGPKT+MS.XS0
                                                ;IF #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT SETIN MSGPKT+MS.XS0 THEN

013474  001427                          BEQ     50154$
                                                                        ;IF TCC2 CAUSED BY ANYTHING BUT EOT:
013476  105737  003515                  TSTB    RANDOM      ;IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
013502  001403                          BEQ     50155$
013504  105737  003516                  TSTB    VFYFLG
013510  001421                          BEQ     50156$
013512                                  50155$:
                                                                        ;IF NOT IN RANDOM OR IF CMD IS WTV:
013512  105737  003521                  TSTB    IRE             ;IF RFC ERROR REPORTS ARE ALLOWED:
013516  001016                          BNE     50157$
013520  105737  003471                  TSTB    ERRREC          ;IF WE ARE IN ERROR RECOVERY THEN:
013524  001403                          BEQ     50160$
013526  105237  003470                  INCB    UNREC           ;SET UNRECOVERABLE FLAG FOR LOG.
                                                                        ;ELSE - IF NOT IN ERROR RECOVERY:
013532  000402                          BR      50161$
013534                                  50160$:
013534  005265  003336                  INC     SCCNT(R5)       ;INCREMENT THE SPEC COND COUNTER.

013540                                  50161$:
013540  005265  003356                  INC     HRDCNT(R5)      ;UPDATE HARD ERROR COUNT.
013544                                  ERRHRD  7,TSAM,STAERM           ;REPORT TAPE STATUS ALERT.
013544  104456                                                                  TRAP    C$ERHRD
013546  000007                                                                  .WORD   7
013550  004705                                                                  .WORD   TSAM
013552  006120                                                                  .WORD   STAERM

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```
2139 013554                          50157$:
2140
2141 013554                          50156$:
2142
2143 013554                          50154$:
2144
2145 013554  000207                 TC2RTN:   RTS   PC                              ;RETURN.
2146
2147
2148                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 3, FUNCTION REJECT.
2149                                 ;       THE SPECIFIED FUNCTION WAS NOT INITIATED.  BITS OF INTEREST ARE
2150                                 ;       RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA.
2151                                 ;       INPUTS:
2152                                 ;       OUTPUTS:
2153                                 ;       REGISTERS:      R2,R4
2154                                 ;       CALLS:          DROPU
2155
2156 013556                          TCC3::  ERRDF   8,FUNRM,STAERM          ;REPORT FUNCTION REJECT.
     013556  104455                                                                  TRAP    C$ERDF
     013560  000010                                                                  .WORD   8
     013562  004622                                                                  .WORD   FUNRM
     013564  006120                                                                  .WORD   STAERM
2157 013566  004737  017156                 JSR     PC,DROPU                        ;DROP THE UNIT.
2158 013572  000207                         RTS     PC                              ;RETURN.
2159
2160                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 4, RECOVERABLE ERROR.
2161                                 ;       TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
2162                                 ;       THE FUNCTION WAS INITIATED.  RECOVERY PROCEDURE IS TO LOG THE
2163                                 ;       ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND.
2164                                 ;       2 WRITE-ERROR-RECOVERY ALGORITHMS CAN BE SELECTED:
2165                                 ;       THE FIRST ONE, VIA BADTSW SWITCH,  DOES DETECT BAD SPOTS ON TAPE.
2166                                 ;       IT CALLS A WRITE RETRY SUBR UNTIL THE RECORD IS RECOVERED
2167                                 ;       OR 20 BAD SPOTS HAVE BEEN LOGGED. ON REACHING 20 BAD
2168                                 ;       SPOTS LOGGED, A BAD TAPE OVERFLOW MSG IS PRINTED AND THE
2169                                 ;       UNIT DROPPED.
2170                                 ;       THE SECOND ALGORITHM ISSUES THE TS05 WRITE RETRY COMMAND
2171                                 ;       UP TO 16 TIMES BEFORE DROPPING THE UNIT OR PROCEEDING
2172                                 ;       WITH THE NEXT RECORD ON RECOVERY.
2173                                 ;       INPUTS:
2174                                 ;       OUTPUTS:
2175                                 ;       REGISTERS:      R2,R4.
2176                                 ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU, WRTY
2177
2178 013574  023727  003426  000002 TCC4::  CMP     CMDLG,#2          ;IF CMDLG EQ #2 ANDB BADTSW NE #0 THEN
2179 013602  001125                         BNE     50162$
2180 013604  105737  002210                 TSTB    BADTSW
2181 013610  001522                         BEQ     50162$
2182 013612  105737  003471                 TSTB    ERRREC    ;IFB ERRREC EQ #0 ANDB ERCVER NE #0 THEN
2183 013616  001007                         BNE     50163$
2184 013620  105737  002207                 TSTB    ERCVER
2185 013624  001404                         BEQ     50163$
2186 013626                                 ERRSOFT 9,RERM,STAERM   ;
     013626  104457                                                                  TRAP    C$ERSOFT
     013630  000011                                                                  .WORD   9
     013632  005017                                                                  .WORD   RERM
     013634  006120                                                                  .WORD   STAERM
2187
```

```
2188 013636                                50163$:
2189 013636  105737  002213                        TSTB    IREC        ;IFB IREC EQ #0 THEN
2190 013642  001102                                BNE     50164$
2191 013644  105237  003471                        INCB    ERRREC      ;RETRY FLAG FOR EXCUTE SUBR: DON'T UPDATE REC CN
2192 013650  105237  003464                        INCB    WRTYER      ;REWRITE ERROR FLAG FOR WRTY SUBR
2193 013654  105737  003463                        TSTB    WRTYFG      ;FIRST RETRY ON THIS RECORD: SUBSEQUENT
2194 013660  001072                                BNE     50165$
2195                                               ;RETRIES WITH TCC4 ERRORS BY-PASS THIS SECTION
2196 013662  013737  003420  015064                MOV     CMDWRD,WTYWRD   ;SAVE WRITE COMMAND PACKET
2197 013670  013737  002330  015062                MOV     CMDPKT,WTYCMD
2198 013676  013737  002336  015066                MOV     CMDPKT+CP.CNT,WTYBRF
2199 013704  105237  003467                        INCB    RWERR           ;LOG SUBR FLAG: COUNT WRT ERRORS
2200 013710  105237  003463                        INCB    WRTYFG          ;RETRY IN PROGRESS FLAG
2201
2202 013714                                50166$:     ;REPEAT
2203 013714  005265  003316                        INC     WRTYCT(R5)      ;COUNT GLOBAL WRITE RETRIES
2204 013720  005037  003460                        CLR     RETRYC          ;CLEAR # OF RETRIES PER RECORD
2205 013724  105037  003462                        CLRB    RPTCNT          ;CLEAR # OF REPEATS
2206 013730  004737  014614                        JSR     PC,WRTY         ;CALL WRITE RETRY
2207 013734  105737  003464                        TSTB    WRTYER          ;REPEAT RETRIES ON SAME RECORD
2208 013740  001404                                BEQ     50167$
2209 013742  027727  167544  000050                CMP     @BTPT,#40.
2210 013750  103761                                BLO     50166$
2211 013752                                50167$:
2212
2213 013752  027727  167534  000050                CMP     @BTPT,#40.              ;UNTIL RECOVERED OR 20 BAD SPOTS
2214 013760  103423                                BLO     50170$                  ;WHEN 20 BAD SPOTS LOGGED
2215 013762                                        PRINTB  #BTMSG2                 ;PRINT BAD TAPE OVERFLOW MSG
     013762  012746  015155                                                               MOV     #BTMSG2,-(SP)
     013766  012746  000001                                                               MOV     #1,-(SP)
     013772  010600                                                                       MOV     SP,R0
     013774  104414                                                                       TRAP    C$PNTB
     013776  062706  000004                                                               ADD     #4,SP
2216 014002  004737  015274                        JSR     PC,BORERS               ;ERASE BAD RECORD
2217 014006  005365  003376                        DEC     RECCNT(R5)
2218 014012  004737  017156                        JSR     PC,DROPU                ;DROP UNIT
2219 014016  005065  003376                        CLR     RECCNT(R5)
2220 014022  012775  002350  002514                MOV     #RWCPK,@TSDB(R5)        ;REWIND UNIT
2221
2222 014030                                50170$:
2223 014030  105037  003463                        CLRB    WRTYFG                  ;RETRY COMPLETE FLAG
2224 014034  105237  003531                        INCB    MISCFG                  ;DO NOT HALT ON THIS CMD FLG
2225 014040  013737  015064  003424                MOV     WTYWRD,PCMDWD           ;RESTORE ORIGINAL WRT CMD AFTER RECOVERY
2226
2227 014046                                50165$:
2228
2229 014046  000402                                BR      50171$
2230 014050                                50164$:
2231 014050  105237  003470                        INCB    UNREC       ;LET UNREC :B= UNREC + #1    ;
2232
2233 014054                                50171$:
2234
2235 014054  000454                                BR      50172$
2236 014056                                50162$:
2237 014056  004737  014466                        JSR     PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED.
2238 014062  023727  003426  000002                CMP     CMDLG,#2                ;IF READ CMD THEN:
2239 014070  003411                                BLE     50173$
```

```
2240 014072  012702  000020            MOV     #RRECL,R2               ;R2=READ RETRY COUNT LIMIT / 2
2241 014076  006202                    ASR     R2
2242 014100  023702  003460            CMP     RETRYC,R2       ;IF RETRY COUNT IS MORE THAN HALF LIMIT:
2243 014104  002403                    BLT     50174$
2244 014106  052737  020000  002330    BIS     #OPP.C,CMDPKT           ;SET OPPOSITE BIT FOR RETRY2.
2245
2246 014114                        50174$:
2247
2248 014114                        50173$:
2249 014114  005737  003460            TST     RETRYC      ;IF THIS IS THE ORIGINAL ERROR THEN:
2250 014120  001007                    BNE     50175$
2251 014122  105737  002207            TSTB    ERCVER
2252 014126  001404                    BEQ     50175$
2253 014130                            ERRSOFT 9,RERM,STAERM   ;REPORT RECOVERABLE ERROR
     014130  104457                                                    TRAP    C$ERSOFT
     014132  000011                                                    .WORD   9
     014134  005017                                                    .WORD   RERM
     014136  006120                                                    .WORD   STAERM
2254                                                        ;PROVIDED OPERATOR HAS ENABLED THE REPORT
2255 014140                        50175$:
2256 014140  005237  003460            INC     RETRYC              ;UPDATE RETRY COUNT.
2257 014144  052737  001000  002330    BIS     #MOD.C1,CMDPKT      ;SET RETRY BIT IN CMD PACKET.
2258 014152  105737  002213            TSTB    IREC                ;IF ERROR RECOVERY ENABLED:
2259 014156  001011                    BNE     50176$
2260 014160  105237  003471            INCB    ERRREC              ;SET ERROR RECOVERY FLAG.
2261 014164  012602                    MOV     (SP)+,R2                    ;POP 2 RTN ADRS FROM STACK.
2262 014166  012602                    MOV     (SP)+,R2
2263 014170  004737  012054            JSR     PC,EXCUTE                           ;GO EXECUTE THE RETRY COMMAND.
2264 014174  000137  012364            JMP     GOWAIT                      ;GO WAIT FOR INTERRUPT + CHECK STATUS.
2265                                                        ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
2266 014200  000402                    BR      50177$
2267 014202                        50176$:
2268 014202  105237  003470            INCB    UNREC               ;SET UNRECOVERABLE ERROR FLAG.
2269
2270 014206                        50177$:
2271
2272 014206                        50172$:
2273 014206  000207                    RTS PC                              ;RETURN
2274
2275                               ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
2276                               ;       TAPE POSITION HAS NOT CHANGED.  RECOVERY PROCEDURE IS TO LOG THE
2277                               ;       ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
2278                               ;       INPUTS:
2279                               ;       OUTPUTS:
2280                               ;       REGISTERS:      R2,R4.
2281                               ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU.
2282
2283 014210  004737  014466        TCC5::  JSR     PC,RTLE                     ;CHECK FOR RETRY LIMIT EXCEEDED
2284 014214  005737  003460            TST     RETRYC                      ;IF THIS IS THE ORIGINAL ERPOR THEN:
2285 014220  001004                    BNE     50200$
2286 014222                            ERRSOFT 10,RERM,STAERM  ;REPORT RECOVERABLE ERROR.
     014222  104457                                                    TRAP    C$ERSOFT
     014224  000012                                                    .WORD   10
     014226  005017                                                    .WORD   RERM
     014230  006120                                                    .WORD   STAERM
2287 014232                        50200$:
2288 014232  005237  003460            INC     RETRYC              ;UPDATE RETRY COUNTER.
```

```
2289 014236  105737  002213                TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED:
2290 014242  001016                        BNE     50201$
2291 014244  105237  003471                INCB    ERRREC          ;SET ERROR RECOVERY FLAG.
2292 014250  005265  003376                INC     RECCNT(R5)      ;UPDATE REC COUNT
2293 014254  016577  003376  167124        MOV     RECCNT(R5),@DATAWT              ;AND INSERT IT INTO WRT BFR
2294 014262  012602                        MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
2295 014264  012602                        MOV     (SP)+,R2
2296 014266  004737  012054                JSR     PC,EXCUTE                       ;GO RE-ISSUE THE COMMAND.
2297 014272  000137  012364                JMP     GOWAIT                  ;GO WAIT FOR INTERRUPT + CHECK STATUS.
2298                                                                        ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
2299 014276  000402                        BR      50202$
2300 014300                        50201$:
2301 014300  105237  003470                INCB    UNREC           ;SET UNRECOVERABLE ERROR FLAG.
2302
2303 014304                        50202$:
2304 014304  000207                        RTS     PC                              ;RETURN.
2305
2306
2307                                ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR.
2308                                ;       TAPE POSITION HAS BEEN LOST.  THE ONLY VALID RECOVERY PROCEDURE
2309                                ;       IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR
2310                                ;       SEQUENCE NUMBERS.  THIS DIAGNOSTIC WILL REWIND AND RETRY THE
2311                                ;       COMMAND ONLY IF DENSITY CHECK IS SET, OTHERWISE THE UNIT WILL BE
2312                                ;       DROPPED FROM THE TEST SEQUENCE.
2313                                ;       INPUTS:
2314                                ;       OUTPUTS:
2315                                ;       REGISTERS:      R2, R4
2316                                ;       CALLS:          RTLE, WSSR, EXCUTE, GOWAIT, DROPU
2317
2318 014306  033737  000010  002370  TCC6::  BIT     X3.DCK,MSGPKT+MS.XS3;IF X3.DCK NOTSETIN MSGPKT+MS.XS3 THEN
2319 014314  001016                        BNE     50203$
2320                                                                    ;IF THERE IS NO DENSITY CHECK THEN:
2321 014316  005737  003426                TST     CMDLG                     ;IF CMD IS A READ OR WRITE THEN:
2322 014322  001404                        BEQ     50204$
2323 014324  105237  003467                INCB    RWERR                ;SET RD/WR ERROR FLAG,
2324 014330  105237  003470                INCB    UNREC                ;SET UNRECOVERABLE ERROR FLAG.
2325
2326 014334                        50204$:
2327 014334                                ERRDF   11,URERM,STAERM  ;REPORT UNRECOVERABLE ERROR.
     014334  104455                                                            TRAP    C$ERDF
     014336  000013                                                            .WORD   11
     014340  005041                                                            .WORD   URERM
     014342  006120                                                            .WORD   STAERM
2328 014344  004737  017156                JSR     PC,DROPU                        ;REPORT ERROR + DROP UNIT.
2329                                                                    ;ELSE-IF THERE IS DENSITY CHECK:
2330 014350  000436                        BR      50205$
2331 014352                        50203$:
2332 014352  004737  014466                JSR     PC,RTLE                   ;CHECK FOR RETRY LIMIT EXCEEDED.
2333 014356  005737  003460                TST     RETRYC                    ;IF THIS IS THE ORIGINAL ERROR THEN:
2334 014362  001004                        BNE     50206$
2335 014364                                ERRSOFT 11,URERM,STAERM          ;REPORT DENSITY CHECK ERROR
     014364  104457                                                            TRAP    C$ERSOFT
     014366  000013                                                            .WORD   11
     014370  005041                                                            .WORD   URERM
     014372  006120                                                            .WORD   STAERM
2336
2337 014374                        50206$:
```

```
2338 014374  005237  003460                INC     RETRYC                  ;UPDATE RETRY COUNT.
2339 014400  105737  003521                TSTB    IRE                     ;IF ERROR RECOVERY IS ENABLED THEN:
2340 014404  001016                        BNE     50207$
2341 014406  105237  003471                INCB    ERRREC                    ;SET ERROR RECOVERY FLAG,
2342 014412  012775  002350  002514        MOV     #RWCPK,@TSDB(R5)          ;ISSUE A REWIND COMMAND,
2343 014420  004737  012700                JSR     PC,WSSR                   ;WAIT FOR SUBSYSTEM READY,
2344 014424  012602                        MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
2345 014426  012602                        MOV     (SP)+,R2
2346 014430  004737  012054                JSR     PC,EXCUTE                 ;REISSUE THE COMMAND,
2347 014434  000137  012364                JMP     GOWAIT                    ;WAIT FOR INTERRUPT
2348                                                                        ;ELSE-IF ERR REC DISABLED:
2349 014440  000402                        BR      50210$
2350 014442                        50207$:
2351 014442  105237  003470                INCB    UNREC                 ;SET UNRECOVERABLE ERROR FLAG.
2352
2353 014446                        50210$:
2354
2355 014446                        50205$:
2356 014446  000207                        RTS     PC                                ;RETURN
2357
2358                               ;        SUBROUTINE TO HANDLE TERMINATION CLASS CODE 7, FATAL SUBSYSTEM
2359                               ;        ERROR.  THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING
2360                               ;        COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE.
2361                               ;        REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR
2362                               ;        ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR.
2363                               ;        INPUTS:
2364                               ;        OUTPUTS:
2365                               ;        REGISTERS:      R2, R4
2366                               ;        CALLS:
2367
2368 014450                        TCC7::  ERRDF   12,FATSM,STAERM         ;REPORT FATAL SUBSYSTEM ERROR.
     014450  104455                                                             TRAP    C$ERDF
     014452  000014                                                             .WORD   12
     014454  004642                                                             .WORD   FATSM
     014456  006120                                                             .WORD   STAERM
2369 014460  004737  017156                JSR     PC,DROPU                        ;DROP THE UNIT.
2370 014464  000207                        RTS     PC                              ;RETURN.
2371
2372
2373                               ;        SUBROUTINE TO CHECK FOR RETRY LIMIT EXCEEDED.  PRINTS ERROR MESSAGE
2374                               ;        IF EXCEEDED AND DROP UNIT UNLESS COMMAND IS A READ.
2375                               ;        INPUTS:
2376                               ;        OUTPUTS:
2377                               ;        REGISTERS:      R2, R4.
2378                               ;        CALLS:          DROPU
2379
2380 014466  005737  003426        RTLE::  TST     CMDLG           ;IF CMD IS NOT A READ OR WRITE THEN:
2381 014472  001010                        BNE     50211$
2382 014474                                ERRDF   11,URERM,STAERM ;REPORT UNRECOVERABLE ERROR.
     014474  104455                                                             TRAP    C$ERDF
     014476  000013                                                             .WORD   11
     014500  005041                                                             .WORD   URERM
     014502  006120                                                             .WORD   STAERM
2383 014504  004737  017156                JSR     PC,DROPU                        ;DROP THE UNIT.
2384 014510  012602                        MOV     (SP)+,R2                ;POP  RTN ADRS FROM STACK.
2385 014512  000437                        BR      RTLRTN                  ;AND RETURN.
2386
```

```
2387 014514                                50211$:
2388 014514  105237  003467                      INCB    RWERR           ;SET READ/WRITE ERROR FLAG.
2389 014520  023727  003426  000002              CMP     CMDLG,#2                ;IF CMD IS A WRT OR WTM:
2390 014526  001016                              BNE     50212$
2391 014530  023727  003460  000020              CMP     RETRYC,#WRECL   ;IF RETRY COUNT HAS REACHED LIMIT:
2392 014536  001011                              BNE     50213$
2393 014540  105237  003470                      INCB    UNREC           ;SET UNRECOVERABLE FLAG
2394 014544                                      ERRDF   14,RLEXM,STAERM ;REPORT RETRY LIMIT EXCEEDED.
     014544  104455                                                              TRAP    C$ERDF
     014546  000016                                                              .WORD   14
     014550  004556                                                              .WORD   RLEXM
     014552  006120                                                              .WORD   STAERM
2395 014554  004737  017156                      JSR     PC,DROPU                ;DROP THE UNIT.
2396 014560  012602                              MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
2397 014562                                50213$:
2398                                                                             ;ELSE - CMD IS A READ:
2399 014562  000413                              BR      50214$
2400 014564                                50212$:
2401 014564  023727  003460  000020              CMP     RETRYC,#RRECL   ;IF RETRY COUNT HAS REACHED LIMIT:
2402 014572  001007                              BNE     50215$
2403 014574  105237  003470                      INCB    UNREC           ;SET UNRECOVERABLE FLAG
2404 014600                                      ERRHRD  14,RLEXM,STAERM ;REPORT RECOVERABLE ERROR.
     014600  104456                                                              TRAP    C$ERHRD
     014602  000016                                                              .WORD   14
     014604  004556                                                              .WORD   RLEXM
     014606  006120                                                              .WORD   STAERM
2405 014610  012602                              MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
2406 014612                                50215$:
2407
2408 014612                                50214$:
2409 014612  000207                        PTLRTN: RTS     PC                              ;RETURN
2410
2411                                       ;       SUBR TO REWRITE A BAD, BUT RECOVERABLE WRITTEN RECORD.
2412                                       ;       REWRITE RECORD ON SAME SPOT: REPEAT 4 TIMES.
2413                                       ;       IF ALL 4 REPEATS GOOD, RECORD IS RECOVERED
2414                                       ;       AND A RECOVERABLE WRITE ERROR IS LOGGED.
2415                                       ;       IF ANY OF 4 REPEATS BAD, ERASE BAD RECORD, LOG SUSPECTED
2416                                       ;       BAD SPOT, RETRY AGAIN. RETRY 4 TIMES, UP TO 4 REPEATS EACH.
2417                                       ;       IF RECORD NOT GOOD AFTER 4 RETRIES, ERASE IT, EXIT WITH
2418                                       ;       ERROR FLAG WRTYER SET, PRINTING RETRY FAILED.
2419                                       ;       THIS ALL SCHEME IS REENTERED 20 TIMES MAX, IE 20 BAD
2420                                       ;       SPOTS MAX ARE ALLOWED.
2421                                       ;
2422                                       ;       INPUTS:
2423                                       ;       OUTPUTS:
2424                                       ;       REGISTERS:      R3,R4
2425                                       ;       CALLS:          BORERS, REWRT
2426
2427 014614                                WRTY::  ;BEGIN RETRY      ;REPEAT
2428
2429 014614                                50217$:
2430                                                ;BEGIN REPEAT           ;REPEAT
2431
2432 014614                                50221$:
2433 014614  004737  015274                      JSR     PC,BORERS               ;BACKSPACE/ERASE ONE RECORD
2434 014620  105037  003464                      CLRB    WRTYER                  ;CLEAR WRITE RETRY ERROR
2435 014624  004737  015450                      JSR     PC,REWRT                ;REWRITE RECORD ON SAME SPOT
```

```
2436 014630  105237  003462                    INCB    RPTCNT                  ;COUNT REPEATS
2437 014634  123727  003462  000004            CMPB    RPTCNT,#4               ;LIMIT: 4 REPEATS OR RECOVERED
2438 014642  001403                            BEQ     50222$
2439 014644  105737  003464                    TSTB    WRTYER
2440 014650  001761                            BEQ     50221$
2441 014652                            50222$:
2442                                       ;END REPEAT
2443 014652                            50220$:
2444 014652  005237  003460                    INC     RETRYC                  ;COUNT RETRIES
2445 014656  105737  003464                    TSTB    WRTYER
2446 014662  001001                            BNE     50223$
2447 014664  000457                            BR      50216$                  ;EXIT RETRY LOOP IF RECOVERED
2448
2449 014666                            50223$:
2450 014666  105737  002207                    TSTB    ERCVER          ;IFB ERCVER NE #0 THEN
2451 014672  001415                            BEQ     50225$
2452 014674                                    PRINTB  #BTMSG1,RETRYC,<B,RPTCNT>       ;PRINT SUSPECTED BAD SPOT
     014674  005046                                                                            CLR     -(SP)
     014676  153716  003462                                                                    BISB    RPTCNT,(SP)
     014702  013746  003460                                                                    MOV     RETRYC,-(SP)
     014706  012746  015070                                                                    MOV     #BTMSG1,-(SP)
     014712  012746  000003                                                                    MOV     #3,-(SP)
     014716  010600                                                                            MOV     SP,R0
     014720  104414                                                                            TRAP    C$PNTB
     014722  062706  000010                                                                    ADD     #10,SP
2453 014726                            50225$:
2454 014726  023727  003460  000001            CMP     RETRYC,#1               ;ON FIRST RETRY, LOGG BAD SPOT
2455 014734  001021                            BNE     50226$
2456 014736  016537  002616  003512            MOV     BTADDR(R5),BTPT         ;BTPT IS BOTH THE BAD SPOT COUNTER
2457 014744  017704  166542                    MOV     @BTPT,R4                ;AND THE LOGGING INDEX
2458 014750  062704  000002                    ADD     #2,R4
2459 014754  010477  166532                    MOV     R4,@BTPT
2460 014760  020427  000050                    CMP     R4,#40.         ;IF R4 LOS #40. THEN
2461 014764  101005                            BHI     50227$
2462 014766  013703  003512                    MOV     BTPT,R3         ;STORE FIRST 20 BAD SPOTS
2463 014772  060304                            ADD     R3,R4           ;LET R4 := R4 + R3              ;
2464 014774  016514  003376                    MOV     RECCNT(R5),(R4) ;LET (R4) := RECCNT(R5)         ;
2465
2466 015000                            50227$:
2467
2468 015000                            50226$:
2469 015000  105237  003525                    INCB    ERSFLG          ;ERASE FLAG TO ERASE BAD RECORD
2470 015004  105037  003467                    CLRB    RWERR           ;CANCELL "LOG" ERROR FLAG ON FAILING RET
2471 015010  105037  003462                    CLRB    RPTCNT          ;CLEAR REPEAT COUNT FOR NEXT RETRY
2472
2473 015014                            50224$:
2474 015014  023727  003460  000004            CMP     RETRYC,#4                       ;LIMIT: 4 RETRIES
2475 015022  001274                            BNE     50217$
2476                                       ;END RETRY
2477 015024                            50216$:
2478 015024  105737  003464                    TSTB    WRTYER  ;IFB WRTYER NE #0 THEN
2479 015030  001413                            BEQ     50230$
2480 015032  105737  002207                    TSTB    ERCVER    ;IFB ERCVER NE #0 THEN
2481 015036  001410                            BEQ     50231$
2482 015040                                    PRINTB  #BTMSG3           .     ;PRINT RETRY FAILED
     015040  012746  015225                                                            MOV     #BTMSG3,-(SP)
     015044  012746  000001                                                            MOV     #1,-(SP)
```

```
        015050  010600                                                  MOV     SP,R0
        015052  104414                                                  TRAP    C$PNTB
        015054  062706  000004                                          ADD     #4,SP
   2483
   2484 015060                          50231$:
   2485
   2486 015060                          50230$:
   2487 015060  000207                          RTS     PC
   2488
   2489 015062  000000                  WTYCMD: .WORD   0               ;STORAGE FOR WRITE CMD WHILE RETRYING
   2490 015064  000000                  WTYWRD: .WORD   0               ;STORAGE FOR WRITE CMD WORD WHILE RETRYING
   2491 015066  000000                  WTYBRF: .WORD   0               ;STORAGE FOR WRITE BPCR WHILE RETRYING
   2492
   2493 015070    045     101     123  BTMSG1: .ASCIZ  /%ASUSPECT BAD SPOT AFTER %D1%A RETRY, %D1%A REPEAT%N/
        015073    125     123     120
        015076    105     103     124
        015101    040     102     101
        015104    104     040     123
        015107    120     117     124
        015112    040     101     106
        015115    124     105     122
        015120    040     045     104
        015123    061     045     101
        015126    040     122     105
        015131    124     122     131
        015134    054     040     045
        015137    104     061     045
        015142    101     040     122
        015145    105     120     105
        015150    101     124     045
        015153    116     000
   2494 015155    045     116     045  BTMSG2: .ASCIZ  /%N%ABAD TAPE OVERFLOW: CHANGE TAPE!%N%N/
        015160    101     102     101
        015163    104     040     124
        015166    101     120     105
        015171    040     117     126
        015174    105     122     106
        015177    114     117     127
        015202    072     040     103
        015205    110     101     116
        015210    107     105     040
        015213    124     101     120
        015216    105     041     045
        015221    116     045     116
        015224    000
   2495 015225    045     101     122  BTMSG3: .ASCIZ  /%ARETRY FAILED ON BAD SPOT...ERASED!%N/
        015230    105     124     122
        015233    131     040     106
        015236    101     111     114
        015241    105     104     040
        015244    117     116     040
        015247    102     101     104
        015252    040     123     120
        015255    117     124     056
        015260    056     056     105
        015263    122     101     123
        015266    105     104     041
```

```
      015271     045     116     000
 2496                                        .EVEN
 2497
 2498                                ;       SUBR TO BACSPACE ONE RECORD
 2499                                ;       IF THE ERASE FLAG IS SET, THEN ERASE THAT RECORD
 2500                                ;       INPUTS:         ERSFLG  1 = DO ERASE
 2501                                ;       OUTPUTS:
 2502                                ;       REGISTERS:
 2503                                ;       CALLS:          EXCUTE, GOWAIT, CKHAE
 2504
 2505 015274  013737  003420  003424 BORERS::MOV     CMDWRD,PCMDWD   ;SET COMMAND  TO SPACE REV
 2506 015302  012737  104410  003420         MOV     #SRR,CMDWRD     ;LET CMDWRD := #SRR     ;
 2507 015310  013737  003420  002330         MOV     CMDWRD,CMDPKT   ;LET CMDPKT := CMDWRD CLR.BY #BRF.C     ;
 2508 015316  042737  004000  002330         BIC     #BRF.C,CMDPKT
 2509 015324  013737  002330  003422         MOV     CMDPKT,CMDSAV   ;LET CMDSAV := CMDPKT   ;
 2510 015332  012737  000001  002332         MOV     #1,CMDPKT+CP.ADL        ;LET CMDPKT+CP.ADL := #1        ;
 2511 015340  005037  003426                 CLR     CMDLG   ;LET CMDLG := #0                ;
 2512 015344  004737  011064                 JSR     PC,CMDAC                ;
 2513 015350  004737  012054                 JSR     PC,EXCUTE               ;
 2514 015354  004737  012364                 JSR     PC,GOWAIT               ;
 2515 015360  004737  017456                 JSR     PC,CKHAE                ;
 2516 015364  105737  003525                 TSTB    ERSFLG          ;WHEN ERASE FLAG IS SET, DO ERASE
 2517 015370  001426                         BEQ     50232$
 2518 015372  013737  003420  003424         MOV     CMDWRD,PCMDWD     ;LET PCMDWD := CMDWRD ;
 2519 015400  012737  100411  003420         MOV     #ERS,CMDWRD       ;LET CMDWRD := #ERS   ;
 2520 015406  013737  003420  002330         MOV     CMDWRD,CMDPKT     ;LET CMDPKT := CMDWRD ;
 2521 015414  013737  002330  003422         MOV     CMDPKT,CMDSAV     ;LET CMDSAV := CMDPKT ;
 2522 015422  004737  011064                 JSR     PC,CMDAC                ;
 2523 015426  004737  012054                 JSR     PC,EXCUTE
 2524 015432  004737  012364                 JSR     PC,GOWAIT
 2525 015436  004737  017456                 JSR     PC,CKHAE
 2526 015442  105037  003525                 CLRB    ERSFLG          ;LET ERSFLG :B= #0
 2527
 2528 015446                         50232$:
 2529 015446  000207                         RTS     PC
 2530
 2531                                ;       SUBR TO REWRITE A BADLY WRITTEN RECORD
 2532
 2533 015450  013737  003420  003424 REWRT:: MOV     CMDWRD,PCMDWD   ;RESTORE WRITE COMMAND PACKET
 2534 015456  013737  015064  003420         MOV     WTYWRD,CMDWRD   ;LET CMDWRD := WTYWRD   ;
 2535 015464  013737  015062  002330         MOV     WTYCMD,CMDPKT   ;LET CMDPKT := WTYCMD   ;
 2536 015472  013737  002330  003422         MOV     CMDPKT,CMDSAV   ;LET CMDSAV := CMDPKT   ;
 2537 015500  013737  003406  002332         MOV     DATAWT,CMDPKT+CP.ADL    ;LET CMDPKT+CP.ADL := DATAWT    ;
 2538 015506  013737  015066  002336         MOV     WTYBRF,CMDPKT+CP.CNT    ;LET CMDPKT+CP.CNT := WTYBRF    ;
 2539 015514  012737  000002  003426         MOV     #2,CMDLG        ;LET CMDLG := #2                ;
 2540 015522  004737  011064                 JSR     PC,CMDAC
 2541 015526  004737  012054                 JSR     PC,EXCUTE                       ;RE-WRITE RECORD
 2542 015532  004737  012364                 JSR     PC,GOWAIT                       ;
 2543 015536  004737  017456                 JSR     PC,CKHAE                        ;
 2544 015542  000207                         RTS     PC
 2545
 2546                                ;       SUBROUTINE TO LOG BYTES READ/WRITTEN.
 2547                                ;       ALSO UPDATES READ/WRITE ERROR COUNTERS.
 2548                                ;       INPUTS:
 2549                                ;       OUTPUTS:
 2550                                ;       REGISTERS:      R2, R3, R4.
 2551                                ;       CALLS:
```

```
2552
2553 015544  105737  003466          LOG::   TSTB    ERLOG           ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED THEN:
2554 015550  001126                          BNE     50233$
2555 015552  105237  003466                  INCB    ERLOG           ;SET LOG DONE FLAG.
2556 015556  013704  003426                  MOV     CMDLG,R4        ;GET CURRENT CMD LOGGING CODE.
2557 015562  005704                          TST     R4              ;IF THERE IS A CODE THEN:
2558 015564  001520                          BEQ     50234$
2559 015566  162704  000002                  SUB     #2,R4           ;ADJUST THE CODE FOR TABLE INDEX.
2560 015572  010502                          MOV     R5,R2           ;R2 = ADR OF BYTE COUNT LSW.
2561 015574  066402  016030                  ADD     BINC(R4),R2
2562 015600  062702  002626                  ADD     #CNTBGN,R2
2563 015604  063712  003416                  ADD     BRFCNT,(R2)             ;ADD BRF TO LSW.
2564 015610  023737  002360  003416          CMP     MSGPKT+MS.RFC,BRFCNT  ;IF THE RFC IS LOWER OR THE SAME AS BRF THEN
2565 015616  101002                          BHI     50235$
2566 015620  163712  002360                  SUB     MSGPKT+MS.RFC,(R2)      ;SUBTRACT RFC FROM EXPECTED BRF.
2567
2568 015624                          50235$:
2569 015624  010203                          MOV     R2,R3                   ;R3 = ADR OF 2ND WORD.
2570 015626  062703  000010                  ADD     #10,R3
2571
2572 015632                          50236$:   ;WHILE (R2) GT #999. DO
2573 015632  021227  001747                  CMP     (R2),#999.
2574 015636  003404                          BLE     50237$
2575 015640  162712  001750                  SUB     #1000.,(R2)     ;UPDATE BYTE COUNT
2576 015644  005213                          INC     (R3)        ;LET (R3) := (R3) + #1      ;2ND WORD.
2577
2578 015646  000771                          BR      50236$
2579 015650                          50237$.
2580 015650  010302                          MOV     R3,R2     ;LET R2 := R3 + #10           ;R2 = ADR OF 3RD WORD.
2581 015652  062702  000010                  ADD     #10,R2
2582 015656                          50240$:   ;WHILE (R3) GT #999. DO
2583 015656  021327  001747                  CMP     (R3),#999.
2584 015662  003404                          BLE     50241$
2585 015664  162713  001750                  SUB     #1000.,(R3)     ;UPDATE BYTE COUNT
2586 015670  005212                          INC     (R2)        ;LET (R2) := (R2) + #1      ;3RD WORD.
2587
2588 015672  000771                          BR      50240$
2589 015674                          50241$:
2590 015674  010203                          MOV     R2,R3     ;LET R3 := R2 + #10           ;R3 = ADR OF 4TH WORD.
2591 015676  062703  000010                  ADD     #10,R3
2592 015702                          50242$:   ;WHILE (R2) GT #999. DO
2593 015702  021227  001747                  CMP     (R2),#999.
2594 015706  003404                          BLE     50243$
2595 015710  162712  001750                  SUB     #1000.,(R2)     ;UPDATE BYTE COUNT
2596 015714  005213                          INC     (R3)        ;LET (R3) := (R3) + #1      ;4TH WORD.
2597
2598 015716  000771                          BR      50242$
2599 015720                          50243$:
2600 015720  105737  003467                  TSTB    RWERR                   ;IF R/W ERROR, UPDATE ERROR COUNT.
2601 015724  001440                          BEQ     50244$
2602 015726  010502                          MOV     R5,R2                     ;R2 = ADR OF COUNTER.
2603 015730  066402  016036                  ADD     EINC(R4),R2
2604 015734  062702  002766                  ADD     #WRREC,R2
2605 015740  105737  003470                  TSTB    UNREC           ;IS THE ERROR UNRECOVERABLE?
2606 015744  001404                          BEQ     50245$
2607 015746  062702  000010                  ADD     #10,R2          ;YES, POINT TO NEXT COUNTER.
2608 015752  005212                          INC     (R2)            ;UPDATE THE ERROR COUNTER
```

```
2609
2610 015754  000424                          BR      50246$                  ;ELSE - IF ERROR IS RECOVERABLE:
2611 015756                          50245$:
2612 015756  005212                          INC     (R2)                    ;UPDATE THE ERROR COUNTER
2613 015760  105737  002213                  TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED:
2614 015764  001020                          BNE     50247$
2615 015766  105737  003522                  TSTB    DROPED                  ;IF UNIT HAS NOT BEEN DROPPED:
2616 015772  001015                          BNE     50250$
2617 015774  105737  002207                  TSTB    ERCVER
2618 016000  001412                          BEQ     50250$
2619 016002                                  PRINTB  #NURTY1,RETRYC      ;PRINT # OF RETRIES TO RECOVER
     016002  013746  003460                                                      MOV     RETRYC,-(SP)
     016006  012746  005422                                                      MOV     #NURTY1,-(SP)
     016012  012746  000002                                                      MOV     #2,-(SP)
     016016  010600                                                              MOV     SP,R0
     016020  104414                                                              TRAP    C$PNTB
     016022  062706  000006                                                      ADD     #6,SP
2620                                                                    ;PROVIDED PRINT HAS BEEN ENABLED
2621 016026                          50250$:
2622
2623 016026                          50247$:
2624
2625
2626 016026                          50246$:
2627
2628 016026                          50244$:
2629
2630 016026                          50234$:
2631
2632 016026                          50233$:
2633 016026  000207                          RTS     PC
2634
2635                                 ;       INDEXES TO BYTE COUNTERS.
2636 016030  000000                  BINC:   0                               ;WRITE.
2637 016032  000040                          40                              ;READ REV.
2638 016034  000100                          100                             ;READ FWD.
2639                                 ;       INDEXES TO READ/WRITE ERROR COUNTERS.
2640 016036  000000                  EINC:   0                               ;WRITE.
2641 016040  000020                          20                              ;READ REV.
2642 016042  000040                          40                              ;READ FWD.
2643
2644                                 ;       IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
2645                                 ;       TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
2646                                 ;       READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
2647                                 ;       INPUTS:
2648                                 ;       OUTPUTS:
2649                                 ;       REGISTERS:
2650                                 ;       CALLS:          VFEXC.
2651
2652 016044  105737  003516          VFYDAT::TSTB    VFYFLG              ;IF DATA IS TO BE VERIFIED:
2653 016050  001426                          BEQ     50251$
2654 016052  013737  003420  003424          MOV     CMDWRD,PCMDWD       ;SAVE THE PREVIOUS COMMAND WORD.
2655 016060  012737  104401  003420          MOV     #RDR,CMDWRD         ;COMMAND IS READ REV.
2656 016066  012737  000004  003426          MOV     #4,CMDLG            ;SET UP CMD LOGGING INDEX.
2657 016074  004737  016130                  JSR     PC,VFEXC            ;GO READ ALL THE RECORDS REV.
2658 016100  013737  003420  003424          MOV     CMDWRD,PCMDWD       ;SAVE THE PREVIOUS COMMAND WORD.
2659 016106  012737  104001  003420          MOV     #RDF,CMDWRD         ;COMMAND IS READ FWD.
```

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 2660 016114  012737  000006  003426          MOV     #6,CMDLG          ;SET UP CMD LOGGING INDEX.
 2661 016122  004737  016130                  JSR     PC,VFEXC                ;GO READ ALL RECORDS FWD.
 2662
 2663 016126                          50251$:
 2664 016126  000207                  RTS     PC      ;RETURN.
 2665
 2666
 2667
 2668
 2669                                 ;       SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
 2670                                 ;       INPUTS:
 2671                                 ;       OUTPUTS:
 2672                                 ;       REGISTERS:      R2
 2673                                 ;       CALLS:          CMDAC, FIRSTU, VFISU, NEXTU, CKHAE.
 2674
 2675 016130  013737  003420  002330  VFEXC:: MOV     CMDWRD,CMDPKT   ;COMMAND PACKET = READ REV OR FWD.
 2676 016136  042737  004000  002330          BIC     #BRF.C,CMDPKT
 2677 016144  105737  003520                  TSTB    SWBFLG                  ;IF BYTES ARE TO BE SWAPPED:
 2678 016150  001403                          BEQ     50252$
 2679 016152  052737  010000  002330          BIS     #SWB.C,CMDPKT     ;SET SWAB BIT IN CMD PACKET.
 2680
 2681 016160                          50252$:
 2682 016160  013737  002330  003422          MOV     CMDPKT,CMDSAV                   ;SAVE COMMAND PACKET 1ST WORD.
 2683 016166  013737  003410  002332          MOV     DATARD,CMDPKT+CP.ADL    ;SAVE BUFFER START ADDRESS.
 2684 016174  005037  003412                  CLR     NCNT                            ;CLEAR NUMBER OF OPERATIONS.
 2685
 2686 016200                          50253$: ;WHILE NCNT LT NCNT1 DO         ;WHILE THERE ARE RECORDS REMAINING:
 2687 016200  023737  003412  003414          CMP     NCNT,NCNT1
 2688 016206  002062                          BGE     50254$
 2689 016210  004737  011064                  JSR     PC,CMDAC                        ;STORE CMD ASCII IN ERROR MSG.
 2690 016214  004737  017060                  JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
 2691 016220                          50255$:   ;WHILE  DEVTBL(R5) NE #END DO ;WHILE THERE ARE DEVICES REMAINING:
 2692 016220  026527  002604  177777          CMP     DEVTBL(R5),#END
 2693 016226  001442                          BEQ     50256$
 2694 016230  032737  000400  003420          BIT     #MOD.CO,CMDWRD            ;IF CMD IS REVERSE THEN:
 2695 016236  001421                          BEQ     50257$
 2696 016240  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)         ;IF NOT AT BOT
 2697 016246  001014                          BNE     50260$
 2698 016250  032765  000001  003502          BIT     #X0.EOT,EOTFLG(R5)         ;BUT IF AT EOT
 2699 016256  001406                          BEQ     50261$
 2700 016260  105737  003524                  TSTB    ALLEOT                    ;AND ALL OTHERS AT EOT
 2701 016264  001402                          BEQ     50262$
 2702 016266  004737  016356                  JSR     PC,VFISU                  ;THEN READ VERIFY
 2703                                                                         ;IF NOT ALL AT EOT, FREEZE UNIT(S)
 2704 016272                          50262$:                                         ;IF NOT AT BOT AND
 2705
 2706 016272  000402                          BR      50263$
 2707 016274                          50261$:
 2708 016274  004737  016356                  JSR     PC,VFISU                        ;NOT AT EOT, READ VFY
 2709
 2710 016300                          50263$:
 2711
 2712 016300                          50260$:
 2713 016300  000412                          BR      50264$                  ;ELSE IF CMD IS NOT REVERSE:
 2714 016302                          50257$:
 2715 016302  032765  000001  003502          BIT     #X0.EOT,EOTFLG(R5)
 2716 016310  001404                          BEQ     50265$
```

```
2717 016312  032737  000001  003420          BIT     #CMD.CO,CMDWRD
2718 016320  001002                          BNE     50266$
2719 016322                          50265$:
2720                                                  ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
2721 016322  004737  016356                  JSR     PC,VFISU                ;ISSUE CMD, CHECK STATUS AND DATA.
2722
2723 016326                          50266$:
2724
2725 016326                          50264$:
2726 016326  004737  017126                  JSR     PC,NEXTU                ;GO FIND THE NEXT UNIT.
2727
2728 016332  000732                          BR      50255$
2729 016334                          50256$:
2730 016334  004737  017456                  JSR     PC,CKHAE                ;CHECK FOR HALT AFTER EACH CMD.
2731 016340  005237  003412                  INC     NCNT                    ;UPDATE THE RECORD COUNT.
2732 016344  013737  003420  003424          MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS COMMAND WORD.
2733
2734 016352  000712                          BR      50253$
2735 016354                          50254$:
2736 016354  000207                          RTS     PC                      ;RETURN.
2737
2738                                 ;       SUBROUTINE TO ISSUE COMMAND, AWAIT INTERRUPT,
2739                                 ;       CHECK STATUS, CHECK DATA.
2740                                 ;       INPUTS:
2741                                 ;       OUTPUTS:
2742                                 ;       REGISTERS:      R2
2743                                 ;       CALLS:          EXCUTE, GOWAIT, CKDATA.
2744
2745 016356  013702  003410          VFISU:: MOV     DATARD,R2       ;INIT READ BUFFER POINTER.
2746 016362  062702  000010                  ADD     #8.,R2
2747 016366                          50267$:     ;WHILE R2 NE DATARD DO      ;UNTIL 8 BYTES HAVE BEEN SET,
2748 016366  020237  003410                  CMP     R2,DATARD
2749 016372  001403                          BEQ     50270$
2750 016374  012742  177777                  MOV     #-1,-(R2)               ;INIT READ BUFFER.
2751
2752 016400  000772                          BR      50267$
2753 016402                          50270$:
2754 016402  004737  012054                  JSR     PC,EXCUTE               ;GO EXECUTE THE COMMAND.
2755 016406  105737  003522                  TSTB    DROPED          ;IF UNIT HAS NOT BEEN DROPPED THEN:
2756 016412  001002                          BNE     50271$
2757 016414  004737  012364                  JSR     PC,GOWAIT       ;GO WAIT FOR DONE BIT.
2758
2759 016420                          50271$:
2760 016420  105737  003522                  TSTB    DROPED          ;IF UNIT HAS NOT BEEN DROPPED THEN:
2761 016424  001006                          BNE     50272$
2762 016426  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)      ;WHEN NOT REVERSED INTO BOT, THEN
2763 016434  001002                          BNE     50273$
2764 016436  004737  016444                  JSR     PC,CKDATA       ;GO VERIFY DATA.
2765
2766 016442                          50273$:
2767
2768 016442                          50272$:
2769 016442  000207                          RTS     PC
2770
2771
2772                                 ;       SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
2773                                 ;       AND PRINT ERROR MESSAGE ON MISCOMPARE.
```

```
2774                            ;       INPUTS:
2775                            ;       OUTPUTS:
2776                            ;       REGISTERS:      R2, R3, R4.
2777                            ;       CALLS:          GCMDA
2778
2779 016444  013703  003416     CKDATA::MOV     BRFCNT,R3               ;COMPUTE REC LENGTH READ
2780 016450  163703  002360             SUB     MSGPKT+MS.RFC,R3
2781 016454  005703                     TST     R3                      ;WHEN NO DATA RECEIVED
2782 016456  001015                     BNE     50274$
2783 016460                              ERRHRD  17,WTVERM,DTAERM                ;PRINT ERROR AND EXIT
     016460  104456                                                              TRAP    C$ERHRD
     016462  000021                                                              .WORD   17
     016464  004430                                                              .WORD   WTVERM
     016466  005752                                                              .WORD   DTAERM
2784 016470                              PRINTB  #DTAER4         ;COMPARE ROUTINE
     016470  012746  005337                                                      MOV     #DTAER4,-(SP)
     016474  012746  000001                                                      MOV     #1,-(SP)
     016500  010600                                                              MOV     SP,R0
     016502  104414                                                              TRAP    C$PNTB
     016504  062706  000004                                                      ADD     #4,SP
2785 016510  000560                     BR      50275$
2786 016512                     50274$:
2787 016512  020337  003416             CMP     R3,BRFCNT               ;WHEN REC READ IS LONGER
2788 016516  101417                     BLOS    50276$
2789 016520                                 ERRHRD 17,WTVERM,DTAERM             ;THAN EXPECTED, PRINT
     016520  104456                                                              TRAP    C$ERHRD
     016522  000021                                                              .WORD   17
     016524  004430                                                              .WORD   WTVERM
     016526  005752                                                              .WORD   DTAERM
2790 016530                                 PRINTB #DTAER5,CMDPKT+CP.CNT        ;AN ERROR MESSAGE
     016530  013746  002336                                                      MOV     CMDPKT+CP.CNT,-(SP)
     016534  012746  005360                                                      MOV     #DTAER5,-(SP)
     016540  012746  000002                                                      MOV     #2,-(SP)
     016544  010600                                                              MOV     SP,R0
     016546  104414                                                              TRAP    C$PNTB
     016550  062706  000006                                                      ADD     #6,SP
2791                                                                    ;AND EXIT ROUTINE
2792 016554  000536                     BR      50277$
2793 016556                     50276$:
2794 016556  010337  017054             MOV     R3,CKDCNT               ;SAVE VERIFICATION LENGTH - 1.
2795 016562  005337  017054             DEC     CKDCNT
2796 016566  005037  017056             CLR     CKDFF                   ;CLEAR # OF BYTES IN ERROR COUNTER.
2797 016572  005002                     CLR     R2                      ;INIT BYTE COUNTER
2798 016574  013703  003406             MOV     DATAWT,R3               ;GET WRITE BUFFER ADDRESS.
2799 016600  013704  003410             MOV     DATARD,R4               ;GET READ BUFFER ADDRESS.
2800 016604  105737  003523             TSTB    T1SWB                   ;WHEN RUNNING TEST1-SUB 12,
2801 016610  001401                     BEQ     50300$
2802 016612  000313                     SWAB    (R3)                    ;SWAP FIRST WORD OF WRT BFR
2803                                                            ;WHICH CONTAINS THE RECORD COUNT
2804 016614                     50300$:
2805                                ;REPEAT                             ;REPEAT UNTIL ALL DATA IS COMPARED:
2806 016614                     50301$:
2807 016614  020237  017054             CMP     R2,CKDCNT               ;IF THIS IS THE LAST BYTE THEN:
2808 016620  001011                     BNE     50302$
2809 016622  105737  003520             TSTB    SWBFLG                  ;IF BYTE SWAPPING IS ENABLED THEN:
2810 016626  001406                     BEQ     50303$
2811 016630  032737  000001  017054     BIT     #BIT00,CKDCNT           ;IF RECORD LENGTH IS ODD THEN:
```

```
2812 016636  001002                        BNE     50304$
2813 016640  105723                        TSTB    (R3)+           ;LAST BYTE WILL BE IN
2814 016642  105724                        TSTB    (R4)+           ;THE UPPER BYTE.
2815
2816 016644                          50304$:
2817
2818 016644                          50303$:
2819
2820 016644                          50302$:
2821 016644  121314                         CMPB    (R3),(R4)               ;ARE THEY EQUAL.
2822 016646  001452                         BEQ     3$                      ;BR IF SO.
2823 016650  005737  017056                 TST     CKDFF                   ;1 ST TIME THRU?
2824 016654  001010                         BNE     2$                      ;BR IF NOT.
2825 016656  005265  003346                 INC     VFYCNT(R5)              ;INC THE VERIFY ERROR COUNTER.
2826 016662  005265  003356                 INC     HRDCNT(R5)              ;INC THE HARD ERROR COUNT.
2827 016666                                 ERRHRD  17,WTVERM,DTAERM        ;REPORT WRITE/VERIFY ERROR.
     016666  104456                                                                TRAP    C$ERHRD
     016670  000021                                                                .WORD   17
     016672  004430                                                                .WORD   WTVERM
     016674  005752                                                                .WORD   DTAERM
2828 016676  005237  017056           2$:      INC     CKDFF;LET CKDFF := CKDFF + #1   ;INCREMENT # OF BYTES IN ERROR.
2829 016702  111437  003436                    MOVB    (R4),TIME1              ;SAVE WAS DATA FOR TYPOUT.
2830 016706  042737  177400  003436            BIC     #177400,TIME1           ;CLEAR GARBAGE.
2831 016714  111337  003440                    MOVB    (R3),TIME2              ;SAVE SHOULD BE DATA FOR TYPOUT.
2832 016720  042737  177400  003440            BIC     #177400,TIME2           ;CLEAR GARBAGE.
2833 016726  023727  017056  000013          CMP     CKDFF,#11.              ;IF ERROR BYTE COUNT IS LESS THAN 11:
2834 016734  002017                         BGE     50305$
2835 016736                                 PRINTX  #DTAER2,R2,<B,TIME1>,<B,TIME2>;PRINT ACTUAL & EXPECTED DATA
     016736  005046                                                                CLR     -(SP)
     016740  153716  003440                                                        BISB    TIME2,(SP)
     016744  005046                                                                CLR     -(SP)
     016746  153716  003436                                                        BISB    TIME1,(SP)
     016752  010246                                                                MOV     R2,-(SP)
     016754  012746  005226                                                        MOV     #DTAER2,-(SP)
     016760  012746  000004                                                        MOV     #4,-(SP)
     016764  010600                                                                MOV     SP,R0
     016766  104415                                                                TRAP    C$PNTX
     016770  062706  000012                                                        ADD     #12,SP
2836 016774                          50305$:
2837
2838 016774  105723                  3$:       TSTB    (R3)+           ;UPDATE WRITE BUFFER ADDRESS.
2839 016776  105724                            TSTB    (R4)+           ;UPDATE READ BUFFER ADDRESS.
2840 017000  105722                            TSTB    (R2)+           ;UPDATE BYTE COUNTER.
2841 017002  020237  017054                    CMP     R2,CKDCNT       ;END OF DATA COMPARE REPEAT LOOP.
2842 017006  003702                            BLE     50301$
2843 017010  005237  017054                    INC     CKDCNT          ;CKDCNT EQUALS RECORD LENGTH.
2844 017014  005737  017056                    TST     CKDFF           ;IF COMPARE ERROR HAS OCCURED THEN:
2845 017020  001414                            BEQ     50306$
2846 017022                                    PRINTB  #DTAER3,CKDFF,CKDCNT    ;PRINT # OF BYTES IN ERROR.
     017022  013746  017054                                                        MOV     CKDCNT,-(SP)
     017026  013746  017056                                                        MOV     CKDFF,-(SP)
     017032  012746  005275                                                        MOV     #DTAER3,-(SP)
     017036  012746  000003                                                        MOV     #3,-(SP)
     017042  010600                                                                MOV     SP,R0
     017044  104414                                                                TRAP    C$PNTB
     017046  062706  000010                                                        ADD     #10,SP
2847
```

```
                                50306$:
                                50277$:
                                50275$:
017052  000207                          RTS     PC                      ;OTHERWISE, RETURN.
017054  000000                  CKDCNT: .WORD   0                       ;# OF BYTES TO BE VERIFIED -1.
017056  000000                  CKDFF:  .WORD   0                       ;# OF BYTES IN ERROR COUNTER.
                                ;       SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:
                                ;       CALLS:
017060  105037  003522          FIRSTU:: CLRB   DROPED          ;CLR UNIT DROPPED FLAG
017064  005005                          CLR     R5                      ;CLR DEVICE POINTER.
017066  026527  002604  177774  50307$: CMP     DEVTBL(R5),#NINUSE      ;WHILE DEVICES ARE NOT IN USE:
017074  001003                          BNE     50310$
017076  062705  000002                  ADD     #2,R5   ;LET R5 := R5 + #2      ;POINT TO NEXT DEVICE.
017102  000771                          BR      50307$
017104                          50310$:
017104  026527  002604  177777          CMP     DEVTBL(R5),#END         ;IF ALL UNITS HAVE BEEN DROPPED THEN:
017112  001001                          BNE     50311$
017114                                  DOCLN                           ;DO CLEAN CODE AND TERMINATE PASS.
017114  104444                                                          TRAP    C$DCLN
017116                          50311$:
017116  016537  002604  002074          MOV     DEVTBL(R5),L$LUN        ;SET UNIT # IN 'HEADER' FOR ERROR REPORT
017124  000207                          RTS     PC                      ;RETURN WITH 1ST DEVICE IN R5.
                                ;       SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:
                                ;       CALLS:
017126  105037  003522          NEXTU:: CLRB    DROPED                  ;CLR UNIT DROPPED FLAG
                                ;REPEAT                                 ;REPEAT UNTIL THE NEXT DEVICE IS FOUND.
017132                          50312$:
017132  062705  000002                  ADD     #2,R5                   ;UPDATE DEVICE TABLE POINTER.
017136  026527  002604  177774          CMP     DEVTBL(R5),#NINUSE      ;UNTIL DEVTBL(R5) NE #NINUSE
017144  001772                          BEQ     50312$
017146  016537  002604  002074          MOV     DEVTBL(R5),L$LUN        ;SET UNIT # IN 'HEADER' FOR ERROR REPORT
017154  000207                          RTS     PC                      ;RETURN.
                                ;       SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:
                                ;       CALLS:          MOVMSG, PRXST, LOG
017156  005265  003366          DROPU:: INC     FTLCNT(R5)              ;INCREMENT THE FATAL ERROR COUNT.
017162  013704  002370                  MOV     MSGPKT+MS.XS3,R4        ;GET UDIAG ERROR CODE FROM XSTAT3.
```

```
2904 017166  042704  000377              BIC     #377,R4
2905 017172  016503  002544              MOV     MSGPKA(R5),R3   ;ADR OF THIS UNIT'S MSG PACKET.
2906 017176  005002                      CLR     R2      ;LET R2 := #0                   ;CLR COUNTER.
2907 017200                      50313$: ;WHILE R2 NE #MSGCNT DO         ;WHILE THERE ARE MORE LOCATIONS:
2908 017200  020227  000020              CMP     R2,#MSGCNT
2909 017204  001405                      BEQ     50314$
2910 017206  012723  177777              MOV     #-1,(R3)+               ;INIT THE MSG PACKET WITH ALL 1'S
2911 017212  062702  000002              ADD     #2,R2     ;LET R2 := R2 + #2            ;UPDATE COUNTER.
2912
2913 017216  000770                      BR      50313$
2914 017220                      50314$:
2915 017220  012775  002340  002514      MOV     #GSCPK,@TSDB(R5)        ;INITIATE A GET STATUS COMMAND.
2916 017226  004737  012700              JSR     PC,WSSR                 ;WAIT A WHILE FOR SSR=1
2917 017232  004737  012734              JSR     PC,MOVMSG               ;MOVE MSG PACKET TO COMMON AREA.
2918 017236  020427  157400              CMP     R4,#X3.RNY              ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
2919 017242  001005                      BNE     50315$
2920 017244                              ERRDF   16,RNYM,STAERM          ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
     017244  104455                                                              TRAP    C$ERDF
     017246  000020                                                              .WORD   16
     017250  004753                                                              .WORD   RNYM
     017252  006120                                                              .WORD   STAERM
2921                                                                 ;ELSE-IF NOT A RUNNAWAY:
2922 017254  000402                      BR      50316$
2923 017256                      50315$:
2924 017256  004737  017370              JSR     PC,PRXST                ;PRINT EXTENDED STATUS REGISTERS.
2925
2926 017262                      50316$:
2927 017262  105737  003465              TSTB    RECLOG                  ;IF THE RECORD HAS BEEN LOGGED THEN:
2928 017266  001404                      BEQ     50317$
2929 017270  105237  003522              INCB    DROPED                  ;SET UNIT DROPPED FLAG.
2930 017274  004737  015544              JSR     PC,LOG                  ;LOG DATA BYTES + RD/WR ERRORS.
2931
2932 017300                      50317$:
2933 017300                              DORPT                           ;PRINT PERFORMANCE REPORT
     017300  104424                                                              TRAP    C$DRPT
2934 017302  005765  003326      DROPUA: TST     PASCNT(R5)              ;IF PASCNT(R5) NE #0 THEN
2935 017306  001402                      BEQ     50320$
2936 017310  005365  003326              DEC     PASCNT(R5)      ;LET PASCNT(R5) := PASCNT(R5) - #1
2937
2938 017314                      50320$:
2939 017314  013737  003534  017366      MOV     TSNP,DROPN              ;SAVE # OF UNIT TO BE DROPPED.
2940 017322  013700  003534              MOV     TSNP,R0                 ;R0=LOGICAL DEVICE NUMBER
2941 017326                              DODU    R0                      ;DROP THE UNIT
     017326  104451                                                              TRAP    C$DODU
2942                                                                 ;EXEC BGNDU-ENDDU CODE IF IDU = 0
2943
2944 017330  026527  002604  177774      CMP     DEVTBL(R5),#NINUSE      ;IF UNIT NOT DROPPED
2945 017336  001410                      BEQ     50321$
2946 017340  105737  002213              TSTB    IREC                      ;IF RECOVERY IS ENABLED THEN:
2947 017344  001005                      BNE     50322$
2948 017346  000240                      NOP
2949 017350  000240                      NOP
2950 017352  000240                      NOP
2951 017354  105237  003526              INCB    STAFLG                  ;SET START FLAG TO ENABLE REWIND,
2952
2953 017360                      50322$:
2954
```

```
 2955 017360                            50321$:
 2956 017360  105237  003522           DRORTN: INCB    DROPED                  ;SET UNIT DROPPED FLAG.
 2957 017364  000207                            RTS     PC                      ;RETURN.
 2958
 2959 017366  000000                    DROPN:  .WORD   0                       ;# OF UNIT TO BE DROPPED
 2960
 2961                                   ;       SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
 2962                                   ;       INPUTS:
 2963                                   ;       OUTPUTS:
 2964                                   ;       REGISTERS:
 2965                                   ;       CALLS:
 2966
 2967 017370                            PRXST:: PRINTX #GETSTM
      017370  012746  005507                                                                  MOV     #GETSTM,-(SP)
      017374  012746  000001                                                                  MOV     #1,-(SP)
      017400  010600                                                                          MOV     SP,R0
      017402  104415                                                                          TRAP    C$PNTX
      017404  062706  000004                                                                  ADD     #4,SP
 2968 017410                                    PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3,MSGPKT+MS.XS
      017410  013746  002372                                                                  MOV     MSGPKT+MS.XS4,-(SP)
      017414  013746  002370                                                                  MOV     MSGPKT+MS.XS3,-(SP)
      017420  013746  002366                                                                  MOV     MSGPKT+MS.XS2,-(SP)
      017424  013746  002364                                                                  MOV     MSGPKT+MS.XS1,-(SP)
      017430  013746  002362                                                                  MOV     MSGPKT+MS.XS0,-(SP)
      017434  012746  006753                                                                  MOV     #STAER5,-(SP)
      017440  012746  000006                                                                  MOV     #6,-(SP)
      017444  010600                                                                          MOV     SP,R0
      017446  104415                                                                          TRAP    C$PNTX
      017450  062706  000016                                                                  ADD     #16,SP
 2969 017454  000207                            RTS PC
 2970
 2971                                   ;       SUBROUTINE TO HALT AFTER EACH COMMAND.
 2972                                   ;       INPUTS:
 2973                                   ;       OUTPUTS:
 2974                                   ;       REGISTERS:      R3, R4
 2975                                   ;       CALLS:
 2976
 2977 017456  105737  002206           CKHAE:: TSTB    HAE;IFB HAE NE #0 THEN          ;IF HALT FLAG IS SET:
 2978 017462  001430                            BEQ     50323$
 2979 017464  105737  003531                    TSTB    MISCFG    ;IFB MISCFG EQ #0 THEN                ;
 2980 017470  001023                            BNE     50324$
 2981 017472                                        MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
      017472  104450                                                                          TRAP    C$MANI
 2982 017474                                        BNCOMPLETE CKHRTN               ;BR IF NOT.
      017474  103023                                                                          BCC     CKHRTN
 2983 017476  013704  003420                    MOV     CMDWRD,R4               ;LET R4 := CMDWRD       ;COMMAND WORD.
 2984 017502  004737  011136                        JSR PC,GCMDA                    ;FETCH ADR OF CMD ASCII.
 2985 017506  112337  004306                    MOVB    (R3)+,HALTM             ;MOVE CMD ASCII
 2986 017512  112337  004307                    MOVB    (R3)+,HALTM+1           ;LET HALTM+1 :B= (R3)+
 2987 017516  111337  004310                    MOVB    (R3),HALTM+2                ;INTO MESSAGE.
 2988 017522                                        GMANIL HALTM,TIME1,1,YES        ;HALT - WAIT FOR AN OEPRATOR INPUT.
      017522  104443                                                                          TRAP    C$GMAN
      017524  000404                                                                          BR      10000$
      017526  003436                                                                          .WORD   TIME1
      017530  000130                                                                          .WORD   T$CODE
      017532  004306                                                                          .WORD   HALTM
      017534  000001                                                                          .WORD   1
```

```
        017536                          10000$:
   2989 017536                          10000$:
   2990
   2991 017536  000402                          BR      50325$
   2992 017540                          50324$:
   2993 017540  105037  003531                  CLRB    MISCFG      ;LET MISCFG :B= #0          ;
   2994
   2995 017544                          50325$:
   2996
   2997 017544                          50323$:
   2998 017544  000207                  CKHRTN: RTS     PC                      ;RETURN
   2999                                         .EVEN
   3000
   3001 017546                                  ENDMOD
   3002
   3003
   3004                                 .TITLE MISCELLANEOUS SECTIONS
   3005                                 .SBTTL  REPORT CODING SECTION
   3006
   3007
   3008                                 ;++
   3009                                 ; THE REPORT CODING SECTION CONTAINS THE
   3010                                 ; 'PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
   3011                                 ;--
   3012
   3013 017546                                  BGNRPT
        017546                          L$RPT::
   3014 017546  010537  003452                  MOV     R5,R5SAVE               ;SAVE CURRENT DEVICE POINTER.
   3015 017552  004737  017060                  JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
   3016 017556                          50326$: ;WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
   3017 017556  026527  002604  177777        CMP     DEVTBL(R5),#END
   3018 017564  001562                          BEQ     50327$
   3019 017566                                    PRINTS      #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
        017566  016546  003376                                                  MOV     RECCNT(R5),-(SP)
        017572  016546  003326                                                  MOV     PASCNT(R5),-(SP)
        017576  016546  002604                                                  MOV     DEVTBL(R5),-(SP)
        017602  012746  020410                                                  MOV     #RPT1A,-(SP)
        017606  012746  000004                                                  MOV     #4,-(SP)
        017612  010600                                                          MOV     SP,R0
        017614  104416                                                          TRAP    C$PNTS
        017616  062706  000012                                                  ADD     #12,SP
   3020 017622                                    PRINTS      #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
        017622  016546  002626                                                  MOV     WRBC(R5),-(SP)
        017626  016546  002636                                                  MOV     WRBC+10(R5),-(SP)
        017632  016546  002646                                                  MOV     WRBC+20(R5),-(SP)
        017636  016546  002656                                                  MOV     WRBC+30(R5),-(SP)
        017642  012746  020465                                                  MOV     #RPT1B,-(SP)
        017646  012746  000005                                                  MOV     #5,-(SP)
        017652  010600                                                          MOV     SP,R0
        017654  104416                                                          TRAP    C$PNTS
        017656  062706  000014                                                  ADD     #14,SP
   3021 017662                                    PRINTS      #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
        017662  016546  002666                                                  MOV     RRBC(R5),-(SP)
        017666  016546  002676                                                  MOV     RRBC+10(R5),-(SP)
        017672  016546  002706                                                  MOV     RRBC+20(R5),-(SP)
        017676  016546  002716                                                  MOV     RRBC+30(R5),-(SP)
        017702  012746  020536                                                  MOV     #RPT1C,-(SP)
```

```
        017706  012746  000005                                                  MOV     #5,-(SP)
        017712  010600                                                          MOV     SP,R0
        017714  104416                                                          TRAP    C$PNTS
        017716  062706  000014                                                  ADD     #14,SP
3022    017722                          PRINTS  #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
        017722  016546  002726                                                  MOV     RFBC(R5),-(SP)
        017726  016546  002736                                                  MOV     RFBC+10(R5),-(SP)
        017732  016546  002746                                                  MOV     RFBC+20(R5),-(SP)
        017736  016546  002756                                                  MOV     RFBC+30(R5),-(SP)
        017742  012746  020607                                                  MOV     #RPT1D,-(SP)
        017746  012746  000005                                                  MOV     #5,-(SP)
        017752  010600                                                          MOV     SP,R0
        017754  104416                                                          TRAP    C$PNTS
        017756  062706  000014                                                  ADD     #14,SP
3023    017762                          PRINTS  #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
        017762  016546  003026                                                  MOV     RFREC(R5),-(SP)
        017766  016546  003006                                                  MOV     RRREC(R5),-(SP)
        017772  016546  002766                                                  MOV     WRREC(R5),-(SP)
        017776  012746  020713                                                  MOV     #RPT1F,-(SP)
        020002  012746  000004                                                  MOV     #4,-(SP)
        020006  010600                                                          MOV     SP,R0
        020010  104416                                                          TRAP    C$PNTS
        020012  062706  000012                                                  ADD     #12,SP
3024    020016                          PRINTS  #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
        020016  016546  003036                                                  MOV     RFUNR(R5),-(SP)
        020022  016546  003016                                                  MOV     RRUNR(R5),-(SP)
        020026  016546  002776                                                  MOV     WRUNR(R5),-(SP)
        020032  012746  020764                                                  MOV     #RPT1G,-(SP)
        020036  012746  000004                                                  MOV     #4,-(SP)
        020042  010600                                                          MOV     SP,R0
        020044  104416                                                          TRAP    C$PNTS
        020046  062706  000012                                                  ADD     #12,SP
3025    020052  105737  002210        TSTB    BADTSW  ;IFB BADTSW NE #0 THEN  ;
3026    020056  001402                BEQ     50330$
3027    020060  004737  020142            JSR PC,BTRPT        ;GO PRINT BAD TAPE SPOTS WHEN  ENABLED
3028
3029    020064                  50330$:
3030    020064                    PRINTS        #RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNT(R5)
        020064  016546  003346                                                  MOV     VFYCNT(R5),-(SP)
        020070  016546  003366                                                  MOV     FTLCNT(R5),-(SP)
        020074  016546  003356                                                  MOV     HRDCNT(R5),-(SP)
        020100  016546  003336                                                  MOV     SCCNT(R5),-(SP)
        020104  012746  021161                                                  MOV     #RPT1I,-(SP)
        020110  012746  000005                                                  MOV     #5,-(SP)
        020114  010600                                                          MOV     SP,R0
        020116  104416                                                          TRAP    C$PNTS
        020120  062706  000014                                                  ADD     #14,SP
3031    020124  004737  017126          JSR   PC,NEXTU              ;FIND THE NEXT UNIT.
3032
3033    020130  000612                BR      50326$
3034    020132                  50327$:
3035    020132  013705  003452        MOV     R5SAVE,R5           ;RESTORE CURRENT DEVICE POINTER.
3036    020136                        EXIT    RPT
        020136  000167                                                          .WORD   J$JMP
        020140  001130                                                          .WORD   L10010-2-.
3037
3038                            ;       SUBR TO PRINT BAD TAPES SPOTS DURING THE REPORT PRINTS
```

```
3039                                    ;       WRITE RETRIES: CUMULATIVE COUNT
3040                                    ;       BAD TAPE SPOTS: COUNT PER TAPE PASS ONLY, NOT CUMULATIVE.
3041                                    ;       COUNT OF RECOVERABLE WRITE ERRORS EXCLUDES BAD TAPE SPOTS.
3042
3043 020142                            BTRPT:: PRINTS  #RPT1E,WRTYCT(R5)       ;PRINT GLOBAL WRITE RETRY COUNT
      020142  016546  003316                                                            MOV     WRTYCT(R5),-(SP)
      020146  012746  021035                                                            MOV     #RPT1E,-(SP)
      020152  012746  000002                                                            MOV     #2,-(SP)
      020156  010600                                                                    MOV     SP,R0
      020160  104416                                                                    TRAP    C$PNTS
      020162  062706  000006                                                            ADD     #6,SP
3044 020166  016537  002616  003512          MOV     BTADDR(R5),BTPT         ;BTPT IS BOTH THE BAD TAPE SPOT COUNTER
3045 020174  017703  163312                  MOV     @BTPT,R3                ;AND THE LOGGING INDEX
3046 020200  006203                          ASR     R3
3047 020202                                  PRINTS  #RPT1J,R3       ;PRINT # OF BAD TAPE SPOTS
      020202  010346                                                            MOV     R3,-(SP)
      020204  012746  021065                                                            MOV     #RPT1J,-(SP)
      020210  012746  000002                                                            MOV     #2,-(SP)
      020214  010600                                                                    MOV     SP,R0
      020216  104416                                                                    TRAP    C$PNTS
      020220  062706  000006                                                            ADD     #6,SP
3048 020224  005703                          TST     R3                      ;PRINT RECORD # IF BAD SPOTS DETECTED
3049 020226  001457                          BEQ     50331$
3050 020230  020327  000024                  CMP     R3,#20.         ;IF R3 HI #20. THEN     ;
3051 020234  101402                          BLOS    50332$
3052 020236  012703  000024                  MOV     #20.,R3                 ;20 BAD SPOTS IS THE LIMIT
3053
3054 020242                            50332$:
3055 020242                              PRINTS      #CRLFSP     ;
      020242  012746  005744                                                            MOV     #CRLFSP,-(SP)
      020246  012746  000001                                                            MOV     #1,-(SP)
      020252  010600                                                                    MOV     SP,R0
      020254  104416                                                                    TRAP    C$PNTS
      020256  062706  000004                                                            ADD     #4,SP
3056 020262  013704  003512          MOV     BTPT,R4   ;LET R4 := BTPT + #2  ;FETCH A BAD SPOT ID
3057 020266  062704  000002          ADD     #2,R4
3058 020272  005002                  CLR     R2                      ;R2 = PRINT COUNT PER LINE: 10 MAX
3059 020274                        50333$:   ;REPEAT                 ;
3060 020274                                  PRINTS      #RPT1K,(R4)     ;PRINT A BAD SPOT ID
      020274  011446                                                            MOV     (R4),-(SP)
      020276  012746  021152                                                            MOV     #RPT1K,-(SP)
      020302  012746  000002                                                            MOV     #2,-(SP)
      020306  010600                                                                    MOV     SP,R0
      020310  104416                                                                    TRAP    C$PNTS
      020312  062706  000006                                                            ADD     #6,SP
3061 020316  005202                  INC     R2              ;LET R2 := R2 + #1  ;COUNT PRINTS
3062 020320  062704  000002          ADD     #2,R4           ;LET R4 := R4 + #2  ;NEXT
3063 020324  020227  000012          CMP     R2,#10.         ;IF R2 EQ #10. THEN ;
3064 020330  001014                  BNE     50334$
3065 020332                                PRINTS #CRLFSP            ;GO TO NEXT PRINT LINE PAST 10 PRINTS
      020332  012746  005744                                                            MOV     #CRLFSP,-(SP)
      020336  012746  000001                                                            MOV     #1,-(SP)
      020342  010600                                                                    MOV     SP,R0
      020344  104416                                                                    TRAP    C$PNTS
      020346  062706  000004                                                            ADD     #4,SP
3066 020352  162703  000012          SUB     #10.,R3         ;LET R3 := R3 - #10.        ;ADJUST BAD SPOT COUNT
3067 020356  162702  000012          SUB     #10.,R2         ;LET R2 := R2 - #10.        ;ADJUST PRINT COUNT
```

```
                                                                        ;
020362                                    50334$:
020362  020203                                    CMP     R2,R3      ;UNTIL R2 EQ R3              ;LIMIT: # OF BAD SPOTS
020364  001343                                    BNE     50333$
                                                                        ;
020366                                    50331$:
020366                                            PRINTS  #CRLF           ;
020366  012746  005741                                                                 MOV     #CRLF,-(SP)
020372  012746  000001                                                                 MOV     #1,-(SP)
020376  010600                                                                         MOV     SP,R0
020400  104416                                                                         TRAP    C$PNTS
020402  062706  000004                                                                 ADD     #4,SP
020406  000207                                    RTS PC

                                                  .NLIST  BEX
020410     045      116     045   RPT1A:  .ASCIZ  /%N%N%AUNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
020465     045      101     102   RPT1B:  .ASCIZ  /%ABYTES WRITTEN  %D3%A,%Z3%A,%Z3%A,%Z3%N/
020536     045      101     102   RPT1C:  .ASCIZ  /%ABYTES READ REV %D3%A,%Z3%A,%Z3%A,%Z3%N/
020607     045      101     102   RPT1D:  .ASCII  /%ABYTES READ FWD %D3%A,%Z3%A,%Z3%A,%Z3%N/
020657     045      123     062           .ASCIZ  /%S23%AWRT%S4%ARDR%S4%ARDF%N/
020713     045      101     122   RPT1F:  .ASCIZ  /%ARECOVERABLE ERRORS   %D5%S2%D5%S2%D5%N/
020764     045      101     125   RPT1G:  .ASCIZ  /%AUNRECOVERABLE ERRORS %D5%S2%D5%S2%D5%N/
021035     045      101     127   RPT1E:  .ASCIZ  /%AWRITE RETRIES%S8%D5%N/
021065     045      116     045   RPT1J:  .ASCIZ  /%N%D2%A BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:/
021152     045      104     065   RPT1K:  .ASCIZ  /%D5%S1/
021161     045      101     123   RPT1I:  .ASCII  '%ASPEC COND%S3%AHARD%S3%AFATAL%S3%ACOMPARE%N'
021235     045      123     063           .ASCIZ  /%S3%D5%S3%D5%S3%D5%S3%D5%N%N/
                                                  .LIST   BEX
                                                  .EVEN

021272                                            ENDRPT
021272                                    L10010:
021272  104425                                                                         TRAP    C$RPT

                                          .SBTTL  LOAD DEVICE PROTECTION TABLE

                                          ;++
                                          ;TABLE FOR SUPERVISOR TO IDENTIFY THE P-TBL FOR THE LOAD DEV
                                          ;THE SUPERVISOR USES THE TBL TO WARN THE OPERATOR WHEN HE TRIES TO TEST THE LOAD DEV
                                          ;--

021274                                            BGNPROT
021274                                    L$PROT::

021274  000000                                      .WORD 0            ;P-TBL OFFSET OF TSDB
021276  177777                                      .WORD -1           ;P-TBL OFFSET OF MASS BUS UNIT #: -1 = NOT A MASS BUS DE
021300  177777                                      .WORD -1           ;P-TBL OFFSET OF DRIVE #: -1 = NONE, THREE DRIVES PER CONTRO
021302                                            ENDPROT

                                          .SBTTL  INITIALIZE SECTION

                                          ;++
                                          ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                          ; AT THE BEGINNING OF EACH PASS.
                                          ;--

021302                                            BGNINIT
```

```
      021302                                L$INIT::
3117
3118 021302  032727  000003  002330  INIT10: BIT     #BIT0!BIT1,#CMDPKT   ;IF CMD PACKET IS NOT ON MODULO 4 BOUNDRY:
3119 021310  001421                          BEQ     50335$
3120 021312                                    ERRSF 1,CMDPKM               ;PRINT ERROR MSG,
      021312  104454                                                              TRAP    C$ERSF
      021314  000001                                                              .WORD   1
      021316  004346                                                              .WORD   CMDPKM
      021320  000000                                                              .WORD   0
3121 021322                                    DELAY 200.                   ;GO TO SUPERVISOR, WAIT 2 SECONDS.
      021322  012727  000310                                                      MOV     #200.,(PC)+
      021326  000000                                                              .WORD   0
      021330  013727  002116                                                      MOV     L$DLY,(PC)+
      021334  000000                                                              .WORD   0
      021336  005367  177772                                                      DEC     -6(PC)
      021342  001375                                                              BNE     .-4
      021344  005367  177756                                                      DEC     -22(PC)
      021350  001367                                                              BNE     .-20
3122 021352  000753                          BR      INIT10               ;
3123
3124 021354                                50335$:
3125
3126 021354  105737  002204                TSTB    CLRFLG                   ;IF CLR COUNTERS FLAG SET:
3127 021360  001413                        BEQ     50336$
3128 021362  105037  002204                  CLRB  CLRFLG                   ;INIT CLR FLAG.
3129 021366  005002                        CLR     R2          ;LET R2 := #0
3130 021370                                50337$:   ;WHILE R2 NE #CNTLEN DO
3131 021370  020227  000550                CMP     R2,#CNTLEN
3132 021374  001405                        BEQ     50340$
3133 021376  005062  002626                CLR     WRBC(R2)                 ;CLR ALL STATISTICAL COUNTERS.
3134 021402  062702  000002                ADD     #2,R2       ;LET R2 := R2 + #2
3135
3136 021406  000770                        BR      50337$
3137 021410                                50340$:
3138
3139 021410                                50336$:
3140
3141 021410  105737  002205                TSTB    RRANV           ;IF RESET RANDOM VARIABLE FLAG IS SET THEN:
3142 021414  001406                        BEQ     50341$
3143 021416  012737  153624  003432        MOV     #RANBC,RANB               ;RESET RANDOM BASE #.
3144
3145 021424  012737  032561  003434        MOV     #RANSC,RANS               ;RESET RANDOM SAVE LOCATION.
3146
3147 021432                                50341$:
3148 021432                                READEF  #EF.START                ;READ START COMMAND EVENT FLAG.
      021432  012700  000040                                                      MOV     #EF.START,R0
      021436  104447                                                              TRAP    C$REFG
3149 021440                                BNCOMPLETE      INIT15           ;BRANCH IF NOT STARTING.
      021440  103057                                                              BCC     INIT15
3150 021442  105237  003526                INCB    STAFLG                   ;SET START COMMAND FLAG.
3151 021446  012705  000006                MOV     #6,R5   ;LET R5 := #6
3152 021452                                50342$: ;REPEAT                  ;INITIATE UNIT NUMBER TABLE
3153 021452  012765  177774  002604        MOV     #NINUSE,DEVTBL(R5)       ;BY STORING NOT IN USE IN EACH LOCATION.
3154 021460  162705  000002                SUB     #2,R5     ;LET R5 := R5 - #2
3155 021464  005705                        TST     R5      ;UNTIL R5 EQ #0
3156 021466  001371                        BNE     50342$
3157 021470  022737  000001  002012        CMP     #1,L$UNIT                ;ONLY ONE UNIT ALLOWED
```

```
3158 021476  001425                    BEQ     5034$                   ;OK
3159 021500                             PRINTF  #AUDRUN                 ;TELL THE MAN
     021500  012746  005146                                                       MOV     #AUDRUN,-(SP)
     021504  012746  000001                                                       MOV     #1,-(SP)
     021510  010600                                                               MOV     SP,R0
     021512  104417                                                               TRAP    C$PNTF
     021514  062706  000004                                                       ADD     #4,SP
3160 021520                             DELAY   25                      ;WAIT
     021520  012727  000025                                                       MOV     #25,(PC)+
     021524  000000                                                               .WORD   0
     021526  013727  002116                                                       MOV     L$DLY,(PC)+
     021532  000000                                                               .WORD   0
     021534  005367  177772                                                       DEC     -6(PC)
     021540  001375                                                               BNE     .-4
     021542  005367  177756                                                       DEC     -22(PC)
     021546  001367                                                               BNE     .-20
3161 021550                             DOCLN                           ;ABORT
     021550  104444                                                               TRAP    C$DCLN
3162 021552  013705  002012    5034$:  MOV     L$UNIT,R5       ;LET R5 := L$UNIT SHIFT 1
3163 021556  006305                    ASL     R5
3164 021560                     50343$: ;REPEAT                         ;STORE ALL UNIT
3165 021560  162705  000002            SUB     #2,R5     ;LET R5 := R5 - #2            ;NUMBERS IN DEVTBL.
3166 021564  010565  002604            MOV     R5,DEVTBL(R5)     ;LET DEVTBL(R5) := R5 SHIFT -1
3167 021570  006265  002604            ASR     DEVTBL(R5)
3168 021574  005705                    TST     R5      ;UNTIL R5 EQ #0
3169 021576  001370                    BNE     50343$
3170
3171 021600                     INIT15: READEF #EF.PWR                  ;HAS THERE BE A POWER FAILURE?
     021600  012700  000034                                                       MOV     #EF.PWR,R0
     021604  104447                                                               TRAP    C$REFG
3172 021606                             BNCOMPLETE INIT16               ;BRANCH IF NOT.
     021606  103004                                                               BCC     INIT16
3173 021610  105237  003526            INCB    STAFLG                  ;IF SO - SET THE START FLAG.
3174 021614  105237  003527            INCB    PWRFLG                  ;IF SO - SET THE POWER FAIL FLAG.
3175
3176 021620                     INIT16: RFLAGS  OPFLAG                  ;READ AND STORE FLAGS SET BY OPERATOR
     021620  104421                                                               TRAP    C$RFLA
     021622  010037  003536                                                       MOV     R0,OPFLAG
3177 021626  005003                    CLR     R3      ;LET R3 := #0                   ;CLEAR EVENT FLAG
3178 021630  105737  003527            TSTB    PWRFLG          ;IF POWER FAIL HAS NOT OCCURRED THEN:
3179 021634  001020                    BNE     50344$
3180 021636                                   READEF #EF.NEW            ;UPDATE PASS COUNT WHEN
     021636  012700  000035                                                       MOV     #EF.NEW,R0
     021642  104447                                                               TRAP    C$REFG
3181 021644  103014                    BCC     50345$                  ;SUPERVISOR IS IN NEW PASS
3182 021646  105737  003526            TSTB    STAFLG                  ;AND DIAG WAS NEITHER STARTED
3183 021652  001010                    BNE     50346$
3184 021654                                     READEF #EF.RES          ;NOR
     021654  012700  000037                                                       MOV     #EF.RES,R0
     021660  104447                                                               TRAP    C$REFG
3185 021662  103402                    BCS     50347$          ;IFCOND CC THEN         ;RESTARTED
3186 021664  005103                    COM     R3                ;LET R3 := COMP R3    ;DO IT
3187
3188 021666  000401                    BR      50350$
3189 021670                     50347$:
3190 021670  005203                    INC     R3                      ;SET 1ST PASS IF NEW PASS AND
3191                                                                    ;RESTARTING
```

```
3192 021672                          50350$:
3193
3194 021672  000401                          BR      50351$
3195 021674                          50346$:
3196 021674  005203                          INC     R3                      ;SET 1ST PASS IF NEW PASS AND
3197                                                                         ;STARTING
3198 021676                          50351$:
3199                                                    ;DO NOT UPDATE IT ON CONTINUE
3200 021676                          50345$:
3201                                                    ;OR ON POWER FAIL
3202 021676                          50344$:
3203 021676  004737  017060                    JSR     PC,FIRSTU               ;INIT DEVICE POINTER.
3204 021702  005002                          CLR     R2      ;LET R2 := #0                   ;INIT DEVICE COUNTER.
3205 021704                          50352$: ;WHILE DEVTBL(R5) NE #END DO
3206 021704  026527  002604  177777        CMP     DEVTBL(R5),#END
3207 021712  001456                          BEQ     50353$
3208 021714  005202                          INC     R2      ;LET R2 := R2 + #1
3209 021716  010500                          MOV     R5,R0   ;LET R0 := R5 SHIFT -1
3210 021720  006200                          ASR     R0
3211 021722                                  GPHARD  R0,R0                   ;GET HARDWARE P TABLE FROM SUPER.
     021722  104442                                                                  TRAP    C$GPHRD
3212 021724  103044                          BCC     50354$  ;IFCOND CS THEN
3213 021726  011065  002514                  MOV     (R0),TSDB(R5)           ;SAVE TSDB ADDRESS.
3214 021732  012065  002524                  MOV     (R0)+,TSSR(R5)          ;SAVE TSSR ADDRESS.
3215 021736  062765  000002  002524          ADD     #2,TSSR(R5)
3216 021744  012065  002534                  MOV     (R0)+,TSVCT(R5)         ;SAVE INTERRUPT VECTOR ADDRESS.
3217 021750  011065  003532                  MOV     (R0),TSUNT(R5)          ;SAVE NUMBER OF DRIVE
3218 021754  011037  003534                  MOV     (R0),TSNP               ;SAVE FOR PRINT OUT'S
3219 021760                                  SETVEC  TSVCT(R5),TS5INT(R5),#INTPRI
     021760  012746  000340                                                          MOV     #INTPRI,-(SP)
     021764  016546  002554                                                          MOV     TS5INT(R5),-(SP)
     021770  016546  002534                                                          MOV     TSVCT(R5),-(SP)
     021774  012746  000003                                                          MOV     #3,-(SP)
     022000  104437                                                                  TRAP    C$SVEC
     022002  062706  000010                                                          ADD     #10,SP
3220                                                    ;SET UP INTERUPT PROCESSING CONDITIONS.
3221 022006  005065  003472                  CLR     INTFLG(R5)              ;CLEAR INTERRUPT FLAGS.
3222 022012  005703                          TST     R3                      ;ACTUAL PASSCOUNT UPDATE PER R3
3223 022014  001410                          BEQ     50355$
3224 022016  005703                          TST     R3              ;IF R3 LT #0 THEN
3225 022020  002003                          BGE     50356$
3226 022022  005265  003326                  INC     PASCNT(R5)              ;LET PASCNT(R5) := PASCNT(R5) + #1
3227
3228 022026  000403                          BR      50357$
3229 022030                          50356$:
3230 022030  012765  000001  003326          MOV     #1,PASCNT(R5)           ;LET PASCNT(R5) := #1
3231
3232 022036                          50357$:
3233
3234 022036                          50355$:
3235
3236 022036                          50354$:
3237 022036  005065  003376                  CLR     RECCNT(R5)              ;CLEAR RECORD COUNT
3238 022042  004737  017126                    JSR   PC,NEXTU                ;DO IT FOR ALL DEVICES.
3239
3240 022046  000716                          BR      50352$
3241 022050                          50353$:
```

```
                                        TST     R2                      ;IF THERE ARE NO UNITS:
                                        BNE     50360$
                                          PRINTF #AUDRPM                ;PRINT ALL UNITS DROPPED,
022054  012746  005114                                                        MOV     #AUDRPM,-(SP)
022060  012746  000001                                                        MOV     #1,-(SP)
022064  010600                                                              MOV     SP,R0
022066  104417                                                              TRAP    C$PNTF
022070  062706  000004                                                      ADD     #4,SP
                                          DELAY 200.                    ;GO TO SUPERVISOR, WAIT 2 SECONDS.
022074  012727  000310                                                      MOV     #200.,(PC)+
022100  000000                                                            .WORD   0
022102  013727  002116                                                      MOV     L$DLY,(PC)+
022106  000000                                                            .WORD   0
022110  005367  177772                                                      DEC     -6(PC)
022114  001375                                                            BNE     .-4
022116  005367  177756                                                      DEC     -22(PC)
022122  001367                                                            BNE     .-20
                                          BREAK                         ;GO TO SUPERVISOR, CHECK TTY.
022124  104422                                                              TRAP    C$BRK
                                        DOCLN                           ;DO CLEAN CODE + ABORT PASS.
022126  104444                                                              TRAP    C$DCLN

                                50360$:

                                        SETPRI #PRI00                   ;LOWER CPU PRIORITY TO 0
022130  012700  000000                                                      MOV     #PRI00,R0
022134  104441                                                              TRAP    C$SPRI
022136  105737  002213                    TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED
022142  001033                          BNE     1$
022144  032737  000020  003536          BIT     #ADR,OPFLAG
022152  001027                          BNE     1$
022154  004737  017060                  JSR     PC,FIRSTU               ;AND AUTO-DROP NOT CALLED, THEN SET UP FOR FIRST
                                50362$:                                 ;WHILE THERE ARE MORE DEVICES:
022160  026527  002604  177777          CMP     DEVTBL(R5),#END
022166  001421                          BEQ     1$
022170  105037  003530                  CLRB    TRAPD4                  ;CLEAR TRAP FLAG
                                        SETVEC  #4,#TRAP4,#INTPRI       ;SET VECTOR 4,PRIORTY @6
022174  012746  000340                                                      MOV     #INTPRI,-(SP)
022200  012746  023706                                                      MOV     #TRAP4,-(SP)
022204  012746  000004                                                      MOV     #4,-(SP)
022210  012746  000003                                                      MOV     #3,-(SP)
022214  104437                                                            TRAP    C$SVEC
022216  062706  000010                                                      ADD     #10,SP
                                                                        ;START 3.5 MINUTE COUNTER
022222  012737  000001  003436          MOV     #1,TIME1                ;INCR TIME1 FROM #1 TO #25 BY #1
022230  000404                          BR      50365$
022232  000137  023060          1$:     JMP     50363$

                                50366$:
022236  005237  003436                  INC     TIME1
                                50365$:
022242  023727  003436  000025          CMP     TIME1,#25
022250  003134                          BGT     4$
022252  012775  002340  002514          MOV     #GSCPK,@TSDB(R5)        ;AND GET UNITS STATUS
022260                                  DELAY   25                      ;WAIT
```

```
        022260  012727  000025                                                  MOV     #25,(PC)+
        022264  000000                                                          .WORD   0
        022266  013727  002116                                                  MOV     L$DLY,(PC)+
        022272  000000                                                          .WORD   0
        022274  005367  177772                                                  DEC     -6(PC)
        022300  001375                                                          BNE     .-4
        022302  005367  177756                                                  DEC     -22(PC)
        022306  001367                                                          BNE     .-20
3276    022310                          CLRVEC  #4              ;CLEAR VECTOR AT 4
        022310  012700  000004                                                  MOV     #4,R0
        022314  104436                                                          TRAP    C$CVEC
3277    022316  105737  003530          TSTB    TRAPD4          ;IFB TRAPD4 NE #0 THEN
3278    022322  001423                  BEQ     2$
3279    022324  005265  003366          INC     FTLCNT(R5)      ;LET FTLCNT(R5) := FTLCNT(R5) + #1
3280    022330                          PRINTF  #NODEV,TSSR(R5) ;PRINT ERROR
        022330  016546  002524                                                  MOV     TSSR(R5),-(SP)
        022334  012746  005543                                                  MOV     #NODEV,-(SP)
        022340  012746  000002                                                  MOV     #2,-(SP)
        022344  010600                                                          MOV     SP,R0
        022346  104417                                                          TRAP    C$PNTF
        022350  062706  000006                                                  ADD     #6,SP
3281    022354  016537  002604  017366  MOV     DEVTBL(R5),DROPN        ;SAVE # OF UNIT TO BE DROPPED.
3282    022362  010500                  MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
3283    022364  006200                  ASR     R0
3284    022366                          DODU    R0                      ;DROP THE UNIT
        022366  104451                                                          TRAP    C$DODU
3285
3286    022370                          DOCLN                           ; EXEC BGNDU-ENDDU CODE IF IDU = 0
        022370  104444                                                  ;DO CLEAN &ABORT
                                                                                TRAP    C$DCLN
3287
3288    022372  105037  003530  2$:     CLRB    TRAPD4          ;CLEAR TRAP FLAG
3289    022376                          SETVEC  #4,#TRAP4,#INTPRI       ;SET VECTOR 4,PRIORTY @6
        022376  012746  000340                                                  MOV     #INTPRI,-(SP)
        022402  012746  023706                                                  MOV     #TRAP4,-(SP)
        022406  012746  000004                                                  MOV     #4,-(SP)
        022412  012746  000003                                                  MOV     #3,-(SP)
        022416  104437                                                          TRAP    C$SVEC
        022420  062706  000010                                                  ADD     #10,SP
3290    022424  005775  002524          TST     @TSSR(R5)       ;CHECK FOR ADDRESS
3291    022430                          DELAY   25              ;WAIT
        022430  012727  000025                                                  MOV     #25,(PC)+
        022434  000000                                                          .WORD   0
        022436  013727  002116                                                  MOV     L$DLY,(PC)+
        022442  000000                                                          .WORD   0
        022444  005367  177772                                                  DEC     -6(PC)
        022450  001375                                                          BNE     .-4
        022452  005367  177756                                                  DEC     -22(PC)
        022456  001367                                                          BNE     .-20
3292    022460                          CLRVEC  #4              ;CLEAR VECTOR AT 4
        022460  012700  000004                                                  MOV     #4,R0
        022464  104436                                                          TRAP    C$CVEC
3293    022466  105737  003530          TSTB    TRAPD4          ;IFB TRAPD4 NE #0 THEN
3294    022472  001424                  BEQ     3$
3295    022474  005265  003366          INC     FTLCNT(R5)      ;LET FTLCNT(R5) := FTLCNT(R5) + #1
3296    022500                          PRINTF  #NODEV,TSSR(R5) ;PRINT ERROR
        022500  016546  002524                                                  MOV     TSSR(R5),-(SP)
        022504  012746  005543                                                  MOV     #NODEV,-(SP)
```

```
                022510  012746  000002                                                  MOV     #2,-(SP)
                022514  010600                                                          MOV     SP,R0
                022516  104417                                                          TRAP    C$PNTF
                022520  062706  000006                                                  ADD     #6,SP
3297            022524  016537  002604  017366          MOV     DEVTBL(R5),DROPN        ;SAVE # OF UNIT TO BE DROPPED.
3298            022532  010500                          MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
3299            022534  006200                          ASR     R0
3300            022536                                  DODU    R0                      ;DROP THE UNIT
                022536  104451                                                          TRAP    C$DODU
3301
3302            022540                                  DOCLN                           ; EXEC BGNDU-ENDDU CODE IF IDU = 0
                022540  104444                                                          TRAP    C$DCLN  ;DO CLEAN &ABORT
3303
3304            022542  003127                  4$:     BGT     50367$
3305
3306            022544  004737  007766          3$:     JSR     PC,SETDEF               ;SET UNIT NUMBER
3307            022550  010475  002514                  MOV     R4,@TSDB(R5)
3308            022554                                  DELAY   25
                022554  012727  000025                                                  MOV     #25,(PC)+
                022560  000000                                                          .WORD   0
                022562  013727  002116                                                  MOV     L$DLY,(PC)+
                022566  000000                                                          .WORD   0
                022570  005367  177772                                                  DEC     -6(PC)
                022574  001375                                                          BNE     .-4
                022576  005367  177756                                                  DEC     -22(PC)
                022602  001367                                                          BNE     .-20
3309            022604  012775  002340  002514          MOV     #GSCPK,@TSDB(R5)        ;AND GET UNITS STATUS
3310            022612                                  DELAY   25                      ;WAIT
                022612  012727  000025                                                  MOV     #25,(PC)+
                022616  000000                                                          .WORD   0
                022620  013727  002116                                                  MOV     L$DLY,(PC)+
                022624  000000                                                          .WORD   0
                022626  005367  177772                                                  DEC     -6(PC)
                022632  001375                                                          BNE     .-4
                022634  005367  177756                                                  DEC     -22(PC)
                022640  001367                                                          BNE     .-20
3311            022642  032775  000200  002524          BIT     #TS.SSR,@TSSR(R5)       ;IF #TS.SSR SETIN @TSSR(R5) THEN
3312            022650  001420                          BEQ     50370$
3313            022652  032775  000100  002524          BIT     #TS.OFL,@TSSR(R5)       ;IF #TS.OFL NOTSETIN @TSSR(R5) THEN
3314            022660  001001                          BNE     50371$
3315            022662  000457                          BR      50364$                  ;EXIT COUNTER WHEN UNIT ON LINE
3316
3317            022664                          50371$:
3318            022664                                  PRINTF #OFLINM,TSNP             ;PRINT UNIT OFF LINE EVERY 10 SEC
                022664  013746  003534                                                  MOV     TSNP,-(SP)
                022670  012746  005456                                                  MOV     #OFLINM,-(SP)
                022674  012746  000002                                                  MOV     #2,-(SP)
                022700  010600                                                          MOV     SP,R0
                022702  104417                                                          TRAP    C$PNTF
                022704  062706  000006                                                  ADD     #6,SP
3319
3320            022710                          50372$:
3321
3322            022710  000412                          BR      50373$
3323            022712                          50370$:
3324            022712                                    PRINTF #NRDYM,DEVTBL(R5)
                022712  016546  002604                                                  MOV     DEVTBL(R5),-(SP)
```

```
        022716  012746  023656                                                  MOV     #NRDYM,-(SP)
        022722  012746  000002                                                  MOV     #2,-(SP)
        022726  010600                                                          MOV     SP,R0
        022730  104417                                                          TRAP    C$PNTF
        022732  062706  000006                                                  ADD     #6,SP
  3325
  3326  022736                          50373$:
  3327  022736  012737  000001  003440          MOV     #1,TIME2                ;INCR TIME2 FROM #1 TO #13 BY #1
  3328  022744  000402                  BR      50374$
  3329  022746                          50375$:
  3330  022746  005237  003440          INC     TIME2
  3331  022752                          50374$:
  3332  022752  023727  003440  000013  CMP     TIME2,#13
  3333  022760  003016                  BGT     50376$
  3334  022762                          DELAY   100.           ;WAIT FOR UNIT TO BE SET ON-LINE
        022762  012727  000144                                                  MOV     #100.,(PC)+
        022766  000000                                                          .WORD   0
        022770  013727  002116                                                  MOV     L$DLY,(PC)+
        022774  000000                                                          .WORD   0
        022776  005367  177772                                                  DEC     -6(PC)
        023002  001375                                                          BNE     .-4
        023004  005367  177756                                                  DEC     -22(PC)
        023010  001367                                                          BNE     .-20
  3335  023012                          BREAK                   ;ALLOW TERMINAL INTERRUPT
        023012  104422                                                          TRAP    C$BRK
  3336  023014  000754                  BR      50375$
  3337  023016                          50376$:
  3338  023016  000137  022236          JMP     50366$
  3339  023022                          50367$:
  3340  023022                          50364$:
  3341  023022                          CLRVEC  #4                      ;CLEAR VECTOR AT 4
        023022  012700  000004                                                  MOV     #4,R0
        023026  104436                                                          TRAP    C$CVEC
  3342  023030  023727  003436  000025  CMP     TIME1,#25               ;IF OFF LINE FOR 3.5 MINUTES
  3343  023036  003404                  BLE     50377$
  3344  023040  004737  012734          JSR PC,MOVMSG                   ;GET MESSAGE PACKET
  3345  023044  004737  013430          JSR PC,TCC1                     ;PRINT ERROR AND DROP OFF LINE UNIT
  3346
  3347  023050                          50377$:
  3348                                                                    ;REPEAT UNTIL ON LINE OR TIMED OUT.
  3349  023050  004737  017126              JSR PC,NEXTU                ;SET UP FOR NEXT UNIT.
  3350
  3351  023054  000137  022160          JMP     50362$
  3352
  3353  023060                          50363$:
  3354  023060                          50361$:
  3355  023060  105737  003527          TSTB    PWRFLG  ;IFB PWRFLG EQ #0 THEN
  3356  023064  001026                  BNE     50400$
  3357  023066                            MEMORY DATAWT         ;REQUEST MEMORY FROM SUPER FOR RD/WR BUFFERS.
        023066  104431                                                          TRAP    C$MEM
        023070  010037  003406                                                  MOV     R0,DATAWT
  3358  023074  013737  003406  003410  MOV     DATAWT,DATARD   ;SET RD BFR ADDRESS
  3359  023102  062737  004000  003410  ADD     #DATCNT,DATARD
  3360  023110  027727  160272  004000  CMP     @DATAWT,#DATCNT   ;WHEN NOT ENOUGH FREE MEMO AVAILABLE
  3361  023116  002011                  BGE     50401$
  3362  023120                            PRINTF #MEMOM                 ;WARN OPERATOR
        023120  012746  023166                                                  MOV     #MEMOM,-(SP)
```

```
        023124  012746  000001                                                  MOV     #1,-(SP)
        023130  010600                                                          MOV     SP,R0
        023132  104417                                                          TRAP    C$PNTF
        023134  062706  000004                                                  ADD     #4,SP
3363    023140                          DOCLN                   ;AND ABORT PASS
        023140  104444                                                          TRAP    C$DCLN
3364                                                    ;DIAG MUST BE RE-LOADED IN A CPU WITH LARGER MEMO
3365    023142                  50401$:
3366
3367    023142                  50400$:
3368
3369    023142  105037  002214          CLRB    CHGFLG                  ;CLR CHANGE CMD SEQ TBL FLAG.
3370    023146  012703  003526          MOV     #ENDFLG,R3      ;LET R3 := #ENDFLG
3371    023152  004737  012664          JSR     PC,CLRERR               ;CLEAR ALL FLAGS.
3372    023156  105037  003527          CLRB    PWRFLG                  ;CLEAR THE POWER FAIL FLAG.
3373
3374    023162                          EXIT    INIT
        023162  104432                                                          TRAP    C$EXIT
        023164  000104                                                          .WORD   L10012-.
3375    023166     045     101     106  MEMOM:  .ASCII  /%AFREE MEMO TOO SMALL FOR RD-WR BFRS%N/
        023171     122     105     105
        023174     040     115     105
        023177     115     117     040
        023202     124     117     117
        023205     040     123     115
        023210     101     114     114
        023213     040     106     117
        023216     122     040     122
        023221     104     055     127
        023224     122     040     102
        023227     106     122     123
        023232     045     116
3376    023234     045     101     122          .ASCIZ  /%ARE-LOAD IN LARGER MEMO%N/
        023237     105     055     114
        023242     117     101     104
        023245     040     111     116
        023250     040     114     101
        023253     122     107     105
        023256     122     040     115
        023261     105     115     117
        023264     045     116     000
3377
3378
3379    023270                          ENDINIT
        023270                  L10012:
        023270  104411                                                          TRAP    C$INIT
3380
3381                                    .SBTTL  AUTO DROP SECTION
3382
3383                                    ;++
3384                                    ;SECTION EXECUTED AFTER THE INIT CODE WHEN "ADR" FLAG IS SET BY OPERATOR
3385                                    ;SECTION CHEKS FOR A VALID INTERFACE LOCATION.  DROPS UNIT IF NO RESPONSE
3386                                    ;FROM INTERFACE
3387                                    ;--
3388
3389    023272                          BGNAUTO
        023272                  L$AUTO::
```

```
3390
3391 023272  004737  017060                  JSR PC,FIRSTU                   ;FIND FIRST UNIT
3392 023276                          50402$: ;WHILE DEVTBL(R5) NE #END DO    ;
3393 023276  026527  002604  177777          CMP     DEVTBL(R5),#END
3394 023304  001525                          BEQ     50403$
3395 023306  105037    7530                  CLRB    TRAPD4    ;LET TRAPD4 :B= #0            ;
3396 023312                                    SETVEC #4,#TRAP4,#INTPRI      ;SET VECTOR 4
     023312  012746  000340                                                          MOV     #INTPRI,-(SP)
     023316  012746  023706                                                          MOV     #TRAP4,-(SP)
     023322  012746  000004                                                          MOV     #4,-(SP)
     023326  012746  000003                                                          MOV     #3,-(SP)
     023332  104437                                                                 TRAP    C$SVEC
     023334  062706  000010                                                          ADD     #10,SP
3397 023340  017502  002514                  MOV     @TSDB(R5),R2           ;ADDRESS TSOS INTERFACE
3398 023344                                    CLRVEC #4                     ;CLEAR VECTOR AT 4
     023344  012700  000004                                                          MOV     #4,R0
     023350  104436                                                                 TRAP    C$CVEC
3399 023352  105737  003530                  TSTB    TRAPD4    ;IFB TRAPD4 NE #0 THEN
3400 023356  001423                          BEQ     50404$
3401 023360  005265  003366                  INC     FTLCNT(R5)          ;LET FTLCNT(R5) := FTLCNT(R5) + #1
3402 023364                                    PRINTF #AUTODM,TSDB(R5)       ;PRINT ERROR
     023364  016546  002514                                                          MOV     TSDB(R5),-(SP)
     023370  012746  023562                                                          MOV     #AUTODM,-(SP)
     023374  012746  000002                                                          MOV     #2,-(SP)
     023400  010600                                                                 MOV     SP,R0
     023402  104417                                                                 TRAP    C$PNTF
     023404  062706  000006                                                          ADD     #6,SP
3403 023410  016537  002604  017366          MOV     DEVTBL(R5),DROPN                ;SAVE # OF UNIT TO BE DROPPED.
3404 023416  010500                          MOV     R5,R0                  ;R0=LOGICAL DEVICE NUMBER
3405 023420  006200                          ASR     R0
3406 023422                                  DODU    R0      ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF IDU = 0
     023422  104451                                                                 TRAP    C$DODU
3407
3408 023424  000452                          BR      50405$
3409 023426                          50404$:
3410 023426  012775  002340  002514          MOV     #GSCPK,@TSDB(R5)        ;SEND GET STATUS COMMAND
3411 023434  004737  012700                    JSR PC,WSSR                   ;WAIT
3412 023440  032775  000200  002524          BIT     #TS.SSR,@TSSR(R5)       ;IF #TS.SSR SETIN @TSSR(R5) THEN
3413 023446  001423                          BEQ     50406$
3414 023450  032775  000100  002524          BIT     #TS.OFL,@TSSR(R5)       ;IF #TS.OFL SETIN @TSSR(R5) THEN
3415 023456  001416                          BEQ     50407$
3416 023460  005265  003366                  INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
3417 023464                                    PRINTF #OFLINM,TSNP
     023464  013746  003534                                                          MOV     TSNP,-(SP)
     023470  012746  005456                                                          MOV     #OFLINM,-(SP)
     023474  012746  000002                                                          MOV     #2,-(SP)
     023500  010600                                                                 MOV     SP,R0
     023502  104417                                                                 TRAP    C$PNTF
     023504  062706  000006                                                          ADD     #6,SP
3418 023510  004737  017302                    JSR PC,DROPUA
3419
3420 023514                          50407$:
3421
3422 023514  000416                          BR      50410$
3423 023516                          50406$:
3424 023516  005265  003366                  INC     FTLCNT(R5)          ;LET FTLCNT(R5) := FTLCNT(R5) + #1
3425 023522                                    PRINTF #NRDYM,DEVTBL(R5)
```

```
     023522  016546  002604                                                    MOV     DEVTBL(R5),-(SP)
     023526  012746  023656                                                    MOV     #NRDYM,-(SP)
     023532  012746  000002                                                    MOV     #2,-(SP)
     023536  010600                                                            MOV     SP,R0
     023540  104417                                                            TRAP    C$PNTF
     023542  062706  000006                                                    ADD     #6,SP
     023546  004737  017302                       JSR PC,DROPUA

     023552                           50410$:

     023552                           50405$:
     023552  004737  017126                    JSR PC,NEXTU

     023556  000647                            BR      50402$
     023560                           50403$:

     023560                                    ENDAUTO
     023560                           L10013:
     023560  104461                                                            TRAP    C$AUTO

     023562     045     101     102   AUTODM: .ASCII  /%ABUS TRAP AT %06%N/
     023565     125     123     040
     023570     124     122     101
     023573     120     040     101
     023576     124     040     045
     023601     117     066     045
     023604     116
     023605     045     101     111           .ASCIZ  /%AINTERFACE BAD OR NOT SET TO ABOVE AD%N/
     023610     116     124     105
     023613     122     106     101
     023616     103     105     040
     023621     102     101     104
     023624     040     117     122
     023627     040     116     117
     023632     124     040     123
     023635     105     124     040
     023640     124     117     040
     023643     101     102     117
     023646     126     105     040
     023651     101     104     045
     023654     116     000
     023656     045     101     125   NRDYM:  .ASCIZ  /%AUNIT %D1%A NOT RDY%N/
     023661     116     111     124
     023664     040     045     104
     023667     061     045     101
     023672     040     116     117
     023675     124     040     122
     023700     104     131     045
     023703     116     000
                                              .EVEN

                                      ;       DEVICE BUS TRAP HANDLER
                                      ;       OUTPUT: TRAPD4 BYTE  1: TRAPED AT 4
                                      ;                            0: NO TRAP

     023706  105237  003530           TRAP4:: INCB    TRAPD4;LET TRAPD4 :B= TRAPD4 + #1
     023712  000002                           RTI
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE END OF EACH PASS.
                                        ;--

                                                BGNCLN
                                        L$CLEAN::

023714  004737  017060                          JSR     PC,FIRSTU               ;FIND FIRST UNIT.
023720                                  50411$: ;WHILE DEVTBL(R5) NE #END DO
026527  002604  177777                          CMP     DEVTBL(R5),#END
023726  001410                                  BEQ     50412$
023730  004737  012700                            JSR PC,WSSR                   ;WAIT FOR UNIT READY OR TIMEOUT,
023734                                            CLRVEC        TSVCT(R5)       ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
023734  016500  002534                                                                  MOV     TSVCT(R5),R0
023740  104436                                                                        TRAP    C$CVEC
023742  004737  017126                            JSR   PC,NEXTU                ;FIND NEXT UNIT.

023746  000764                                  BR      50411$
023750                                  50412$:

                                                EXIT    CLN
023750                                                                          TRAP    C$EXIT
023752  000002                                                                  .WORD   L10014-.

                                                .EVEN

                                                ENDCLN
023754                                  L10014:
023754  104412                                                                  TRAP    C$CLEAN

                                        .SBTTL  DROP UNIT SECTION

                                        ;++
                                        ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                        ; TO NO LONGER BE TESTED.  THAT CODE SHALL BE EXECUTED WHEN DODU
                                        ;MACRO IS CALLED WHILE IDU FLAG IS NOT SET BY OPERATOR
                                        ;--

                                                BGNDU
023756                                  L$DU::

023756  010005                                  MOV     R0,R5                   ;R5 = LOGICAL DEVICE NUMBER X 2.
023760  006305                                  ASL     R5
023762  012765  177774  002604                  MOV     #NINUSE,DEVTBL(R5)      ;SET NOT IN USE FLAG FOR THE DEVICE.
023770                                          CLRVEC TSVCT(R5)                ;RELEASE THE INTERRUPT VECTOR.
023770  016500  002534                                                                  MOV     TSVCT(R5),R0
023774  104436                                                                        TRAP    C$CVEC
023776                                          PRINTF  #DROPDM,DROPN           ;PRINT DROP DEVICE MESSAGE
023776  013746  017366                                                                  MOV     DROPN,-(SP)
024002  012746  005065                                                                MOV     #DROPDM,-(SP)
024006  012746  000002                                                                MOV     #2,-(SP)
024012  010600                                                                        MOV     SP,R0
024014  104417                                                                        TRAP    C$PNTF
```

```
024016  062706  000006                                               ADD     #6,SP
024022                           EXIT    DU
024022  000167                                                       .WORD   J$JMP
024024  000000                                                       .WORD   L10015-2-.
                                 .EVEN

024026                           ENDDU
024026                   L10015:
024026  104453                                                       TRAP    C$DU

                         .SBTTL  ADD UNIT SECTION

                         ;++
                         ; THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                         ;  TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
                         ;  "EF.AUNIT" IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
                         ;--

024030                           BGNAU
024030                   L$AU::
024030  010005                   MOV     R0,R5               ;R5 = LOGICAL DEVICE NUMBER X 2.
024032  006305                   ASL     R5
024034  010065  002604           MOV     R0,DEVTBL(R5)       ;STORE UNIT # IN DEVICE TABLE.
024040                           GPHARD  R0,R0               ;GET HARDWARE P TABLE FROM SUPER.
024040  104442                                                       TRAP    C$GPHRD
024042  011065  002514           MOV     (R0),TSDB(R5)       ;SAVE TSDB ADDRESS.
024046  012065  002524           MOV     (R0)+,TSSR(R5)      ;SAVE TSSR ADDRESS.
024052  062765  000002  002524   ADD     #2,TSSR(R5)
024060  011065  002534           MOV     (R0),TSVCT(R5)      ;SAVE INTERRUPT VECTOR ADDRESS.
024064  011065  003532           MOV     (R0),TSUNT(R5)      ;SAVE NUMBER OF DRIVE
024070  011037  003534           MOV     (R0),TSNP           ;SAVE FOR PRINT OUT'S
024074                           SETVEC TSVCT(R5),TS5INT(R5),#INTPRI
024074  012746  000340                                               MOV     #INTPRI,-(SP)
024100  016546  002554                                               MOV     TS5INT(R5),-(SP)
024104  016546  002534                                               MOV     TSVCT(R5),-(SP)
024110  012746  000003                                               MOV     #3,-(SP)
024114  104437                                                       TRAP    C$SVEC
024116  062706  000010                                               ADD     #10,SP
                                                             ;SET UP INTERUPT PROCESSING CONDITIONS.
024122  005065  003472           CLR     INTFLG(R5)          ;CLEAR INTERRUPT FLAGS.

024126                           EXIT    AU
024126  000167                                                       .WORD   J$JMP
024130  000000                                                       .WORD   L10016-2-.

                                 .EVEN

024132                           ENDAU
024132                   L10016:
024132  104452                                                       TRAP    C$AU



                         .TITLE HARDWARE TESTS

                         .SBTTL  TEST 1:  BASIC FUNCTIONS.

```

```
3531                                    ;++
3532                                    ; TEST TO EXECUTE ALL TS05 FUNCTIONS.
3533                                    ;--
3534
3535 024134                             BGNMOD
3536
3537 024134                             BGNTST
     024134                         T1::
3538
3539 024134  105037  003515             CLRB    RANDOM                  ;CLR THE RANDOM OPERATIONS FLAG.
3540 024140  105037  003514             CLRB    EXPBOT                  ;CLR EXPECT BOT FLAG.
3541
3542 024144                             BGNSUB                  ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.
     024144                         T1.1:
     024144  104402                                                     TRAP    C$BSUB
3543
3544 024146  004737  017060             JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
3545 024152  004737  007072             JSR     PC,SOFINIT              ;INIT DEVICE
3546 024156  103404                     BCS     11$
3547 024160                             ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     024160  104455                                                     TRAP    C$ERDF
     024162  000002                                                     .WORD   2
     024164  004536                                                     .WORD   NSSRM
     024166  006120                                                     .WORD   STAERM
3548
3549 024170  004737  007466         11$:    JSR     PC,MDSET                ;GO DO SETUP'S
3550 024174  012702  025052                 MOV     #BFSEQ0,R2              ;ADR OF CMD SEQ.
3551 024200  004737  025026                 JSR     PC,BFSEQ                ;SET UP CMD SEQ.
3552 024204  004737  010226                 JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
3553 024210  004737  017060                 JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
3554 024214                         50413$: ;WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
3555 024214  026527  002604  177777         CMP     DEVTBL(R5),#END
3556 024222  001451                         BEQ     50414$
3557 024224  016502  002544                 MOV     MSGPKA(R5),R2           ;GET MSG PACKET ADR,
3558 024230  062702  000012                 ADD     #12,R2    ;LET R2 := R2 + #12           ;GET XSTAT2 ADR,
3559 024234  011265  002564                 MOV     (R2),TS5CL(R5)          ;STORE CODE LEVEL FROM DTR BYTE,
3560 024240  042765  177700  002564         BIC     #177700,TS5CL(R5)
3561 024246  011265  002574                 MOV     (R2),TS5SW(R5)                  ;STORE  SWITCH SETTINGS
3562 024252  042765  177477  002574         BIC     #177477,TS5SW(R5)
3563 024260                             PRINTF  #CODELM,DEVTBL(R5),TS5CL(R5)
     024260  016546  002564                                                MOV     TS5CL(R5),-(SP)
     024264  016546  002604                                                MOV     DEVTBL(R5),-(SP)
     024270  012746  004162                                                MOV     #CODELM,-(SP)
     024274  012746  000003                                                MOV     #3,-(SP)
     024300  010600                                                        MOV     SP,R0
     024302  104417                                                        TRAP    C$PNTF
     024304  062706  000010                                                ADD     #10,SP
3564                                                            ;PRINT THE TS05 MICROCODE LEVEL.
3565 024310                             PRINTF  #SWSET,DEVTBL(R5),TS5SW(R5)
     024310  016546  002574                                                MOV     TS5SW(R5),-(SP)
     024314  016546  002604                                                MOV     DEVTBL(R5),-(SP)
     024320  012746  004231                                                MOV     #SWSET,-(SP)
     024324  012746  000003                                                MOV     #3,-(SP)
     024330  010600                                                        MOV     SP,R0
     024332  104417                                                        TRAP    C$PNTF
     024334  062706  000010                                                ADD     #10,SP
3566                                                            ;PRINT THE TS05 SWITCH SETTINGS.
```

```
3567 024340                            50415$:
3568 024340  004737  017126                JSR     PC,NEXTU                ;FIND NEXT UNIT.
3569
3570 024344  000723                    BR      50413$
3571 024346                            50414$:
3572
3573 024346                            ENDSUB
     024346                            L10020:
     024346  104403                                                        TRAP    C$ESUB
3574
3575 024350                            BGNSUB                             ;SUBTEST 2 - REWIND.
     024350                            T1.2:
     024350  104402                                                        TRAP    C$BSUB
3576
3577 024352  012702  025124            MOV     #BFSEQ1,R2                 ;ADR OF CMD SEQ.
3578 024356  004737  025026            JSR     PC,BFSEQ                   ;SET UP CMD SEQ.
3579 024362  004737  010226            JSR     PC,EXALL                   ;EXECUTE CMD SEQ ON ALL DEVICES.
3580 024366  105037  003526            CLRB    STAFLG                     ;CLEAR START FLAG
3581 024372                            ENDSUB
     024372                            L10021:
     024372  104403                                                        TRAP    C$ESUB
3582
3583 024374                            BGNSUB                             ;SUBTEST 3 - WRITE/VERIFY.
     024374                            T1.3:
     024374  104402                                                        TRAP    C$BSUB
3584
3585 024376  012702  025136            MOV     #BFSEQ2,R2                 ;ADR OF CMD SEQ.
3586 024402  004737  025026            JSR     PC,BFSEQ                   ;SET UP CMD SEQ.
3587 024406  004737  010226            JSR     PC,EXALL                   ;EXECUTE CMD SEQ ON ALL DEVICES.
3588 024412                            ENDSUB
     024412                            L10022:
     024412  104403                                                        TRAP    C$ESUB
3589
3590 024414                            BGNSUB                             ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
     024414                            T1.4:
     024414  104402                                                        TRAP    C$RSUB
3591
3592 024416  012702  025230            MOV     #BFSEQ3,R2                 ;ADR OF CMD SEQ.
3593 024422  004737  025026            JSR     PC,BFSEQ                   ;SET UP CMD SEQ.
3594 024426  004737  010226            JSR     PC,EXALL                   ;EXECUTE CMD SEQ ON ALL DEVICES.
3595 024432                            ENDSUB
     024432                            L10023:
     024432  104403                                                        TRAP    C$ESUB
3596
3597 024434                            BGNSUB                             ;SUBTEST 5 - SPACE FILES.
     024434                            T1.5:
     024434  104402                                                        TRAP    C$BSUB
3598
3599 024436  012702  025302            MOV     #BFSEQ4,R2                 ;ADR OF CMD SEQ.
3600 024442  004737  025026            JSR     PC,BFSEQ                   ;SET UP CMD SEQ.
3601 024446  004737  010226            JSR     PC,EXALL                   ;EXECUTE CMD SEQ ON ALL DEVICES.
3602 024452                            ENDSUB
     024452                            L10024:
     024452  104403                                                        TRAP    C$ESUB
3603
3604 024454                            BGNSUB                             ;SUBTEST 6 - SPACE RECORDS.
     024454                            T1.6:
```

```
                024454  104402                                                          TRAP    C$BSUB
3605
3606 024456  012702  025344                    MOV     #BFSEQ5,R2      ;ADR OF CMD SEQ.
3607 024462  004737  025026                    JSR     PC,BFSEQ        ;SET UP CMD SEQ.
3608 024466  004737  010226                    JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
3609 024472                                    ENDSUB
                024472                  L10025:
                024472  104403                                                          TRAP    C$ESUB
3610
3611 024474                                    BGNSUB                  ;SUBTEST 7 - WRITE RETRY.
                024474                  T1.7:
                024474  104402                                                          TRAP    C$BSUB
3612
3613 024476  012702  025416                    MOV     #BFSEQ6,R2      ;ADR OF CMD SEQ.
3614 024502  004737  025026                    JSR     PC,BFSEQ        ;SET UP CMD SEQ.
3615 024506  004737  010226                    JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
3616 024512                                    ENDSUB
                024512                  L10026:
                024512  104403                                                          TRAP    C$ESUB
3617
3618 024514                                    BGNSUB                  ;SUBTEST 8 - READ REV RETRY.
                024514                  T1.8:
                024514  104402                                                          TRAP    C$BSUB
3619
3620 024516  012702  025470                    MOV     #BFSEQ7,R2      ;ADR OF CMD SEQ.
3621 024522  004737  025026                    JSR     PC,BFSEQ        ;SET UP CMD SEQ.
3622 024526  004737  010226                    JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
3623 024532                                    ENDSUB
                024532                  L10027:
                024532  104403                                                          TRAP    C$ESUB
3624
3625 024534                                    BGNSUB                  ;SUBTEST 9 - READ FWD RETRY.
                024534                  T1.9:
                024534  104402                                                          TRAP    C$BSUB
3626
3627 024536  012702  025522                    MOV     #BFSEQ8,R2      ;ADR OF CMD SEQ.
3628 024542  004737  025026                    JSR     PC,BFSEQ        ;SET UP CMD SEQ.
3629 024546  004737  010226                    JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
3630 024552                                    ENDSUB
                024552                  L10030:
                024552  104403                                                          TRAP    C$ESUB
3631
3632 024554                                    BGNSUB                  ;SUBTEST 10- CLEAN.
                024554                  T1.10:
                024554  104402                                                          TRAP    C$BSUB
3633
3634 024556  012702  025554                    MOV     #BFSEQ9,R2      ;ADR OF CMD SEQ.
3635 024562  004737  025026                    JSR     PC,BFSEQ        ;SET UP CMD SEQ.
3636 024566  004737  010226                    JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
3637 024572                                    ENDSUB
                024572                  L10031:
                024572  104403                                                          TRAP    C$ESUB
3638
3639 024574                                    BGNSUB                  ;SUBTEST 11 - WTV SWAPPED DATA BYTES.
                024574                  T1.11:
                024574  104402                                                          TRAP    C$BSUB
3640 024576  012702  025576                    MOV     #BFSE10,R2      ;ADR OF CMD SEQ.
```

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3641 024602  004737  025026                    JSR     PC,BFSEQ                ;SET UP CMD SEQ.
3642 024606  004737  010226                    JSR     PC,EXALL                ;WRITE/VERIFY RECORDS 1 AND 2.
3643 024612  112737  000001  003520            MOVB    #1,SWBFLG               ;ENABLE BYTE SWAPPING.
3644 024620  004737  010226                    JSR     PC,EXALL                ;WRITE/VERIFY RECORDS 3 AND 4.
3645 024624  105037  003520                    CLRB    SWBFLG                  ;DISABLE BYTE SWAPPING.
3646 024630                                    ENDSUB
     024630                          L10032:
     024630  104403                                                            TRAP    C$ESUB
3647 024632  013702  003406                    MOV     DATAWT,R2               ;INIT WRITE BUFFER POINTER.
3648 024636  062702  000012                    ADD     #10.,R2
3649 024642                          50416$: ;WHILE R2 NE DATAWT DO  ;UNTIL 10 BYTES HAVE BEEN SWAPPED.
3650 024642  020237  003406                    CMP     R2,DATAWT
3651 024646  001402                          BEQ     50417$
3652 024650  000342                            SWAB -(R2)                      ;SWAP DATA BYTES IN WRITE BUFFER.
3653
3654 024652  000773                          BR      50416$
3655 024654                          50417$:
3656 024654  105237  003523                    INCB    T1SWB           ;SET T1 SWAP BYTES FLAG FOR "CKDATA" SUBR
3657
3658 024660                                    BGNSUB                          ;SUBTEST 12 - READ SWAPPED DATA BYTES.
     024660                          T1.12:
     024660  104402                                                            TRAP    C$BSUB
3659 024662  012737  104401  003420            MOV     #RDR,CMDWRD             ;CMD IS READ REV.
3660 024670  004737  016130                    JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 4).
3661 024674  012737  000012  002336            MOV     #12,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 10.
3662 024702  004737  016130                    JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 3).
3663 024706  112737  000001  003520            MOVB    #1,SWBFLG               ;ENABLE BYTE SWAPPING.
3664 024714  012737  000011  002336            MOV     #11,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 9.
3665 024722  004737  016130                    JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 2).
3666 024726  012737  000012  002336            MOV     #12,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 10.
3667 024734  004737  016130                    JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 1).
3668 024740  012737  104001  003420            MOV     #RDF,CMDWRD             ;CMD IS READ FWD.
3669 024746  004737  016130                    JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 1).
3670 024752  012737  000011  002336            MOV     #11,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 9.
3671 024760  004737  016130                    JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 2).
3672 024764  105037  003520                    CLRB    SWBFLG                  ;DISABLE BYTE SWAPPING.
3673 024770  012737  000012  002336            MOV     #12,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 10.
3674 024776  004737  016130                    JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 3).
3675 025002  012737  000011  002336            MOV     #11,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 9.
3676 025010  004737  016130                    JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 4).
3677
3678 025014                                    ENDSUB
     025014                          L10033:
     025014  104403                                                            TRAP    C$ESUB
3679
3680 025016  105037  003523                    CLRB    T1SWB                   ;CLEAR T1 SWAP BYTES FLAG
3681
3682 025022                                    EXIT    TST
     025022  104432                                                            TRAP    C$EXIT
     025024  000574                                                            .WORD   L10017-.
3683
3684                                ;       SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
3685                                ;       INPUTS:         R2 = FWA OF COMMAND SEQUENCE.
3686                                ;       OUTPUTS:
3687                                ;       REGISTERS:
3688                                ;       CALLS:
3689
```

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3690 025026  012701  003540          BFSEQ:: MOV     #CMDSEQ,R1              ;INIT SEQ TABLE ADDRESS.
3691 025032                          50420$: ;WHILE (R2) NE #END DO          ;WHILE THERE ARE MORE COMMANDS:
3692 025032  021227  177777                  CMP     (R2),#END
3693 025036  001402                          BEQ     50421$
3694 025040  012221                          MOV     (R2)+,(R1)+             ;MOVE COMMANDS TO SEQ TABLE.
3695
3696 025042  000773                          BR      50420$
3697 025044                          50421$:
3698 025044  012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE.
3699 025050  000207                          RTS     PC                      ;RETURN.
3700
3701
3702                                 ;       BASIC FUNCTION COMMAND SEQUENCE
3703
3704 025052  140004                  BFSEQ0: .WORD   SCH                     ;SET CHAR. 200.         (1)
3705 025054  000200                          200
3706 025056  000001                          1
3707 025060  000000                          0
3708 025062  100013                          DRI                     ;DRIVE INIT.            (2)
3709 025064  000001                          1
3710 025066  000001                          1
3711 025070  000000                          0
3712 025072  140004                          SCH                     ;SET CHAR. 20           (3)
3713 025074  000020                          20
3714 025076  000001                          1
3715 025100  000000                          0
3716 025102  100017                          GES                     ;GET STATUS.            (4)
3717 025104  000001                          1
3718 025106  000001                          1
3719 025110  000000                          0
3720 025112  140004                          SCH                     ;SET CHAR. 40.          (5)
3721 025114  000040                          40
3722 025116  000001                          1
3723 025120  000000                          0
3724 025122  177777                  .WORD   END
3725
3726 025124  102010                  BFSEQ1:         RWD                     ;REWIND TWICE.          (6)
3727 025126  000001                          1
3728 025130  000002                          2
3729 025132  000000                          0
3730 025134  177777                  .WORD   END
3731
3732 025136  104105                  BFSEQ2:         WTV                     ;WRITE/VERIFY PAT 1.    (7)
3733 025140  004000                          DATCNT
3734 025142  000001                          1
3735 025144  000001                          1
3736 025146  104105                          WTV                     ;WTV PAT 2.             (8)
3737 025150  004000                          DATCNT
3738 025152  000001                          1
3739 025154  000002                          2
3740 025156  104105                          WTV                     ;WTV PAT 3.             (9)
3741 025160  004000                          DATCNT
3742 025162  000001                          1
3743 025164  000003                          3
3744 025166  104105                          WTV                     ;WTV PAT 4.             (10)
3745 025170  004000                          DATCNT
3746 025172  000001                          1
```

```
3747 025174  000004                          4
3748 025176  104105                          WTV             ;WTV PAT 5.          (11)
3749 025200  004000                          DATCNT
3750 025202  000001                          1
3751 025204  000005                          5
3752 025206  104105                          WTV             ;WTV PAT 6.          (12)
3753 025210  004000                          DATCNT
3754 025212  000001                          1
3755 025214  000006                          6
3756 025216  104105                          WTV             ;WTV PAT 0.          (13)
3757 025220  004000                          DATCNT
3758 025222  000001                          1
3759 025224  000000                          0
3760 025226  177777                  .WORD   END
3761
3762 025230  100011          BFSEQ3:         WTM             ;WRITE TAPE MARK.    (14)
3763 025232  000001                          1
3764 025234  000001                          1
3765 025236  000000                          0
3766 025240  104005                          WRT             ;WRITE 10 RECORDS.   (15)
3767 025242  004000                          DATCNT
3768 025244  000010                          10
3769 025246  000001                          1
3770 025250  100411                          ERS             ;ERASE 10 TIMES.     (16)
3771 025252  000001                          1
3772 025254  000010                          10
3773 025256  000000                          0
3774 025260  100011                          WTM             ;WRITE TAPE MARK.    (17)
3775 025262  000001                          1
3776 025264  000001                          1
3777 025266  000000                          0
3778 025270  101011                          WTR             ;WTM RETRY           (18)
3779 025272  000001                          1
3780 025274  000001                          1
3781 025276  000000                          0
3782 025300  177777                  .WORD   END
3783
3784 025302  105410          BFSEQ4:         SFR             ;SPACE 2 FILES REV.  (19)
3785 025304  000002                          2
3786 025306  000001                          1
3787 025310  000000                          0
3788 025312  105010                          SFF             ;SPACE 2 FILES FWD.  (20)
3789 025314  000002                          2
3790 025316  000001                          1
3791 025320  000000                          0
3792 025322  105410                          SFR             ;SPACE 2 FILES REV.  (21)
3793 025324  000001                          1
3794 025326  000002                          2
3795 025330  000000                          0
3796 025332  105010                          SFF             ;SPACE 2 FILES FWD.  (22)
3797 025334  000001                          1
3798 025336  000002                          2
3799 025340  000000                          0
3800 025342  177777                  .WORD   END
3801
3802 025344  102010          BFSEQ5:         RWD             ;REWIND.             (23)
3803 025346  000001                          1
```

```
3804 025350  000001                              1
3805 025352  000000                              0
3806 025354  104010                              SRF             ;SPACE 7 RECORDS FWD.   (24)
3807 025356  000007                              7
3808 025360  000001                              1
3809 025362  000000                              0
3810 025364  104410                              SRR             ;SPACE 7 RECORDS REV.   (25)
3811 025366  000007                              7
3812 025370  000001                              1
3813 025372  000000                              0
3814 025374  104010                              SRF             ;SPACE 7 RECORDS FWD.   (26)
3815 025376  000001                              1
3816 025400  000007                              7
3817 025402  000000                              0
3818 025404  104410                              SRR             ;SPACE 7 RECORDS REV.   (27)
3819 025406  000001                              1
3820 025410  000007                              7
3821 025412  000000                              0
3822 025414  177777                      .WORD   END
3823
3824 025416  102010                BFSEQ6:       RWD             ;REWIND.                (28)
3825 025420  000001                              1
3826 025422  000001                              1
3827 025424  000000                              0
3828 025426  104005                              WRT             ;WRITE.                 (29)
3829 025430  004000                              DATCNT
3830 025432  000001                              1
3831 025434  000001                              1
3832 025436  105005                              WRR             ;WRITE RETRY.           (30)
3833 025440  004000                              DATCNT
3834 025442  000001                              1
3835 025444  000001                              1
3836 025446  100011                              WTM             ;WRITE TAPE MARK.
3837 025450  000001                              1
3838 025452  000001                              1
3839 025454  000000                              0
3840 025456  105410                              SFR             ;SPACE 1 FILE REV.
3841 025460  000001                              1
3842 025462  000001                              1
3843 025464  000000                              0
3844 025466  177777                      .WORD   END
3845
3846 025470  104401                BFSEQ7:       RDR             ;READ REV.              (31)
3847 025472  004000                              DATCNT
3848 025474  000001                              1
3849 025476  000001                              1
3850 025500  105401                              RNR             ;READ NEXT REV.         (32)
3851 025502  004000                              DATCNT
3852 025504  000001                              1
3853 025506  000001                              1
3854 025510  125401                              RNF             ;READ NEXT FWD.         (33)
3855 025512  004000                              DATCNT
3856 025514  000001                              1
3857 025516  000001                              1
3858 025520  177777                      .WORD   END
3859
3860 025522  104001                BFSEQ8:       RDF             ;READ FWD.              (34)
```

```
3861 025524  004000                                DATCNT
3862 025526  000001                                1
3863 025530  000001                                1
3864 025532  105001                                RPF             ;READ PREVIOUS FWD.     (35)
3865 025534  004000                                DATCNT
3866 025536  000001                                1
3867 025540  000001                                1
3868 025542  125001                                RPR             ;READ PREVIOUS REV.     (36)
3869 025544  004000                                DATCNT
3870 025546  000001                                1
3871 025550  000001                                1
3872 025552  177777                    .WORD       END
3873
3874 025554  101012                BFSEQ9: .WORD   CLN             ;CLEAN.                 (37)
3875 025556  000001                                1
3876 025560  000001                                1
3877 025562  000000                                0
3878 025564  102010                                RWD             ;REWIND                 (38)
3879 025566  000001                                1
3880 025570  000001                                1
3881 025572  000000                                0
3882 025574  177777                    .WORD       END             ;END OF SEQUENCE.
3883
3884 025576  104105                BFSE10:         WTV             ;WRITE/VERIFY EVEN LENGTH.      (39)
3885 025600  000012                                12
3886 025602  000001                                1
3887 025604  000000                                0
3888 025606  104105                                WTV             ;WRITE/VERIFY ODD LENGTH.       (40)
3889 025610  000011                                11
3890 025612  000001                                1
3891 025614  000000                                0
3892 025616  177777                    .WORD       END
3893                                    .EVEN
3894
3895 025620                                        ENDTST
     025620                         L10017:
     025620  104401                                                                    TRAP    C$ETST
3896
3897                                .SBTTL  TEST 2: DATA RELIABILITY.
3898
3899                                ;++
3900                                ; TEST TO CHECK THE DATA RELIABILITY OF THE TS05.
3901                                ;--
3902 025622                                        BGNTST
     025622                         T2::
3903
3904 025622  112737  000001  003515                MOVB    #1,RANDOM       ;SET THE RANDOM OPERATIONS FLAG.
3905 025630  105037  003514                        CLRB    EXPBOT          ;CLEAR EXPECT BOT FLAG.
3906 025634  005037  003456                        CLR     WTMFLG          ;CLEAR WRITE TAPE MARK FLAG
3907 025640  004737  017060                        JSR     PC,FIRSTU       ;FIND THE FIRST UNIT.
3908 025644  004737  007072                        JSR     PC,SOFINIT      ;INIT DEVICE
3909 025650  103404                                BCS     11$
3910 025652                                        ERRDF   2,NSSRM,STAERM  ;REPORT TS05 NOT READY
     025652  104455                                                                    TRAP    C$ERDF
     025654  000002                                                                    .WORD   2
     025656  004536                                                                    .WORD   NSSRM
     025660  006120                                                                    .WORD   STAERM
```

```
3911
3912 025662  004737  007466          11$:    JSR     PC,MDSET                ;GO DO SETUP'S
3913 025666  012702  004000                  MOV     #DATCNT,R2              ;SET UP THE RECORD LENGTH MASK,
3914 025672  005302                          DEC     R2
3915 025674  010237  003430                  MOV     R2,LENMSK               ;ALLOW MAXIMUM BUFFER.
3916 025700  005137  003430                  COM     LENMSK
3917 025704  004737  010162                  JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
3918 025710  105737  003526                  TSTB    STAFLG  ;IFB STAFLG NE #0 THEN          ;IF STARTING THEN:
3919 025714  001417                          BEQ     50424$
3920 025716  004737  010206                    JSR   PC,SETRW                ;CMD2=REWIND
3921 025722  105037  003526                  CLRB    STAFLG    ;LET STAFLG :B= #0            ;CLR START FLAG.
3922
3923 025726                          50422$:
3924 025726  012721  104105                  MOV     #WTV,(R1)+
3925 025732  012721  004000                  MOV     #DATCNT,(R1)+
3926 025736  012702  177740                  MOV     #RNOPSC,R2
3927 025742  005102                          COM     R2
3928 025744  010221                          MOV     R2,(R1)+
3929 025746  012721  000007                  MOV     #RANP,(R1)+
3930
3931 025752                          50423$: BREAK                           ; DO A SUPVSR BREAK FIRST.
     025752  104422                                                                  TRAP    C$BRK
3932
3933 025754                          50424$:                                 ;FILL SEQ TBL WITH RANDOM CMDS.
3934 025754  020127  003740                  CMP     R1,#SEQEND
3935 025760  002012                          BGE     50425$
3936 025762  063737  003432  003434          ADD     RANB,RANS           ;LET RANS := RANS + RANB
3937 025770  013702  003434                  MOV     RANS,R2
3938 025774  042702  177741                  BIC     #177741,R2
3939 026000  004772  026136                  JSR     PC,@RANCMD(R2)          ;SET UP A RANDOM CMD + BRF.
3940
3941 026004  000763                          BR      50424$
3942 026006                          50425$:
3943 026006  012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
3944 026012  004737  010226                    JSR   PC,EXALL                ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE.
3945
3946 026016  012701  003540                  MOV     #CMDSEQ,R1              ;INIT CMD SEQ TBL POINTER,
3947 026022  005702                          TST     R2                              ;REPEAT UNTIL EOT IS REACHED
3948 026024  001752                          BEQ     50423$
3949 026026  105237  003524                  INCB    ALLEOT                  ;FLAG ALL UNITS @ EOT
3950 026032  000240                          NOP
3951 026034  000240                          NOP
3952 026036  000240                          NOP
3953 026040  004737  027612                  JSR     PC,T5WEOT       ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
3954                                                                  ;SO THAT SHORTER READ STOP DISTANCE
3955                                                                  ;SHALL POSITION HEAD IN CLEAN IRG GAP
3956                                                                ;READ REV THAT EXTRA REC TO RE-POSITION THE TAPE
3957 026044  004737  026176                  JSR     PC,RANRD                ;SET UP READ REV/FWD CMDS,
3958 026050  012737  177740  003544          MOV     #RNOPSC,CMDSEQ+4        ;# OF RECORDS FOR READ REV.
3959 026056  005137  003544                  COM     CMDSEQ+4
3960 026062  013737  003544  003554          MOV     CMDSEQ+4,CMDSEQ+14      ;# OF RECORDS FOR READ FORWARD.
3961 026070  012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENSE CODE IN SEQ TABLE.
3962 026074  004737  010226                  JSR     PC,EXALL                ;GO EXECUTE READ REV/FWD OF LAST N RECORDS.
3963 026100  105037  003524                  CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
3964 026104  112737  000001  003517          MOVB    #1,RPTFLG               ;REQUEST PERFORMANCE REPORT DURING REWIND.
3965 026112  012701  003540                  MOV     #CMDSEQ,R1              ;INIT SEQ TBL POINTER,
3966 026116  004737  010206                  JSR PC,SETRW                    ;STORE REWIND IN SEQ TBL,
```

```
3967 026122  012711  177777                MOV     #END,(R1)               ;STORE END IN SEQ TBL,
3968 026126  004737  010226                JSR PC,EXALL                    ;EXECUTE REWIND CMD ON ALL UNITS
3969
3970 026132                                EXIT    TST
     026132  104432                                                         TRAP    C$EXIT
     026134  000320                                                         .WORD   L10034-.
3971
3972                                ;       ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
3973                                ;       THE DATA RELIABILITY TEST.
3974
3975 026136  026334                RANCMD: RANWV                   ;WRITE/VERIFY.
3976 026140  026310                        RANWR                   ;WRITE.
3977 026142  026310                        RANWR                   ;WRITE.
3978 026144  026310                        RANWR                   ;WRITE.
3979 026146  026310                        RANWR                   ;WRITE.
3980 026150  026310                        RANWR                   ;WRITE.
3981 026152  026310                        RANWR                   ;WRITE.
3982 026154  026310                        RANWR                   ;WRITE.
3983 026156  026176                        RANRD                   ;READ.
3984 026160  026176                        RANRD                   ;READ.
3985 026162  026176                        RANRD                   ;READ.
3986 026164  026176                        RANRD                   ;READ.
3987 026166  026176                        RANRD                   ;READ.
3988 026170  026176                        RANRD                   ;READ.
3989 026172  026176                        RANRD                   ;READ.
3990 026174  026176                        RANRD                   ;READ.
3991
3992
3993                                ;       SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
3994                                ;       INPUTS:
3995                                ;       OUTPUTS:
3996                                ;       REGISTERS:      R2
3997                                ;       CALLS:
3998
3999 026176  005737  003456        RANRD:: TST     WTMFLG                  ;WAS LAST CMD A WRITE?
4000 026202  001406                        BEQ     1$                      ;NO,GO AHEAD
4001 026204  004737  026346                JSR     PC,RAWTM                ;YES PUT DOWN TAPE MARK
4002 026210  004737  026374                JSR     PC,RASFR                ;AND SPACE FILE REV
4003 026214  005037  003456                CLR     WTMFLG                  ;THEN CLEAR THE FLAG
4004 026220  020127  003740        1$:     CMP     R1,#SEQEND
4005 026224  002030                        BGE     2$
4006 026226  012721  104401                MOV     #RDR,(R1)+              ;STORE READ REV CMD.
4007 026232  012721  004000                MOV     #DATCNT,(R1)+           ;SET BRF TO MAX FOR READ RANDOM LENGTHS.
4008 026236  063737  003434  003432        ADD     RANS,RANB       ;LET RANB := RANB + RANS
4009 026244  013702  003432                MOV     RANB,R2         ;LET R2 := RANB CLR.BY #RNOPSC
4010 026250  042702  177740                BIC     #RNOPSC,R2
4011 026254  010221                        MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
4012 026256  012721  000007                MOV     #RANP,(R1)+     ;RANDOM PATTERN.
4013 026262  020127  003740                CMP     R1,#SEQEND
4014 026266  002007                        BGE     2$
4015 026270  012721  104001                MOV     #RDF,(R1)+      ;STORE READ FWD CMD.
4016 026274  012721  004000                MOV     #DATCNT,(R1)+   ;SET BRF TO MAX TO READ RANDOM LENGTHS.
4017 026300  010221                        MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
4018 026302  012721  000007                MOV     #RANP,(R1)+     ;RANDOM PATTERN.
4019 026306  000207                2$:     RTS PC
4020
4021                                ;       SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE.
```

```
4022                                    ;       THEN A WRITE TAPE MARK AND SPACE FILE REVERSE.
4023                                    ;
4024                                    ;       INPUTS:
4025                                    ;       OUTPUTS:
4026                                    ;       REGISTERS:
4027                                    ;       CALLS:
4028
4029 026310  012721  104005        RANWR:: MOV     #WRT,(R1)+              ;STORE WRITE CMD.
4030 026314  004737  026422                JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
4031 026320  005737  003456                TST     WTMFLG                  ;LAST CMD A WRT?
4032 026324  001002                       BNE     1$                      ;YES,RETURN
4033 026326  005237  003456                INC     WTMFLG                  ;NO,SET THE FLAG
4034 026332  000207                1$:     RTS PC
4035
4036
4037                                    ;       SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
4038                                    ;       INPUTS:
4039                                    ;       OUTPUTS:
4040                                    ;       REGISTERS:
4041                                    ;       CALLS:
4042
4043 026334  012721  104105        RANWV:: MOV     #WTV,(R1)+              ;STORE WRITE/VERIFY CMD.
4044 026340  004737  026422                JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
4045 026344  000207                       RTS     PC
4046
4047
4048                                    ;       SUBROUTINE TO SET UP A WRITE TAPE MARK IN THE SEQUENCE TABLE.
4049                                    ;       INPUTS:
4050                                    ;       OUTPUTS:
4051                                    ;       REGISTERS:
4052                                    ;       CALLS:
4053
4054 026346  020127  003740        RAWTM:: CMP     R1,#SEQEND
4055 026352  002007                       BGE     1$
4056 026354  012721  100011                MOV     #WTM,(R1)+               ;STORE WRITE TAPE MARK CMD.
4057 026360  012721  000001                MOV     #1,(R1)+                ;BRF
4058 026364  012721  000001                MOV     #1,(R1)+                ;# OF OPERATIONS
4059 026370  005721                       TST     (R1)+                   ;SKIP PATTERNS
4060 026372  000207                1$:     RTS PC
4061
4062                                    ;       SUBROUTINE TO SET UP A SPACE FILE REVERSE IN THE SEQUENCE TABLE.
4063                                    ;       INPUTS:
4064                                    ;       OUTPUTS:
4065                                    ;       REGISTERS:
4066                                    ;       CALLS:
4067
4068 026374  020127  003740        RASFR:: CMP     R1,#SEQEND
4069 026400  002007                       BGE     1$
4070 026402  012721  105410                MOV     #SFR,(R1)+              ;STORE SPACE FILE REVERSE
4071 026406  012721  000001                MOV     #1,(R1)+                ;BRF
4072 026412  012721  000001                MOV     #1,(R1)+                ;# OF OPERATIONS
4073 026416  005721                       TST     (R1)+                   ;SKIP PATTERNS
4074 026420  000207                1$:     RTS PC
4075
4076
4077                                    ;       SUBROUTINE TO STORE BRF, # OF OPERATIONS, PATTERN IN COMMAND
4078                                    ;       SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
```

```
4079                                    ;       INPUTS:
4080                                    ;       OUTPUTS:
4081                                    ;       REGISTERS:      R2
4082                                    ;       CALLS:
4083
4084 026422  012721  004000            RANW::  MOV     #DATCNT,(R1)+           ;SET BRF TO MAX FOR PATTERN GENERATION.
4085                                                                    ;RANDOM BRF WILL BE GENERATED FOR EACH RECORD.
4086 026426  063737  003434  003432            ADD     RANS,RANB       ;LET RANB := RANB + RANS
4087 026434  013702  003432                    MOV     RANB,R2         ;LET R2 := RANB CLR.BY #RNOPSC
4088 026440  042702  177740                    BIC     #RNOPSC,R2
4089 026444  010221                            MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
4090 026446  012721  000007                    MOV     #RANP,(R1)+     ;RANDOM PATTERN.
4091 026452  000207                            RTS PC                          ;RETURN.
4092
4093                                            .EVEN
4094
4095 026454                                     ENDTST
     026454                             L10034:
     026454  104401                                                                     TRAP    C$ETST
4096
4097                                    .SBTTL  TEST 3: WRITE COMPATABILITY/WRITE UTILITY.
4098
4099                                    ;++
4100                                    ; TEST TO WRITE RECORDS FROM BOT TO EOT.
4101                                    ;--
4102
4103 026456                                     BGNTST
     026456                             T3::
4104
4105 026456  112737  000001  003515            MOVB    #1,RANDOM               ;SET THE RANDOM OPERATIONS FLAG.
4106 026464  105037  003514                    CLRB    EXPBOT  ;LET EXPBOT :B= #0              ;CLEAR EXPECT BOT FLAG.
4107
4108 026470  004737  017060                    JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
4109 026474  004737  007072                    JSR     PC,SOFINIT              ;INIT DEVICE
4110 026500  103404                            BCS     11$
4111 026502                                    ERRDF   2,NSSRM,STAERM          ;REPORT TSO5 NOT READY
     026502  104455                                                                     TRAP    C$ERDF
     026504  000002                                                                     .WORD   2
     026506  004536                                                                     .WORD   NSSRM
     026510  006120                                                                     .WORD   STAERM
4112
4113 026512  004737  007466            11$:    JSR     PC,MDSET                ;GO DO SETUP'S
4114 026516  012702  004000                    MOV     #DATCNT,R2              ;SET UP THE RECORD LENGTH MASK.
4115 026522  005302                            DEC     R2
4116 026524  010237  003430                    MOV     R2,LENMSK               ;ALLOW MAXIMUM BUFFER.
4117 026530  005137  003430                    COM     LENMSK
4118 026534  004737  010162                    JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
4119 026540  004737  010206                    JSR PC,SETRW                    ;CMD2=REWIND
4120 026544  105037  003526                    CLRB    STAFLG  ;LET STAFLG :B= #0              ;CLEAR START FLAG
4121 026550                             50426$: BREAK                   ; DO A SUPVSR BREAK FIRST.
     026550  104422                                                                     TRAP    C$BRK
4122
4123 026552                             50427$:                         ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
4124 026552  020127  003740                    CMP     R1,#SEQEND
4125 026556  002003                            BGE     50430$
4126 026560  004737  026310                    JSR     PC,RANWR                ;STORE A WRITE CMD IN SEQUENCE TABLE.
4127 026564  000772                            BR      50427$
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```
4128 026566                            50430$:
4129 026566  012711  177777                MOV     #END,(R1)           ;STORE END OF SEQUENCE CODE IN TABLE.
4130 026572  004737  010226                  JSR   PC,EXALL            ;EXECUTE ALL CMDS IN SEQ TBL ON UNITS.
4131 026576  012701  003540                MOV     #CMDSEQ,R1                  ;INIT SEQ TBL POINTER,
4132 026602  005702                        TST     R2                          ;REPEAT UNTIL EOT IS REACHED
4133 026604  001761                        BEQ     50426$
4134 026606  105237  003524                INCB    ALLEOT              ;SET ALL UNITS @ EOT FLAG
4135 026612  000240                        NOP
4136 026614  000240                        NOP
4137 026616  000240                        NOP
4138 026620  004737  027612                JSR     PC,T5WEOT       ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
4139                                                                        ;SO THAT SHORTER READ STOP DISTANCE
4140                                                                        ;SHALL POSITION HEAD IN CLEAN IRG GAP
4141                                                                ;READ REV THAT EXTRA REC TO RE-POSITION TAPE
4142 026624  105037  003524                CLRB    ALLEOT              ;CLEAR ALL UNITS @ EOT FLAG
4143 026630  004737  010206                JSR PC,SETRW                ;STORE REWIND IN SEQ TBL,
4144 026634  012711  177777                MOV     #END,(R1)           ;STORE END IN SEQ TBL,
4145 026640  004737  010226                JSR PC,EXALL                ;EXECUTE REWIND CMD ON ALL UNITS
4146
4147
4148 026644                                EXIT    TST
     026644  104432                                                     TRAP    C$EXIT
     026646  000002                                                     .WORD   L10035-.
4149
4150                                       .EVEN
4151
4152 026650                                ENDTST
     026650                            L10035:
     026650  104401                                                     TRAP    C$ETST
4153
4154
4155                                   .SBTTL  TEST 4:  READ COMPATABILITY/READ UTILITY.
4156
4157                                   ;++
4158                                   ; TEST TO READ ENTIRE TAPE FORWARD AND REVERSE.
4159                                   ;--
4160
4161 026652                                BGNTST
     026652                            T4::
4162
4163 026652  112737  000001  003515          MOVB    #1,RANDOM           ;SET THE RANDOM OPERATIONS FLAG.
4164 026660  112737  000001  003514          MOVB    #1,EXPBOT           ;SET EXPECT BOT FLAG.
4165
4166 026666  004737  017060                JSR     PC,FIRSTU           ;FIND THE FIRST UNIT.
4167 026672  004737  007072                JSR     PC,SOFINIT          ;INIT DEVICE
4168 026676  103404                        BCS     11$
4169 026700                                ERRDF   2,NSSRM,STAERM      ;REPORT TS05 NOT READY
     026700  104455                                                     TRAP    C$ERDF
     026702  000002                                                     .WORD   2
     026704  004536                                                     .WORD   NSSRM
     026706  006120                                                     .WORD   STAERM
4170
4171 026710  004737  007466            11$:    JSR     PC,MDSET            ;GO DO SETUP'S
4172 026714  004737  010162                    JSR PC,SETCH                ;CMD 1 = SET CHARACTERISTIC.
4173 026720  004737  010206                    JSR PC,SETRW                ;CMD2=REWIND.
4174 026724  105037  003526                    CLRB    STAFLG  ;LET STAFLG :B= #0          ;CLEAR START FLAG
4175 026730  012721  104001                    MOV     #RDF,(R1)+          ;CMD3 = READ FORWARD.
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```
4176 026734  012721  004000                MOV     #DATCNT,(R1)+           ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
4177 026740  012721  077777                MOV     #77777,(R1)+            ;SET RECORD COUNT TO MAX FOR WHOLE TAPE.
4178 026744  012721  000007                MOV     #RANP,(R1)+             ;PATTERN = RANDOM.
4179 026750  012711  177777                MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
4180 026754  004737  010226                JSR     PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON ALL UNITS.
4181 026760  105237  003524                INCB    ALLEOT                  ;FLAG TO ALLOW ALL UNITS AT EOT TO READ REV
4182 026764  012701  003540                MOV     #CMDSEQ,R1              ;INIT CMD SEQ TBL POINTER.
4183 026770  012721  104401                MOV     #RDR,(R1)+              ;CMD1 = READ REVERSE.
4184 026774  012721  004000                MOV     #DATCNT,(R1)+           ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
4185 027000  012721  077777                MOV     #77777,(R1)+            ;RECORD COUNT = MAX FOR WHOLE TAPE.
4186 027004  012721  000007                MOV     #RANP,(R1)+             ;PATTERN = RANDOM.
4187 027010  012711  177777                MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
4188 027014  004737  010226                JSR     PC,EXALL                ;GO EXECUTE READ REV. OF ENTIRE TAPE.
4189 027020  105037  003524                CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
4190
4191 027024                                EXIT    TST
     027024  104432                                                        TRAP    C$EXIT
     027026  000002                                                        .WORD   L10036-.
4192
4193                                       .EVEN
4194
4195 027030                                ENDTST
     027030                        L10036:
     027030  104401                                                        TRAP    C$ETST
4196
4197                                       .SBTTL  TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
4198
4199                                       ;++
4200                                       ; TEST TO EXECUTE  OPERATOR SELECTED COMMAND SEQUENCE.
4201                                       ;--
4202
4203 027032                                BGNTST
     027032                        T5::
4204
4205 027032  105037  003515                CLRB    RANDOM                  ;CLEAR RAMDOM MODE FLAG.
4206 027036  112737  000001  003514        MOVB    #1,EXPBOT               ;SET EXPECT BOT FLAG.
4207
4208 027044  004737  017060                JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
4209 027050  004737  007072                JSR     PC,SOFINIT              ;INIT DEVICE
4210 027054  103404                        BCS     11$
4211 027056                                ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     027056  104455                                                        TRAP    C$ERDF
     027060  000002                                                        .WORD   2
     027062  004536                                                        .WORD   NSSRM
     027064  006120                                                        .WORD   STAERM
4212
4213 027066  004737  007466        11$:    JSR     PC,MDSET                ;GO DO SETUP'S
4214 027072  113737  002216  003521        MOVB    PIRE,IRE                ;MOVE INHIBIT RFC ERROR REPORT FLAG.
4215 027100  004737  010162                JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
4216 027104  013737  002220  003542        MOV     CHAR,CMDSEQ+2           ;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
4217 027112  012702  002222                MOV     #CMDD,R2                ;R2 POINTS TO CMD2 IN SOFT P TABLE.
4218 027116  004737  027570                JSR     PC,PTCMDS               ;MOVE CMD 2 FROM P TBL TO SEQ TBL.
4219 027122  004737  027570                JSR     PC,PTCMDS               ;MOVE CMD 3 FROM P TBL TO SEQ TBL.
4220 027126  004737  027570                JSR     PC,PTCMDS               ;MOVE CMD 4 FROM P TBL TO SEQ TBL.
4221 027132  004737  027570                JSR     PC,PTCMDS               ;MOVE CMD 5 FROM P TBL TO SEQ TBL.
4222 027136  004737  027570                JSR     PC,PTCMDS               ;MOVE CMD 6 FROM P TBL TO SEQ TBL.
4223 027142  004737  027570                JSR     PC,PTCMDS               ;MOVE CMD 7 FROM P TBL TO SEQ TBL.
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4224 027146  004737  027570                    JSR     PC,PTCMDS               ;MOVE END CMD FROM P TBL TO SEQ TBL.
4225 027152  005037  003442                    CLR     JLOOP                   ;CLEAR JMP CMD LOOP COUNT.
4226 027156  105037  003526                    CLRB    STAFLG                  ;CLEAR START FLAG
4227 027162  012701  003540                    MOV     #CMDSEQ,R1              ;INIT SEQUENCE TABLE POINTER.
4228 027166                            3$:      ;WHILE (R1) NE #END DO          ;WHILE THERE ARE CMDS LEFT IN SEQUENCE TBLE:
4229 027166                            50431$:
4230 027166  021127  177777                    CMP     (R1),#END
4231 027172  001574                            BEQ     50432$
4232 027174  022711  000040                      CMP   #JMP.C,(R1)             ;IS THIS A JUMP CMD?
4233 027200  001024                              BNE   6$                      ;BR IF NOT.
4234 027202  062701  000002                    ADD     #2,R1     ;LET R1 := R1 + #2          ;POINT TO BRF.
4235 027206  012137  003444                      MOV   (R1)+,JLOC              ;SAVE BRF (LOCATION).
4236 027212  022137  003442                      CMP (R1)+,JLOOP               ;HAS LOOP COUNT BE SATISFIED?
4237 027216  001003                              BNE   1$                      ;IF NOT, JMP AGAIN.
4238 027220  062701  000002                    ADD     #2,R1                   ;IF SO, ADJUST SEQ POUNTER
4239 027224  000760                              BR    3$                      ;AND GO TO NEXT COMMAND.
4240 027226  005237  003442                1$:   INC     JLOOP                 ;UPDATE THE LOOP COUNT.
4241 027232  012701  003540                    MOV     #CMDSEQ,R1              ;INIT CMD SEQ TABLE POINTER.
4242 027236  005337  003444                2$:   DEC     JLOC                  ;DECR LOCATION COUNTER.
4243 027242  001751                              BEQ   3$                      ;IF THIS IS THE RIGHT LOCATION TO JMP TO, GO SET
4244 027244  062701  000010                    ADD     #10,R1                  ;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
4245 027250  000772                              BR    2$                      ;DO IT AGAIN.
4246
4247 027252  022711  000020                6$:   CMP     #DLY.C,(R1)           ;DELAY?
4248 027256  001026                              BNE   4$                      ;BR IF NOT.
4249 027260  062701  000004                    ADD     #4,R1                   ;R1 = LOCATION OF N COUNT.
4250 027264  011137  003440                    MOV     (R1),TIME2              ;SAVE N COUNT.
4251 027270                            7$:     DELAY 1                         ;GO TO SUPER-WAIT 1 MSEC.
     027270  012727  000001                                                                MOV     #1,(PC)+
     027274  000000                                                                        .WORD   0
     027276  013727  002116                                                                MOV     L$DLY,(PC)+
     027302  000000                                                                        .WORD   0
     027304  005367  177772                                                                DEC     -6(PC)
     027310  001375                                                                        BNE     .-4
     027312  005367  177756                                                                DEC     -22(PC)
     027316  001367                                                                        BNE     .-20
4252 027320  005337  003440                      DEC   TIME2
4253 027324  001361                              BNE   7$
4254 027326  062701  000004                    ADD     #4,R1     ;LET R1 := R1 + #4          ;POINT TO NEXT CMD.
4255 027332  000715                              BR    3$                      ;GO CHECK NEXT CMD.
4256 027334  004737  011172                4$:   JSR     PC,SETUP              ;GO SETUP THE COMMAND BLOCK.
4257 027340                            50433$: ;WHILE NCNT LT NCNT1 DO         ;WHILE THERE ARE RECORDS REMAINING:
4258 027340  023737  003412  003414            CMP     NCNT,NCNT1
4259 027346  002103                            BGE     50434$
4260 027350  004737  011064                      JSR PC,CMDAC                  ;STORE CMD ASCII IN ERROR MSG.
4261 027354  004737  010524                      JSR PC,EXSUB                  ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
4262 027360  023727  003420  100017            CMP     CMDWRD,#GES             ;IF CMD IS GET STATUS THEN:
4263 027366  001002                            BNE     50435$
4264 027370  004737  017370                      JSR PC,PRXST                  ;PRINT EXTENDED STATUS REGISTERS.
4265
4266 027374                            50435$:
4267 027374  004737  017456                      JSR PC,CKHAE                  ;CHECK HALT AFTER EACH CMD FLAG.
4268 027400  012702  000001                    MOV     #1,R2                   ;SET ALL UNITS AT BOT/EOT.
4269 027404  004737  017060                      JSR PC,FIRSTU                 ;FIND FIRST UNIT.
4270 027410                            50436$: ;WHILE DEVTBL(R5) NE #END DO            ;WHILE THERE ARE MORE UNITS:
4271 027410  026527  002604  177777            CMP     DEVTBL(R5),#END
4272 027416  001426                            BEQ     50437$
```

```
4273 027420  032737  000400  003420          BIT     #MOD.CO,CMDWRD          ;IF CMD IS REVERSE THEN:
4274 027426  001406                          BEQ     50440$
4275 027430  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)        ;IF NOT AT BOT THEN:
4276 027436  001001                          BNE     50441$
4277 027440  005002                          CLR     R2                      ;CLEAR EOT/BOT FLAG.
4278
4279 027442                          50441$:
4280 027442  000411                          BR      50442$                          ;ELSE IF CMD IS NOT REVERSE:
4281 027444                          50440$:
4282 027444  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)
4283 027452  001404                          BEQ     50443$
4284 027454  032737  000001  003420          BIT     #CMD.CO,CMDWRD
4285 027462  001001                          BNE     50444$
4286 027464                          50443$:
4287                                                        ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
4288 027464  005002                          CLR     R2      ;LET R2 := #0           ;CLEAR EOT/BOT FLAG.
4289
4290 027466                          50444$:
4291
4292 027466                          50442$:
4293 027466  004737  017126                  JSR PC,NEXTU            ;FIND NEXT UN'T
4294                                                        ;
4295 027472  000746                          BR      50436$
4296 027474                          50437$:
4297 027474  020227  000001                  CMP     R2,#1           ;IF ALL UNIT ARE AT EOT/BOT THEN:
4298 027500  001016                          BNE     50445$
4299 027502  013737  003412  003414          MOV     NCNT,NCNT1      ;FORCE TERMINATION OF COMMAND.
4300 027510  005237  003414                  INC     NCNT1
4301 027514  105237  003524                  INCB    ALLEOT           ;FLAG ALL UNITS AT EOT/BOT TO ALLOW VERIFY OF D
4302 027520  023727  003426  000002          CMP     CMDLG,#2        ;WHEN WRITING IS CURRENT COMMAND
4303 027526  001002                          BNE     50446$
4304 027530  004737  027612                  JSR PC,T5WEOT   ;GO WRITE/READ REV ONE RECORD BEYOND EOT
4305
4306 027534                          50446$:
4307
4308 027534  000402                          BR      50447$
4309 027536                          50445$:
4310 027536  105037  003524                  CLRB    ALLEOT          ;WHEN NOT ALL @EOT, CLEAR FLAG
4311
4312 027542                          50447$:
4313 027542  005237  003412                  INC     NCNT            ;UPDATE RECORD COUNT.
4314 027546  013737  003420  003424          MOV     CMDWRD,PCMDWD   ;SAVE PREVIOUS COMMAND WORD.
4315
4316 027554  000671                          BR      50433$
4317 027556                          50434$:
4318 027556  004737  016044                    JSR   PC,VFYDAT       ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
4319                                                        ;VERIFY THE LAST N RECORDS OF DATA.
4320
4321 027562  000601                          BR      50431$
4322 027564                          50432$:
4323
4324 027564                          EXIT    TST
     027564  104432                                                      TRAP    C$EXIT
     027566  000140                                                      .WORD   L10037-.
4325
4326                                 ;       SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
4327                                 ;       THE COMMAND SEQUENCE TABLE.
```

```
                                        ;       INPUTS:         R2 = POINTER TO SOFT 'P' TABLE
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R3.
                                        ;       CALLS:

027570  012203                  PTCMDS::MOV     (R2)+,R3            ;R3 = COMMAND TABLE INDEX.
027572  005303                          DEC     R3
027574  006303                          ASL     R3
027576  016321  003752                  MOV     CMDTBL(R3),(R1)+        ;MOVE COMMAND WORD.
027602  012221                          MOV     (R2)+,(R1)+             ;MOVE # OF BYTES.
027604  012221                          MOV     (R2)+,(R1)+             ;MOVE # OF OPERATIONS.
027606  012221                          MOV     (R2)+,(R1)+             ;MOVE PATTERN CODE.
027610  000207                          RTS PC

                                        ;       SUBROUTINE TO WRITE THEN READ REVERSE ONE RECORD BEYOND EOT
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:          CMDAC,EXSUB,CKHAE

027612  000240                  T5WEOT:: NOP
027614  000240                          NOP
027616  004737  010524                  JSR PC,EXSUB            ;WRITE ONE RECORD BEYOND EOT
027622  004737  017456                  JSR PC,CKHAE            ;SO THAT READ SHORTER STOP DISTANCE
                                                                ;SHALL POSITION HEAD IN CLEAN IRG GAP
027626  012700  000002                  MOV     #2,R0           ;SET UP COUNTER FOR EOT
027632  013737  003420  003424  1$:     MOV     CMDWRD,PCMDWD   ;LET PCMDWD := CMDWRD   ;REPOSITION TAPE
027640  012737  104401  003420          MOV     #RDR,CMDWRD     ;LET CMDWRD := #RDR     ;BEFORE EXTRA RECORD
027646  012737  000004  003426          MOV     #4,CMDLG                        ;BY READING REVERSE
027654  013737  003420  002330          MOV     CMDWRD,CMDPKT    ;LET CMDPKT := CMDWRD CLR.BY #BRF.C
027662  042737  004000  002330          BIC     #BRF.C,CMDPKT
027670  013737  002330  003422          MOV     CMDPKT,CMDSAV     ;LET CMDSAV := CMDPKT ;THAT RECORD TO ALLOW
027676  013737  003410  002332          MOV     DATARD,CMDPKT+CP.ADL        ;NEXT COMMAND IN THE
027704  004737  011064                  JSR PC,CMDAC            ;TABLE TO BE EXECUTED
027710  004737  010524                  JSR PC,EXSUB
027714  004737  017456                  JSR PC,CKHAE
027720  005300                          DEC     R0              ;FOUND EOT YET?
027722  001343                          BNE     1$              ;NO,KEEP GOING
027724  000207                          RTS PC                  ;YES,RETURN

                                        .EVEN

                                        ENDTST
027726
027726                          L10037:
027726  104401                                                                  TRAP    C$ETST

027730                                  ENDMOD

                                .TITLE PARAMETER CODING

                                .SBTTL  HARDWARE PARAMETER CODING SECTION

027730                                  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.
                                ;--

                                        BGNHRD

027730  000042                  L$HARD::                                        .WORD L10040-L$HARD/2
027732

                                        GPRMA   TS5ADR,0,0,160010,177564,YES

027732  000031                                                                  .WORD   T$CODE
027734  027770                                                                  .WORD   TS5ADR
027736  160010                                                                  .WORD   T$LOLIM
027740  177564                                                                  .WORD   T$HILIM

                                        GPRMD   TS5VCT,2,0,777,60,776,YES

027742  001032                                                                  .WORD   T$CODE
027744  030005                                                                  .WORD   TS5VCT
027746  000777                                                                  .WORD   777
027750  000060                                                                  .WORD   T$LOLIM
027752  000776                                                                  .WORD   T$HILIM

                                        GPRMD   TS5UNT,4,0,1,0,1,NO

027754  002022                                                                  .WORD   T$CODE
027756  030014                                                                  .WORD   TS5UNT
027760  000001                                                                  .WORD   1
027762  000000                                                                  .WORD   T$LOLIM
027764  000001                                                                  .WORD   T$HILIM

                                        EXIT HRD

027766  024004                                                                  .WORD   T$CODE

                                        .NLIST  BEX
027770      124     123     104 TS5ADR: .ASCIZ  /TSDB ADDRESS/
030005      126     105     103 TS5VCT: .ASCIZ  /VECTOR/
030014      123     105     114 TS5UNT: .ASCIZ  /SELECT DRIVE 0-1/
                                        .LIST   BEX
                                        .EVEN

                                        ENDHRD

030036                                                                          .EVEN
                                L10040:

                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;++
                                ; THE SOFTWARE 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.
                                ;--

                                        BGNSFT

030036  000302                  L$SOFT::                                        .WORD L10041-L$SOFT/2
030040

                                        GPRML   CLRM,0,1,YES

030040  000130                                                                  .WORD   T$CODE
```

```
        030042  030644
        030044  000001
4418    030046                          GPRML   RRVM,0,400,YES
        030046  000130
        030050  030663
        030052  000400
4419    030054                          GPRML   RCVERM,2,400,YES
        030054  001130
        030056  030766
        030060  000400
4420    030062                          GPRML   HAEM,2,1,YES
        030062  001130
        030064  030712
        030066  000001
4421    030070                          GPRML   IRECM,6,400,YES
        030070  003130
        030072  031042
        030074  000400
4422    030076                          XFERT   NEXTSP
        030076  004024
4423    030100                          GPRML   BADTM,4,1,YES
        030100  002130
        030102  030736
        030104  000001
4424    030106                  NEXTSP: GPRML   DINTM,6,1,YES
        030106  003130
        030110  031017
        030112  000001
4425    030114                          GPRML   IREM,12,1,YES
        030114  005130
        030116  031107
        030120  000001
4426    030122                          GPRML   CHGM,10,1,YES
        030122  004130
        030124  031063
        030126  000001
4427    030130                          XFERF   ENDSP1
        030130  127044
4428    030132                          GPRMD   CHARM,14,0,377,0,777,YES
        030132  006032
        030134  031140
        030136  000377
        030140  000000
        030142  000777
4429    030144                          GPRMD   CMD2M,16,D,37,1,33,YES
        030144  007052
        030146  031165
        030150  000037
        030152  000001
        030154  000033
4430    030156                          GPRMD   BPCRM,20,D,-1,1,DATCNT,YES
        030156  010052
        030160  031173
        030162  177777
        030164  000001
        030166  004000
4431    030170                          GPRMD   NUMBM,22,D,-1,1,77777,YES
```

```
.WORD   CLRM
.WORD   1

.WORD   T$CODE
.WORD   RRVM
.WORD   400

.WORD   T$CODE
.WORD   RCVERM
.WORD   400

.WORD   T$CODE
.WORD   HAEM
.WORD   1

.WORD   T$CODE
.WORD   IRECM
.WORD   400

.WORD   T$CODE

.WORD   T$CODE
.WORD   BADTM
.WORD   1

.WORD   T$CODE
.WORD   DINTM
.WORD   1

.WORD   T$CODE
.WORD   IREM
.WORD   1

.WORD   T$CODE
.WORD   CHGM
.WORD   1

.WORD   T$CODE

.WORD   T$CODE
.WORD   CHARM
.WORD   377
.WORD   T$LOLIM
.WORD   T$HILIM

.WORD   T$CODE
.WORD   CMD2M
.WORD   37
.WORD   T$LOLIM
.WORD   T$HILIM

.WORD   T$CODE
.WORD   BPCRM
.WORD   -1
.WORD   T$LOLIM
.WORD   T$HILIM
```

```
        030170  011052                                                  .WORD   T$CODE
        030172  031205                                                  .WORD   NUMBM
        030174  177777                                                  .WORD   -1
        030176  000001                                                  .WORD   T$LOLIM
        030200  077777                                                  .WORD   T$HILIM
   4432 030202                  GPRMD   PATTM,24,D,17,0,10,YES
        030202  012052                                                  .WORD   T$CODE
        030204  031225                                                  .WORD   PATTM
        030206  000017                                                  .WORD   17
        030210  000000                                                  .WORD   T$LOLIM
        030212  000010                                                  .WORD   T$HILIM
   4433 030214                  GPRMD   CMD3M,26,D,37,1,33,YES
        030214  013052                                                  .WORD   T$CODE
        030216  031334                                                  .WORD   CMD3M
        030220  000037                                                  .WORD   37
        030222  000001                                                  .WORD   T$LOLIM
        030224  000033                                                  .WORD   T$HILIM
   4434 030226                  GPRMD   BPCRM,30,D,-1,1,DATCNT,YES
        030226  014052                                                  .WORD   T$CODE
        030230  031173                                                  .WORD   BPCRM
        030232  177777                                                  .WORD   -1
        030234  000001                                                  .WORD   T$LOLIM
        030236  004000                                                  .WORD   T$HILIM
   4435 030240                  GPRMD   NUMBM,32,D,-1,1,77777,YES
        030240  015052                                                  .WORD   T$CODE
        030242  031205                                                  .WORD   NUMBM
        030244  177777                                                  .WORD   -1
        030246  000001                                                  .WORD   T$LOLIM
        030250  077777                                                  .WORD   T$HILIM
   4436 030252                  GPRMD   PATTM,34,D,17,0,10,YES
        030252  016052                                                  .WORD   T$CODE
        030254  031225                                                  .WORD   PATTM
        030256  000017                                                  .WORD   17
        030260  000000                                                  .WORD   T$LOLIM
        030262  000010                                                  .WORD   T$HILIM
   4437 030264                  GPRMD   CMD4M,36,D,37,1,33,YES
        030264  017052                                                  .WORD   T$CODE
        030266  031342                                                  .WORD   CMD4M
        030270  000037                                                  .WORD   37
        030272  000001                                                  .WORD   T$LOLIM
        030274  000033                                                  .WORD   T$HILIM
   4438 030276                  GPRMD   BPCRM,40,D,-1,1,DATCNT,YES
        030276  020052                                                  .WORD   T$CODE
        030300  031173                                                  .WORD   BPCRM
        030302  177777                                                  .WORD   -1
        030304  000001                                                  .WORD   T$LOLIM
        030306  004000                                                  .WORD   T$HILIM
   4439 030310                  GPRMD   NUMBM,42,D,-1,1,77777,YES
        030310  021052                                                  .WORD   T$CODE
        030312  031205                                                  .WORD   NUMBM
        030314  177777                                                  .WORD   -1
        030316  000001                                                  .WORD   T$LOLIM
        030320  077777                                                  .WORD   T$HILIM
   4440 030322                  GPRMD   PATTM,44,D,17,0,10,YES
        030322  022052                                                  .WORD   T$CODE
        030324  031225                                                  .WORD   PATTM
        030326  000017                                                  .WORD   17
```

```
                030330  000000
                030332  000010
4441            030334                  GPRMD   CMD5M,46,D,37,1,33,YES
                030334  023052
                030336  031350
                030340  000037
                030342  000001
                030344  000033
4442            030346                  GPRMD   BPCRM,50,D,-1,1,DATCNT,YES
                030346  024052
                030350  031173
                030352  177777
                030354  000001
                030356  004000
4443            030360                  GPRMD   NUMBM,52,D,-1,1,77777,YES
                030360  025052
                030362  031205
                030364  177777
                030366  000001
                030370  077777
4444            030372                  GPRMD   PATTM,54,D,17,0,10,YES
                030372  026052
                030374  031225
                030376  000017
                030400  000000
                030402  000010
4445            030404                  XFER    ENDSP2
                030404  002004
4446            030406          ENDSP1: XFER    ENDSP3
                030406  076004
4447            030410          ENDSP2: GPRMD   CMD6M,56,D,37,1,33,YES
                030410  027052
                030412  031356
                030414  000037
                030416  000001
                030420  000033
4448            030422                  GPRMD   BPCRM,60,D,-1,1,DATCNT,YES
                030422  030052
                030424  031173
                030426  177777
                030430  000001
                030432  004000
4449            030434                  GPRMD   NUMBM,62,D,-1,1,77777,YES
                030434  031052
                030436  031205
                030440  177777
                030442  000001
                030444  077777
4450            030446                  GPRMD   PATTM,64,D,17,0,10,YES
                030446  032052
                030450  031225
                030452  000017
                030454  000000
                030456  000010
4451            030460                  GPRMD   CMD7M,66,D,37,1,33,YES
                030460  033052
                030462  031364

                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   CMD5M
                                        .WORD   37
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   BPCRM
                                        .WORD   -1
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   NUMBM
                                        .WORD   -1
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   PATTM
                                        .WORD   17
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE

                                        .WORD   T$CODE

                                        .WORD   T$CODE
                                        .WORD   CMD6M
                                        .WORD   37
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   BPCRM
                                        .WORD   -1
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   NUMBM
                                        .WORD   -1
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   PATTM
                                        .WORD   17
                                        .WORD   T$LOLIM
                                        .WORD   T$HILIM

                                        .WORD   T$CODE
                                        .WORD   CMD7M
```

```
                030464  000037                                                  .WORD   37
                030466  000001                                                  .WORD   T$LOLIM
                030470  000033                                                  .WORD   T$HILIM
        4452    030472                  GPRMD   BPCRM,70,D,-1,1,DATCNT,YES
                030472  034052                                                  .WORD   T$CODE
                030474  031173                                                  .WORD   BPCRM
                030476  177777                                                  .WORD   -1
                030500  000001                                                  .WORD   T$LOLIM
                030502  004000                                                  .WORD   T$HILIM
        4453    030504                  GPRMD   NUMBM,72,D,-1,1,77777,YES
                030504  035052                                                  .WORD   T$CODE
                030506  031205                                                  .WORD   NUMBM
                030510  177777                                                  .WORD   -1
                030512  000001                                                  .WORD   T$LOLIM
                030514  077777                                                  .WORD   T$HILIM
        4454    030516                  GPRMD   PATTM,74,D,17,0,10,YES
                030516  036052                                                  .WORD   T$CODE
                030520  031225                                                  .WORD   PATTM
                030522  000017                                                  .WORD   17
                030524  000000                                                  .WORD   T$LOLIM
                030526  000010                                                  .WORD   T$HILIM
        4455    030530                  GPRMD   CMD8M,76,D,37,1,33,YES
                030530  037052                                                  .WORD   T$CODE
                030532  031372                                                  .WORD   CMD8M
                030534  000037                                                  .WORD   37
                030536  000001                                                  .WORD   T$LOLIM
                030540  000033                                                  .WORD   T$HILIM
        4456    030542                  GPRMD   BPCRM,100,D,-1,1,DATCNT,YES
                030542  040052                                                  .WORD   T$CODE
                030544  031173                                                  .WORD   BPCRM
                030546  177777                                                  .WORD   -1
                030550  000001                                                  .WORD   T$LOLIM
                030552  004000                                                  .WORD   T$HILIM
        4457    030554                  GPRMD   NUMBM,102,D,-1,1,77777,YES
                030554  041052                                                  .WORD   T$CODE
                030556  031205                                                  .WORD   NUMBM
                030560  177777                                                  .WORD   -1
                030562  000001                                                  .WORD   T$LOLIM
                030564  077777                                                  .WORD   T$HILIM
        4458    030566                  GPRMD   PATTM,104,D,17,0,10,YES
                030566  042052                                                  .WORD   T$CODE
                030570  031225                                                  .WORD   PATTM
                030572  000017                                                  .WORD   17
                030574  000000                                                  .WORD   T$LOLIM
                030576  000010                                                  .WORD   T$HILIM
        4459    030600                  XFER    ENDSP
                030600  022004                                                  .WORD   T$CODE
        4460    030602          ENDSP3: GPRML   TSMD,106,1,YES
                030602  043130                                                  .WORD   T$CODE
                030604  031235                                                  .WORD   TSMD
                030606  000001                                                  .WORD   1
        4461    030610                  XFERT   ENDSP
                030610  016024                                                  .WORD   T$CODE
        4462    030612                  GPRML   FAST,114,1,YES
                030612  046130                                                  .WORD   T$CODE
                030614  031325                                                  .WORD   FAST
                030616  000001                                                  .WORD   1
```

```
4463 030620                               XFERT   ENDSP4
     030620  011024                                                        .WORD   T$CODE
4464 030622                               GPRML   WTBF,112,1,YES
     030622  045130                                                        .WORD   T$CODE
     030624  031305                                                        .WORD   WTBF
     030626  000001                                                        .WORD   1
4465 030630                               XFERT   ENDSP
     030630  006024                                                        .WORD   T$CODE
4466 030632                               GPRML   RDBF,110,1,YES
     030632  044130                                                        .WORD   T$CODE
     030634  031266                                                        .WORD   RDBF
     030636  000001                                                        .WORD   1
4467 030640                       ENDSP5: XFER    ENDSP
     030640  002004                                                        .WORD   T$CODE
4468 030642                       ENDSP4: XFER    ENDSP
     030642  001004                                                        .WORD   T$CODE
4469 030644                       ENDSP:
4470 030644                               ENDSFT
                                                                           .EVEN
     030644                       L10041:
4471                                      .EVEN
4472
4473                                      .NLIST  BEX
4474 030644     103   114   105  CLRM:    .ASCIZ  /CLEAR COUNTERS/
4475 030663     122   105   123  RRVM:    .ASCIZ  /RESET RANDOM VARIABLES/
4476 030712     110   101   114  HAEM:    .ASCIZ  /HALT AFTER EACH CMD/
4477 030736     102   101   104  BADTM:   .ASCIZ  /BAD TAPE SPOT DETECTION/
4478 030766     120   122   111  RCVERM:  .ASCIZ  /PRINT RECOVERABLE ERRORS/
4479 031017     104   111   123  DINTM:   .ASCIZ  /DISABLE INTERRUPTS/
4480 031042     111   116   110  IRECM:   .ASCIZ  /INHIBIT RECOVERY/
4481 031063     103   110   101  CHGM:    .ASCIZ  /CHANGE CMD SEQUENCE/
4482 031107     111   116   110  IREM:    .ASCIZ  /INHIBIT RFC ERROR REPORT/
4483 031140     103   110   101  CHARM:   .ASCIZ  /CHARACTERISTICS CODE/
4484 031165     103   115   104  CMD2M:   .ASCIZ  "CMD/2"
4485 031173     102   122   106  BPCRM:   .ASCIZ  /BRF COUNT/
4486 031205     043   040   117  NUMBM:   .ASCIZ  /# OF OPERATIONS/
4487 031225     120   101   124  PATTM:   .ASCIZ  /PATTERN/
4488 031235     104   105   106  TSMD:    .ASCIZ  /DEFAULT SWITCH SETTINGS?/
4489 031266     122   105   101  RDBF:    .ASCIZ  /READ BUFFERING/
4490 031305     127   122   111  WTBF:    .ASCIZ  /WRITE BUFFERING/
4491 031325     061   060   060  FAST:    .ASCIZ  /100IPS/
4492                                      .LIST   BEX
4493                                      .EVEN
4494
4495                                      .NLIST  BEX
4496 031334     103   115   104  CMD3M:   .ASCIZ  "CMD/3"
4497 031342     103   115   104  CMD4M:   .ASCIZ  "CMD/4"
4498 031350     103   115   104  CMD5M:   .ASCIZ  "CMD/5"
4499 031356     103   115   104  CMD6M:   .ASCIZ  "CMD/6"
4500 031364     103   115   104  CMD7M:   .ASCIZ  "CMD/7"
4501 031372     103   115   104  CMD8M:   .ASCIZ  "CMD/8"
4502                                      .LIST   BEX
4503                                      .EVEN
4504
4505
4506
4507                             ;*********************************************************************
```

```
                                ;*****************************************************************************
                                ;       PATCH AREA
                                ; AND AN ADJUSTMENT TO ACCOUNT FOR THE "LASTAD BIT7" HACK
                                ; DESCRIBED IN "SUPPRG.MEM" (FOR REV C).
                                ;
4514 031400                     PATCH:: .BLKW   64.
4515
4517         032000                     .=.!377+1
4519
4520 032000                             LASTAD
     032000  000000                                                     .EVEN
     032002  000000                                                     .WORD   0
     032004                                                             .WORD   0
                                L$LAST::
4521 032004                             ENDMOD
4522
4523                            .SBTTL  HARD CODED P-TBL
4524
4525                            ;++
4526                            ;DIAG IS PRE-PARAMETERIZED PER TBL
4527                            ;--
4528
4529 032004                             BGNSETUP 1
4530 032004                               BGNPTAB
     032004  000000                                                     .WORD   0
     032006  000003                                                     .WORD   L10044-./2-1
     032010
                                L10042:
4531 032010  172522                         172522
4532 032012  000224                         224
4533 032014  000000                           0
4534 032016                                 ENDPTAB
     032016                     L10044:
4535 032016                             ENDSETUP
4536
4537         000001             .END
```

```
ACK.C = 100000 G    BTADDR  002616 G    CP.CNT= 000006 G    C$TPRI= 000013       EXPBOT  003514 G
ADR   = 000020 G    BTMSG1  015070       CRLF    005741 G    DATARD  003410 G    EXSUB   010524 G
ALLEOT  003524 G    BTMSG2  015155       CRLFSP  005744 G    DATAWT  003406 G    EXTFEA  002322 G
ASSEMB= 000010      BTMSG3  015225       CTCC    003450 G    DATCNT= 004000 G    E$END = 002100
ATTNM   004603 G    BTPT    003512 G    CVC.C = 040000 G    DATERM  005752 G    E$LOAD= 000035
AUDRPM  005114 G    BTRPT   020142 G    C$AU  = 000052       DEVTBL  002604 G    FAST    031325
AUDRUN  005146 G    BTO     003046 G    C$AUTO= 000061       DFPTBL  002174 G    FATSM   004642 G
AUTODM  023562      BT1     003120 G    C$BRK = 000022       DFTSCH= 000040 G    FIRSTU  017060 G
BADTM   030736      BT2     003172 G    C$BSEG= 000004       DIA   = 100006 G    FMT.C0= 000040 G
BADTSW  002210 G    BT3     003244 G    C$BSUB= 000002       DIABLK= 003406 G    FMT.C1= 000100 G
BENBSW  002324 G    CHAR    002220 G    C$CEFG= 000045       DIACNT= 000020 G    FTLCNT  003366 G
BFSEQ   025026 G    CHARM   031140       C$CLCK= 000062       DIAGMC= 000000      FUNRM   004622 G
BFSEQ0  025052      CHGFLG  002214 G    C$CLEA= 000012       DINT    002212 G    F$AU  = 000015
BFSEQ1  025124      CHGM    031063       C$CLOS= 000035       DINTM   031017      F$AUTO= 000020
BFSEQ2  025136      CHKERR  013166 G    C$CLP1= 000006       DLY   = 000020 G    F$BGN = 000040
BFSEQ3  025230      CH.EAI= 000040 G    C$CVEC= 000036       DLY.C = 000020 G    F$CLEA= 000007
BFSEQ4  025302      CH.ERI= 000020 G    C$DCLN= 000044       DRI   = 100013 G    F$DU  = 000016
BFSEQ5  025344      CH.ESS= 000200 G    C$DODU= 000051       DROPDM  005065 G    F$END = 000041
BFSEQ6  025416      CKDATA  016444 G    C$DRPT= 000024       DROPED  003522 G    F$HARD= 000004
BFSEQ7  025470      CKDCNT  017054       C$DU  = 000053       DROPN   017366      F$HW  = 000013
BFSEQ8  025522      CKDFF   017056       C$EDIT= 000003       DROPU   017156 G    F$INIT= 000006
BFSEQ9  025554      CKHAE   017456 G    C$ERDF= 000055       DROPUA  017302      F$JMP = 000050
BFSE10  025576      CKHRTN  017544       C$ERHR= 000056       DRORTN  017360      F$MOD = 000000
BGNFLG= 003460      CLN   = 101012 G    C$ERRO= 000060       DTAERM  005752 G    F$MSG = 000011
BINC    016030      CLRERR  012664 G    C$ERSF= 000054       DTAER2  005226 G    F$PROT= 000021
BIT0  = 000001 G    CLRFLG  002204 G    C$ERSO= 000057       DTAER3  005275 G    F$PWR = 000017
BIT00 = 000001 G    CLRM    030644       C$ESCA= 000010       DTAER4  005337 G    F$RPT = 000012
BIT01 = 000002 G    CMDAC   011064 G    C$ESEG= 000005       DTAER5  005360 G    F$SEG = 000003
BIT02 = 000004 G    CMDASC  004040 G    C$ESUB= 000003       EF.CON= 000036 G    F$SOFT= 000005
BIT03 = 000010 G    CMDD    002222 G    C$ETST= 000001       EF.HSS= 000040 G    F$SRV = 000010
BIT04 = 000020 G    CMDLG   003426 G    C$EXIT= 000032       EF.NEW= 000035 G    F$SUB = 000002
BIT05 = 000040 G    CMDPKM  004346 G    C$GETB= 000026       EF.PWR= 000034 G    F$SW  = 000014
BIT06 = 000100 G    CMDPKT  002330 G    C$GETW= 000027       EF.RBO= 000020 G    F$TEST= 000001
BIT07 = 000200 G    CMDSAV  003422 G    C$GMAN= 000043       EF.RES= 000037 G    GCMDA   011136 G
BIT08 = 000400 G    CMDSEQ  003540 G    C$GPHR= 000042       EF.RWB= 000030 G    GENPAT  011556 G
BIT09 = 001000 G    CMDSE2  003550 G    C$GPLO= 000030       EF.STA= 000040 G    GES   = 100017 G
BIT1  = 000002 G    CMDTBL  003752 G    C$GPRI= 000040       EINC    016036      GETSTM  005507 G
BIT10 = 002000 G    CMDWRD  003420 G    C$INIT= 000011       END   = 177777 G    GIT     012050
BIT11 = 004000 G    CMD.C0= 000001 G    C$INLP= 000020       ENDERF= 003472      GOWAIT  012364 G
BIT12 = 010000 G    CMD.C1= 000002 G    C$MANI= 000050       ENDFLG= 003526      GSCPK   002340 G
BIT13 = 020000 G    CMD.C2= 000004 G    C$MEM = 000031       ENDSP   030644      G$CNTO= 000200
BIT14 = 040000 G    CMD.C3= 000010 G    C$MSG = 000023       ENDSP1  030406      G$DELM= 000372
BIT15 = 100000 G    CMD.C4= 000020 G    C$OPEN= 000034       ENDSP2  030410      G$DISP= 000003
BIT2  = 000004 G    CMD2M   031165       C$PNTB= 000014       ENDSP3  030602      G$EXCP= 000400
BIT3  = 000010 G    CMD3M   031334       C$PNTF= 000017       ENDSP4  030642      G$HILI= 000002
BIT4  = 000020 G    CMD4M   031342       C$PNTS= 000016       ENDSP5  030640      G$LOLI= 000001
BIT5  = 000040 G    CMD5M   031350       C$PNTX= 000015       EOTFLG  003502 G    G$NO  = 000000
BIT6  = 000100 G    CMD6M   031356       C$QIO = 000377       ERCVER  002207 G    G$OFFS= 000400
BIT7  = 000200 G    CMD7M   031364       C$RDBU= 000007       ERLOG   003466 G    G$OFSI= 000376
BIT8  = 000400 G    CMD8M   031372       C$REFG= 000047       ERRREC  003471 G    G$PRMA= 000001
BIT9  = 001000 G    CNTBGN= 002626       C$RESE= 000033       ERS   = 100411 G    G$PRMD= 000002
BOE   = 000400 G    CNTEND= 003376       C$REVI= 000003       ERSFLG  003525 G    G$PRML= 000000
BORERS  015274 G    CNTLEN= 000550 G    C$RFLA= 000021       EVL   = 000004 G    G$RADA= 000140
BPCRM   031173      CODELM  004162 G    C$RPT = 000025       EXALL   010226 G    G$RADB= 000000
BRCPK   002344 G    CP.ADH= 000004 G    C$SEFG= 000046       EXARTN  010522      G$RADD= 000040
BRFCNT  003416 G    CP.ADL= 000002 G    C$SPRI= 000041       EXCRTN  012362      G$RADL= 000120
BRF.C = 004000 G    CP.CMD= 000000 G    C$SVEC= 000037       EXCUTE  012054 G    G$RADO= 000020
```

SYMBOL TABLE

```
G$XFER= 000004        L$CCP   002106 G      L10012  023270        NSSRM   004536 G      RAWTM   026346 G
G$YES = 000010        L$CLEA  023714 G      L10013  023560        NUMBM   031205        RCVERM  030766
HAE     002206 G      L$CO    002032 G      L10014  023754        NURTY1  005422 G      RDBF    031266
HAEM    030712        L$DEPO  002011 G      L10015  024026        OFLINM  005456 G      RDBUF   002314 G
HALTM   004306 G      L$DESC  002136 G      L10016  024132        ONEFIL= 000001        RDF   = 104001 G
HELP  = 000000        L$DESP  002076 G      L10017  025620        OPFLAG  003536 G      RDR   = 104401 G
HOE   = 100000 G      L$DEVP  002060 G      L10020  024346        OPP.C = 020000 G      RECCNT  003376 G
HRDCNT  003356 G      L$DISP  002124 G      L10021  024372        O$APTS= 000000        RECLOG  003465 G
HSSW    002320 G      L$DLY   002116 G      L10022  024412        O$AU  = 000001        RECRED  007066
IBE   = 010000 G      L$DTP   002040 G      L10023  024432        O$BGNR= 000001        RECTAP  010064 G
IDU   = 000040 G      L$DTYP  002034 G      L10024  024452        O$BGNS= 000001        RECUD   013020 G
IER   = 020000 G      L$DU    023756 G      L10025  024472        O$DU  = 000001        RERM    005017 G
IE.C  = 000200 G      L$DUT   002072 G      L10026  024512        O$ERRT= 000000        RETRYC  003460 G
INIT10  021302        L$DVTY  002164 G      L10027  024532        O$GNSW= 000001        REWRT   015450 G
INIT15  021600        L$EF    002052 G      L10030  024552        O$POIN= 000001        RFBC    002726 G
INIT16  021620        L$ENVI  002044 G      L10031  024572        O$SETU= 000000        RFCERM  004521 G
INTFLG  003472 G      L$ETP   002102 G      L10032  024630        PASCNT  003326 G      RFREC   003026 G
INTPRI= 000340 G      L$EXP1  002046 G      L10033  025014        PATCH   031400 G      RFUNR   003036 G
INVRT   007724 G      L$EXP4  002064 G      L10034  026454        PATERN  003446 G      RLEXM   004556 G
IRE     003521 G      L$EXP5  002066 G      L10035  026650        PATR0   011642 G      RNF   = 125401 G
IREC    002213 G      L$HARD  027732 G      L10036  027030        PATR1   011700 G      RNOPSC= 177740 G
IRECM   031042        L$HIME  002120 G      L10037  027726        PATR2   011720 G      RNR   = 105401 G
IREM    031107        L$HPCP  002016 G      L10040  030036        PATR3   011730 G      RNYM    004753 G
ISR   = 000100 G      L$HPTP  002022 G      L10041  030644        PATR4   011754 G      RPF   = 105001 G
IXE   = 004000 G      L$HW    002174 G      L10042  032010        PATR5   011766 G      RPR   = 125001 G
I$AU  = 000041        L$ICP   002104 G      L10044  032016        PATR6   012000 G      RPTCNT  003462 G
I$AUTO= 000041        L$INIT  021302 G      MBR   = 100012 G      PATR7   012020 G      RPTFLG  003517 G
I$CLN = 000041        L$LADP  002026 G      MDSET   007466 G      PATR8   012052 G      RPT1A   020410
I$DU  = 000041        L$LAST  032004 G      MEMOM   023166        PATTBL  011620        RPT1B   020465
I$HRD = 000041        L$LOAD  002100 G      MISCFG  003531 G      PATTM   031225        RPT1C   020536
I$INIT= 000041        L$LUN   002074 G      MOD.C0= 000400 G      PCMDWD  003424 G      RPT1D   020607
I$MOD = 000041        L$MREV  002050 G      MOD.C1= 001000 G      PIRE    002216 G      RPT1E   021035
I$MSG = 000041        L$NAME  002000 G      MOD.C2= 002000 G      PNT   = 001000 G      RPT1F   020713
I$PROT= 000040        L$PRIO  002042 G      MOD.C3= 004000 G      PRI   = 002000 G      RPT1G   020764
I$PTAB= 000041        L$PROT  021274 G      MOVMSG  012734 G      PRI00 = 000000 G      RPT1I   021161
I$PWR = 000041        L$PRT   002112 G      MSGCNT= 000020 G      PRI01 = 000040 G      RPT1J   021065
I$RPT = 000041        L$REPP  002062 G      MSGPKA  002544 G      PRI02 = 000100 G      RPT1K   021152
I$SEG = 000041        L$REV   002010 G      MSGPKT  002354 G      PRI03 = 000140 G      RRANV   002205 G
I$SETU= 000041        L$RPT   017546 G      MSGPK0  002374 G      PRI04 = 000200 G      RRBC    002660 G
I$SFT = 000041        L$SOFT  030040 G      MSGPK1  002414 G      PRI05 = 000240 G      RRECL = 000020 G
I$SRV = 000041        L$SPC   002056 G      MSGPK2  002434 G      PRI06 = 000300 G      RRREC   003006 G
I$SUB = 000041        L$SPCP  002020 G      MSGPK3  002454 G      PRI07 = 000340 G      RRUNR   003016 G
I$TST = 000041        L$SPTP  002024 G      MS.RFC= 000004 G      PRXST   017370 G      RRVM    030663
JLOC    003444 G      L$STA   002030 G      MS.XS0= 000006 G      PTCMDS  027570 G      RTLE    014466 G
JLOOP   003442 G      L$SW    002204 G      MS.XS1= 000010 G      PWRFLG  003527 G      RTLRTN  014612
JMP   = 000040 G      L$TEST  002114 G      MS.XS2= 000012 G      RANB    003432 G      RWCPK   002350 G
JMP.C = 000040 G      L$TIML  002014 G      MS.XS3= 000014 G      RANBC = 153624 G      RWD   = 102010 G
J$JMP = 000167        L$UNIT  002012 G      MS.XS4= 000016 G      RANCMD  026136        RWERR   003467 G
LENMSK  003430 G      L10000  002202        NCMD.C= 177740 G      RANDOM  003515 G      R5SAVE  003452 G
LOE   = 040000 G      L10001  002326        NCNT    003412 G      RANP  = 000007 G      SCCNT   003336 G
LOG     015544 G      L10002  006116        NCNT1   003414 G      RANRD   026176 G      SCERM   004475 G
LOT   = 000010 G      L10003  007070        NEXTSP  030106        RANS    003434 G      SCH   = 140004 G
L$ACP   002110 G      L10004  010040        NEXTU   017126 G      RANSC = 032561 G      SCHBK   002474 G
L$APT   002036 G      L10005  010046        NINUSE= 177774 G      RANW    026422 G      SCHCNT= 000012 G
L$AU    024030 G      L10006  010054        NODEV   005543 G      RANWR   026310 G      SEQEND  003740 G
L$AUT   002070 G      L10007  010062        NOINTM  004670 G      RANWV   026334 G      SETCH   010162 G
L$AUTO  023272 G      L10010  021272        NRDYM   023656        RASFR   026374 G      SETDEF  007766 G
```

```
SETRW   010206 G    TRAP4   023706 G    T$LAST= 000001    T1      024134 G    WRTY    014614 G
SETUP   011172 G    TSAM    004705 G    T$LOLI= 000000    T1SWB   003523 G    WRTYCT  003316 G
SFF   = 105010 G    TSBA  = 002514 G    T$LSYM= 010000    T1.1    024144      WRTYER  003464 G
SFPTBL  002204 G    TSC.FC= 177717 G    T$LTNO= 000005    T1.10   024554      WRTYFG  003463 G
SFR   = 105410 G    TSC.TC= 177761 G    T$NEST= 177777    T1.11   024574      WRUNR   002776 G
SOFINI  007072 G    TSDB    002514 G    T$NS0 = 000000    T1.12   024660      WSM   = 140006 G
SRF   = 104010 G    TSMD    031235      T$NS1 = 000005    T1.2    024350      WSMBK   002506 G
SRR   = 104410 G    TSNP    003534 G    T$NS2 = 000002    T1.3    024374      WSSR    012700 G
STAERM  006120 G    TSSR    002524 G    T$PCNT= 000000    T1.4    024414      WTBF    031305
STAER1  006436      TSSREG  003454 G    T$PTAB= 010043    T1.5    024434      WTBUF   002316 G
STAER2  006616      TSUNT   003532 G    T$PTHV= 000001    T1.6    024454      WTM   = 100011 G
STAER3  006675      TSVCT   002534 G    T$PTNU= 000001    T1.7    024474      WTMFLG  003456 G
STAER4  006733      TS.A16= 000400 G    T$SAVL= 177777    T1.8    024514      WTR   = 101011 G
STAER5  006753      TS.A17= 001000 G    T$SEGL= 177777    T1.9    024534      WTV   = 104105 G
STAER6  006562      TS.NBA= 002000 G    T$SIZE= 000005    T2      025622 G    WTVERM  004430 G
STAER7  006530      TS.NXM= 004000 G    T$SUBN= 000000    T3      026456 G    WTYBRF  015066
STAFLG  003526 G    TS.OFL= 000100 G    T$TAGL= 177777    T4      026652 G    WTYCMD  015062
SVCGBL= 000000      TS.RMR= 010000 G    T$TAGN= 010045    T5      027032 G    WTYWRD  015064
SVCINS= 000001      TS.SC = 100000 G    T$TEMP= 000000    T5WEOT  027612 G    X$ALWA= 000000
SVCSUB= 000000      TS.SPE= 020000 G    T$TEST= 000005    UAM   = 000200 G    X$FALS= 000040
SVCTAG= 000000      TS.SSR= 000200 G    T$TSTM= 177777    UNIWLK  005653      X$OFFS= 000400
SVCTST= 000000      TS.UPE= 040000 G    T$TSTS= 000001    UNL   = 100412 G    X$TRUE= 000020
SWBFLG  003520 G    TS1MD   002312 G    T$$AU = 010016    UNREC   003470 G    X0.BOT= 000002 G
SWB.C = 010000 G    TS5ADR  027770      T$$AUT= 010013    URERM   005041 G    X0.EOT= 000001 G
SWSET   004231 G    TS5CL   002564 G    T$$CLE= 010014    VFEXC   016130 G    X0.LET= 020000 G
S$LSYM= 010000      TS5INT  002554 G    T$$DAT= 010044    VFISU   016356 G    X0.ONL= 000100 G
TCCRA   013372      TS5IN0  010034 G    T$$DU = 010015    VFYCNT  003346 G    X0.RLL= 010000 G
TCC0    013412 G    TS5IN1  010042 G    T$$HAR= 010040    VFYDAT  016044 G    X0.RLS= 040000 G
TCC1    013430 G    TS5IN2  010050 G    T$$HW = 010000    VFYFLG  003516 G    X0.TMK= 100000 G
TCC2    013446 G    TS5IN3  010056 G    T$$INI= 010012    VFY.C = 000100 G    X0.WLK= 000004 G
TCC3    013556 G    TS5SW   002574 G    T$$MSG= 010003    WAITF   007204 G    X2.BFE= 000100 G
TCC4    013574 G    TS5UNT  030014      T$$PC = 000001    WLKCHK  007356 G    X2.EFE= 000200 G
TCC5    014210 G    TS5VCT  030005      T$$PRO= 010011    WLKZRO  011734      X2.OPM= 100000 G
TCC6    014306 G    T$ARGC= 000003      T$$PTA= 010043    WRBC    002626 G    X3.DCK= 000010 G
TCC7    014450 G    T$CODE= 001004      T$$RP1= 010010    WRECL = 000020 G    X3.RNY= 157400 G
TC2RTN  013554      T$ERRN= 000002      T$$SOF= 010041    WRR   = 105005 G    X4.HSS= 100000 G
TIME1   003436 G    T$EXCP= 000000      T$$SRV= 010007    WRREC   002766 G    X4.RCE= 040000 G
TIME2   003440 G    T$FLAG= 000041      T$$SUB= 010033    WRT   = 104005 G    ZROPAT  011704
TOERM   004453 G    T$FREE= 032016      T$$SW = 010001    WRTCHK  007270 G    $LSTIN= 000001
TOOMM   004727 G    T$GMAN= 000000      T$$TES= 010037    WRTCHR  007436 G    $LSTTA= 000001
TRAPD4  003530 G    T$HILI= 000010

. ABS.  032016      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  26197 WORDS  ( 103 PAGES)
DYNAMIC MEMORY:  20346 WORDS  ( 78 PAGES)
ELAPSED TIME:  00:17:56
CVTSEA0,CVTSEA0/-SP=SVC34R/ML,TSV1E,CVTSEA.SRC/EN:AMA:ABS/DS:GBL
```